



**INFORMATION TECHNOLOGY
VISION 2025
2022**



Today, digital technology has become a necessity in citizens' life with internet access becoming as much as essential as water supply systems and road network. We have experienced the pivotal role played by the IT during the Covid19 pandemic and Mumbai.

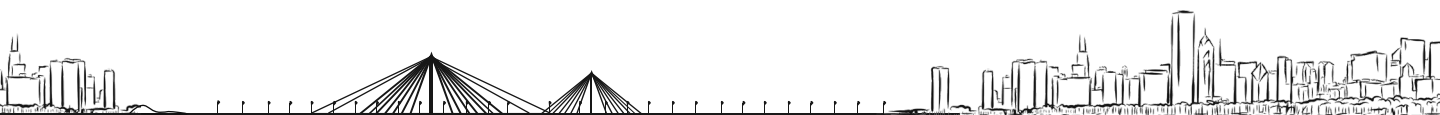
Digital channel is becoming the most prominent delivery mode for services accessed by businesses and households. Also, digital media has been fast shaping the opinion of people, increasing collaboration, and enhancing engagement.

The city IT strategy provides a structured action plan for Mumbai to become truly digital. The purpose of IT Strategy is to set an agenda with clear goals before the city administration to provide digital ecosystem comprising Digital infrastructure, Digital services and cashless payment ecosystem, Digital platform for collaboration and Digital Enterprise to rank higher on reliability. It explores the ways in which technology can be used to innovate and find solutions to urban challenges faced by the city. It will equip BMC and Mumbaikars with digital tools to enhance city governance and quality of life. Mumbai, being the center of IT, is well placed to gain benefits from this IT strategy.

With active participation and support from its citizens, I am sure the strategy will help bring about digital transformation for the city of Mumbai. I would like to assure you that together with my leadership team, this will be given highest priority to make it a success.

Thank you for your support.

Dr. Iqbal Chahal (IAS)
Municipal Commissioner
Brihanmumbai Municipal Corporation





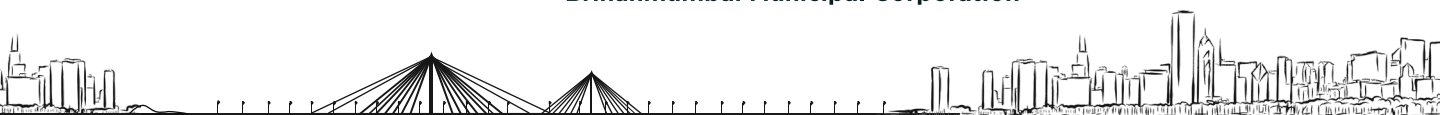
It will not be an exaggeration to state that today technology has literally saved millions of lives across the world. The COVID19 pandemic is just one example of how technology was rapidly embraced by even those who had huge mental blocks or fear towards going digital. It is technology again which connected the best of the minds across the world and facilitated knowledge & coordination to even help develop vaccines in record time.

While Government bodies including BMC had made several IT investments very early on, the need and focus on user experience, ease, speed, reliability, predictability and data analytics had so far been best showcased by corporates, influenced & determined by user demands and stickiness exhibited. A calamity like COVID19 pandemic accelerated adoption of latest tech such as video conferencing apps to efficiently plan & coordinate, social media platforms to rapidly & better communicate, engage, monitor and show impact, tools to collaborate and collect inputs & data, dashboards & data analytics to get a firm grip on evolving situations and help drive data based decisions, use of mobile apps, chatbots or even having responsive & adaptive websites integrated with an ecosystem to amplify outreach. It also gave an opportunity to convince the employees how these tech tools can in fact make their lives easier and more efficient. Much of what BMC did in the recent years from technology & Analytics perspective, also in close collaboration with some of the most reputed & big tech organisations, has been well acknowledged by citizens, media & leadership across India and world.

Assessment of situation, challenges, constraints & aspirations, analysing the trends, strategy designing, coordination, implementation, monitoring, etc. all can be greatly enhanced by usage of right tech solutions. BMC's IT team worked relentlessly to improve, and in fact, rapidly transform several aspects in the recent times by massively increasing the coverage & bandwidth, improving the experience, creating more avenues to connect right & useful information with the citizens and partners. There were several trainings and interactions organised with the corporates and tech companies which were studied so as to emulate their models for better governance within BMC. Best tech strategies & practices of other cities were studied. Tech solutions were evaluated even on aspects such as practicability, scalability and sustainability.

All this has culminated in the articulation of the BMC IT Vision captured in the document. The intention is to have the contained elements as guiding milestones so as to improve citizen and staff experience, to bring in structure & accountability, and also to strengthen the organisation by smart & effective use of technology. I am confident that the IT team and the various departments within BMC will make rapid progress in effective implementation of the initiatives captured in the document. My best wishes to the team.

Ashwini Bhide (IAS)
Additional Municipal Commissioner (Eastern Suburbs)
Brihanmumbai Municipal Corporation





In today's ever-changing world, there is no room for standing still and we must embrace innovation at every turn.

To progress, we must have clarity of vision, a true sense of purpose, inclusiveness, unity and a shared resolve to capitalize on opportunities. Just as importantly, we should act together with a sense of urgency, as time is our most precious resource.

Transformative change means reviewing every aspect of service delivery and asking how technology can do it better. BMC's IT Vision is about helping the city to adopt technology to achieve its key outcomes, economic growth and become a developed class region.

I congratulate the entire BMC IT team for putting up this ambitious plan and wish them all the best for future development.

Sharad Ughade
Director-IT



All of us have experienced the full power and impact of IT & Analytics, more so in the recent COVID19 pandemic times. Before that and even now, our lives are shaped by IT & Analytics driven apps across social media, shopping & mobility. IT systems and Analytics have powered, and transformed every aspect of our lives - connectedness, communication, decision making, health, education, investments lot more. They have indeed saved and enriched several lives! With constant exposure to the innovations across the extremely connected world, the expectations and ambitions too are getting constantly rethought and calibrated accordingly.

The IT Vision document captures and articulates several initiatives after a lot of introspection, very thoughtful study tracking emerging requirements, expectations, initiatives and latest & upcoming technology, careful assessment of present & evolving needs.

All these elements should serve as a lighthouse to the organisation and other similar emerging aspiring entities. These initiatives and investments will certainly and immensely help the citizens, the employees, and the organisation.

Shubhendra Kanade
Chief Analytics Officer

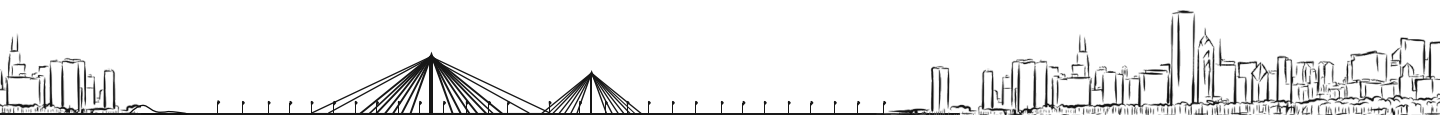


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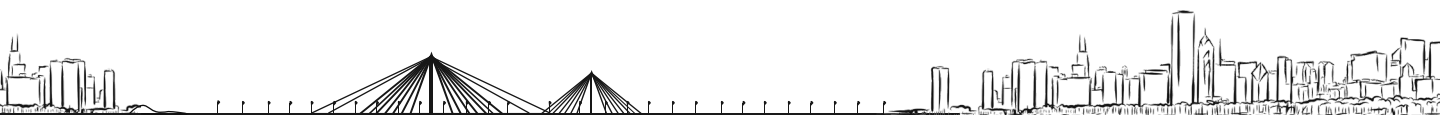
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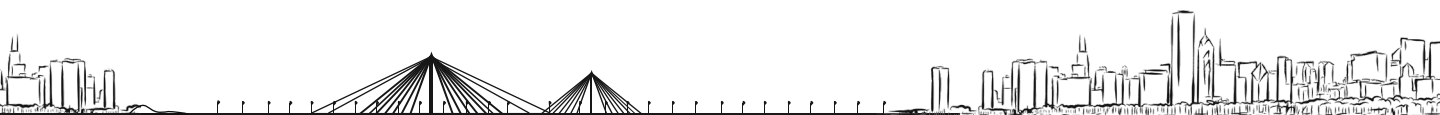
INTRODUCTION —

BMC has been at the forefront in providing the latest technology-based solutions for governance as well as facilitation of citizen services. The IT based initiatives started in the BMC as early as the year 2000, paving way for providing robust as well as diverse and innovative solutions.

Over the years, the BMC ecosystem has matured along with the digital systems, the staff as well as citizens have become conversant in the adoption and use of technology, provided by the BMC. This is a huge accomplishment considering the size, diversity and complexity of the transactions and the services. Over the years, all BMC offices too have been connected through a high availability network as well as end devices.

Due to the rapid changes in technology and the increasing demands of citizens, Government agencies must adopt a different approach. This includes service delivery; manner of communication both internal and external; and most importantly, the way the Government addresses evolving civic needs.

BMC IT vision, launched in Sept. 2022, is the first of its kind for BMC and attempts to drive change in the way BMC serves its citizens. This document includes the BMC IT vision and the approach to be adopted for its implementation. It outlines the current as well as future initiatives and strategies aimed at combining and leveraging technology, innovation, engagement, access and efficiency. It also reflects the changing values and roles of the City's technology office in Municipal Government.



APPROACH TO THE IT VISION

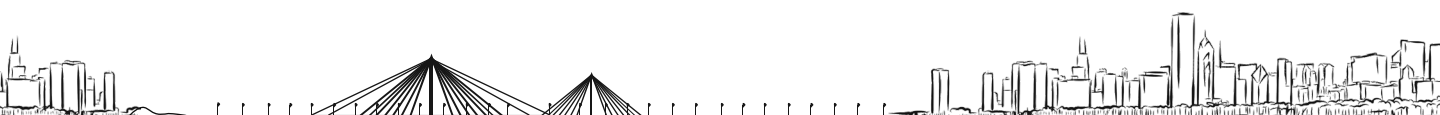
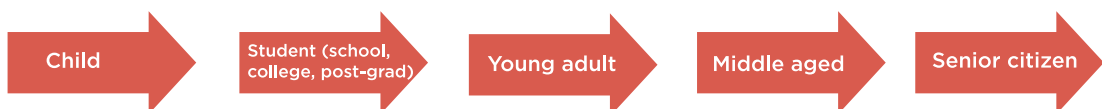
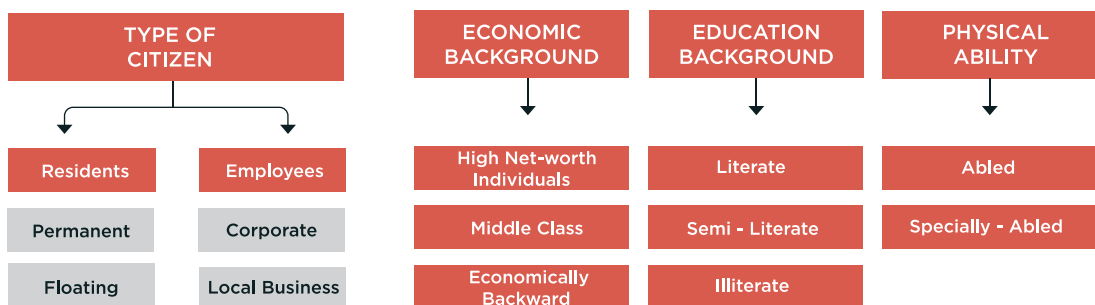
A five-point approach is adopted for creating the IT Vision. At the heart of this vision is the Mumbaikar and associated factors. This includes knowledge of:

1. Who is the Mumbaikar
2. What BMC does
3. Where we are vis-a-vis global cities
4. Know The Global Benchmarks For Cities
5. What are our challenges

1. WHO IS THE MUMBAIKAR - KNOW THE PEOPLE TO SERVE THE PEOPLE BETTER

Mumbai is a melting pot of individuals from multiple walks of life, from multiple regions, religions, economic strata etc. Due to the advancements in communication, the penetration of mobile and internet, and exposure to life in other western countries, the Mumbaikar of today has become a 'Glocal' citizen; global yet local. The awareness and expectations of this Glocal citizen is diverse requiring solutions at par with global cities. These solutions are the need of the hour.

Inclusiveness and fair access to citizens can be achieved by providing services to each of the following segments, as the requirements as well as the medium of service delivery is unique.



1. Type of Citizen:

Mumbai is a unique and historical city, host to great facilities, good opportunities for employment and a densely residential urban landscape. On account of this, Mumbai not only has people that reside in the city but also travel to Mumbai either daily or for extended periods of time.

2. Economic Background:

Mumbai, home to about 13 million people, holds almost \$1 trillion of private wealth. However, it also has people that earn daily wages and keep the city running.

3. Literacy:

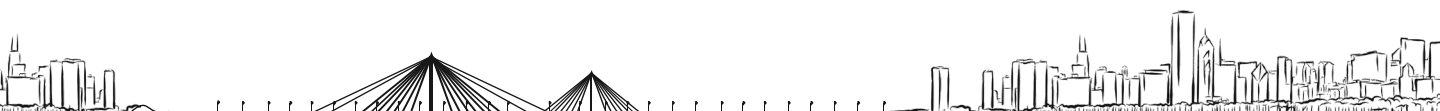
Mumbai has citizens with varied educational backgrounds and not all of them are digitally literate. These citizens may avail services, permissions, certificates.

4. Physical Ability:

There is a section of the population that is differently-abled and that needs to be heard and engaged with as much as those (if not more) who are physically abled. It is extremely critical for the city's administration to be inclusive and plan for interventions that reach out to its citizens including the marginalized section.

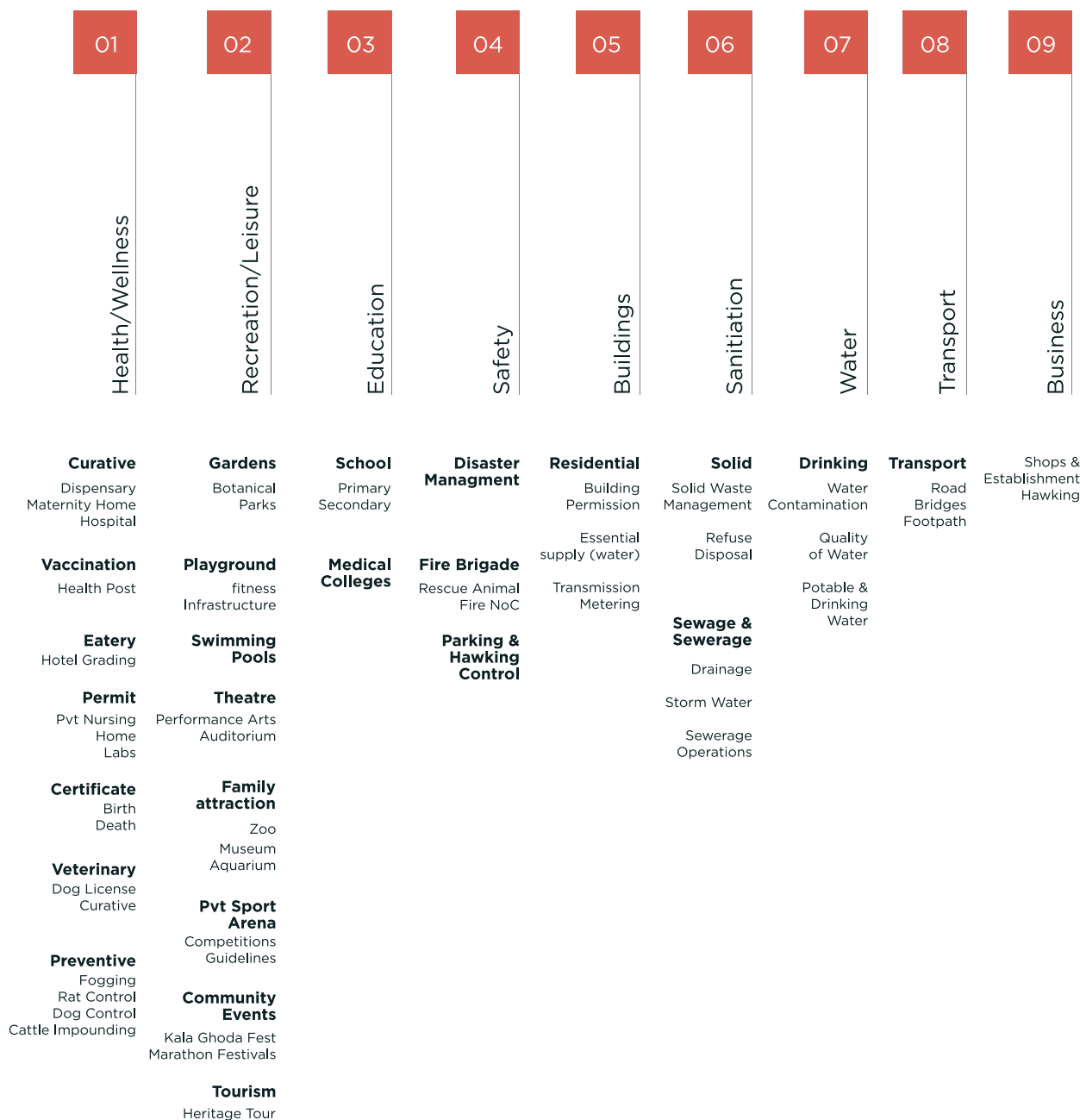
5. Stages of Life:

People are in various stages of life - from new born to seniors. Everyone has different needs and expectations from the city in terms of safety, security, opportunity and facilities. BMC endeavors to cater to all the aforementioned civic needs.



2. WHAT BMC DOES - KNOW THE SERVICES

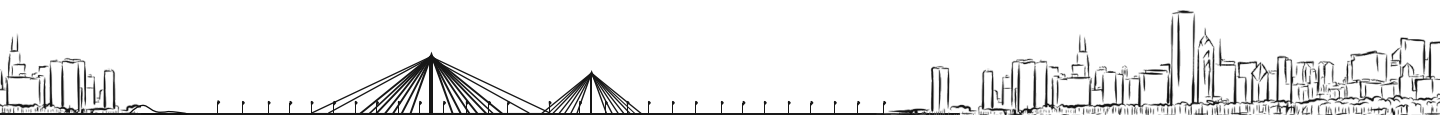
Keeping in step with the times, BMC would like to integrate and synchronize its service delivery. The services provided by the BMC are grouped according to the different aspects of citizens requirement. This grouping would guide the departments in working collaboratively and view their work holistically to achieve global benchmarks for safety, inclusivity, livability and sustainability. This in turn will benefit the citizens community at par with the best cities globally.



3. WHERE ARE WE VIS-A-VIS GLOBAL CITIES

BMC is one of the pioneers in providing citizen services through multiple service delivery channels. BMC's IT Department provides various Digital Services to other BMC departments which includes technical guidance on software development / maintenance, hardware / networking equipment procurement / maintenance and training pertaining to Information Systems. BMC's IT Department is responsible for deployment and operations of various IT Infrastructure on a hybrid Cloud based environment.

SERVICE DELIVERY CHANNEL	APPLICATION	INFRASTRUCTURE
<ul style="list-style-type: none"> • Portal • Mobile App • WhatsApp Chatbot • Citizen Facilitation Centre (CFC) 	<p>IT Department Managed SAP S4 HANA, SAP SRM, SAP CRM, SAP Enterprise Portal, SAP BI, Geospatial Information System, Vehicle Tracking Management System, Hospital Management Information System, Email, e-Office, Video Conference, Collaboration & productivity tools</p> <p>User Department Managed Property Tax Management (P tax), Water Tax Management System (Aqua), Building Plan Approval Management System (Auto DCR), COVID Data Management System (SEER), Removal of Encroachment, ICCB by Disaster Management</p>	MPLS Connectivity 9088 Desktop Computers 2271 Printers 1324 Scanners 501 Laptops 100 Tabs Data Center Cloud & On Premise



4. KNOW THE GLOBAL BENCHMARKS FOR CITIES

The most successful urban areas are those that connect their growth with economic demand, and then support this with comprehensive plans, policies and investments. In a post pandemic world, economic recovery and growth will be the focus area for most, if not all, city governments. Economic growth is an amalgamation of multiple factors under three critical heads -

- Quality of Life (Health Security, Education Security, Infrastructure Security, Personal Security, Digital Security),
- Sustainability (Environmental Security) and
- Economic Growth/Opportunity.

The above 3 factors have been identified to be focused upon by the BMC IT Department after an in-depth assessment of the following documents:

1. Government of India's Ease of Living Index
2. Government of India's Municipal Performance Index
3. The Global Safe City Index
4. World Bank's Ease of Doing Business Index
5. United Nation's Sustainability Development Goals 2030.

The summary of the assessment is provided in the annexure to this document. These identified benchmarks would anchor the entire vision for every intervention in the city involving IT.

5. WHAT ARE OUR CHALLENGES

Economic Asymmetry

- Wealth of opportunity
- Erosion of middle class in developed economies

Disruption

- Disruption of business models
- Blurring of industry boundaries
- Rapid technology changes

Climate

Effects on our natural environment being seen in the form of

- Extreme Weather
- Rising sea levels

Age

Demographic pressure on:

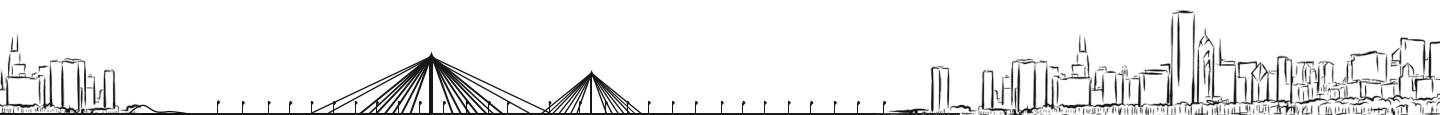
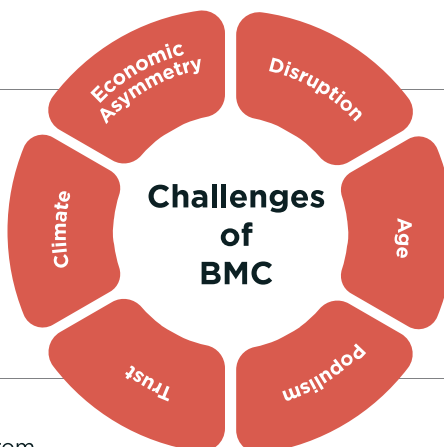
- Businesses
- Social Institutions
- Economies
- Families

Trust

- Expectation of transparency from the institution and new technology

Populism

- Large & Diverse segments to cater to



VISION AND MISSION

1. IT Vision Statement

“Use data to be the technology-driven catalyst that empowers the Municipal ecosystem to achieve globally accepted benchmarks for Quality of Life, Environmental Sustainability and Economic Growth”

2. IT Mission Statement

“To enable technologies to strengthen the administrative backbone, efficiently manage delivery of core functions, provide a pleasant citizen experience and use data for efficient decision-making”

3. City of the Future

1. Building of the City of the Future Collaboratively:

Technology driven engagement between BMC, Citizens, Business and Academia to prepare a comprehensive plan, use design thinking approach to understand the needs, work collaboratively on service design and adoption, and build a sense of pride and satisfaction in building the city of the future. Established and popular technology platforms would be leveraged for the same.

2. Agile and comprehensively connected IT System:

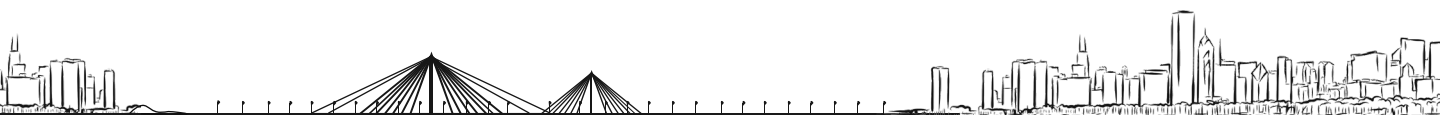
Doing more with Less must be the goal. Increase in productivity and minimum physical interaction with public through optimal digitization of administrative and core functions of departments would be the approach adopted to achieve this.

3. Exceptional Citizen service Delivery:

Faster adoption of latest comprehensive technology to provide reliable as well as a simple service delivery system considering inclusivity and areas of impact indicated in the global index for Cities would be targeted.

4. New avenues for Saving to earning revenue:

Right from saving on IT technology spend due to economies of scale and standardization across BMC IT systems, to monetizing data to reduce the tax payer's burden and more importantly aiding non-BMC organizations in providing timely and better customized services.



IMPLEMENTATION STRATEGY

1. Objective

To achieve the IT Vision enterprise level system reliability as well as agility in delivery of services, latest technology, swift aiding of first responders with technology solution in case of disruption, leading and energetic minds and hands on deck, low-cost solution will be pivotal.

2. Guiding Principles

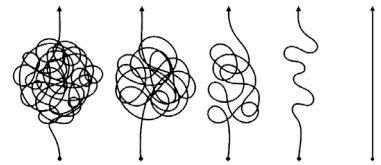
We are Inclusive

We serve and empower residents from diverse language, ability, geographic, and socio-economic backgrounds.



We Simplify

We proactively identify the most urgent and persistent needs of Mumbaikars, then we design engaging, easy-to-navigate services that meet residents' preferences and requirements.



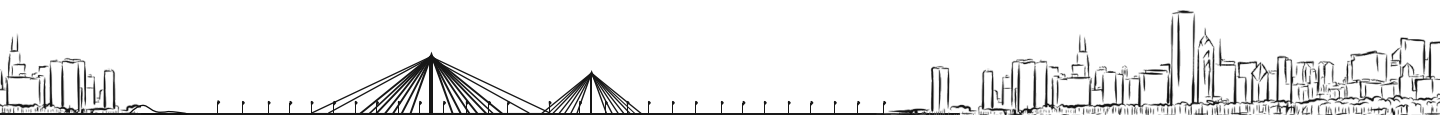
We are Responsive

We develop accurate, responsive services by engaging collaboratively with Mumbaikars, seeking their insights, and responding to people when they interact with us.



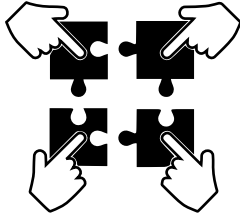
We come to You

We deliver services and information through channels that Mumbaikars already use, and we build on existing resources in Mumbai's diverse communities.



We work Collaboratively

We provide a platform with stakeholders to collaboratively serve Mumbaikars. We develop and share data and platforms to improve all the services City-residents use.

**We improve Trust**

We deliver services that are reliable and accountable; we keep Mumbaikars' personal data secure; and we're transparent about how we use the information we collect.

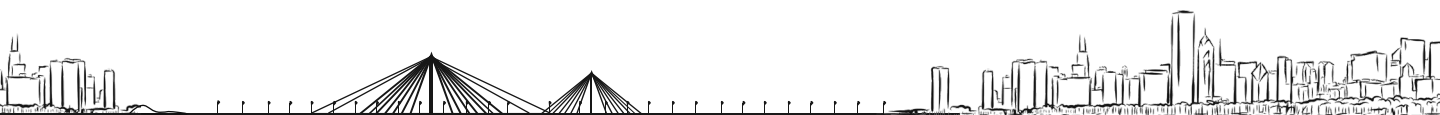
**We deliver Value**

We work to provide technology interventions of high quality at a reasonable price, with fast and immediate access

**3. Scope**

This IT Vision document is rooted in using data and analytics for governance. This data would be useful only when we can ask the right questions to the data. These questions can only be determined if there are appropriate metrics and key performance indicators connected to each initiative. This approach would help the various departments to address the social, economic and environmental aspects critical to work and deliver services efficiently thereby improving the Quality of Life of the citizens and working sustainably for the long term.

The four building blocks for successful delivery of the IT vision are as follows: The BMC IT Department would strengthen the administrative backbone, strengthen governance, core function delivery to enable to departments to provide an exceptional citizen experience and eventually use data for delivering superior services. as follows:



a. Strengthen BMC Department**Strengthen
Administrative
Backbone**

Initiatives targeted
towards improving
efficiency & productivity

**Strengthen
Governance & Core
Function Delivery**

Leverage applications
and technology-led
solutions to strengthen
core function delivery

**Improve
Service
Delivery**

Reliable & secure
platforms with focus
on simple user
interface for pleasant
user experience

b. Facilitate departments, citizens, business, academia**Quality of Life**

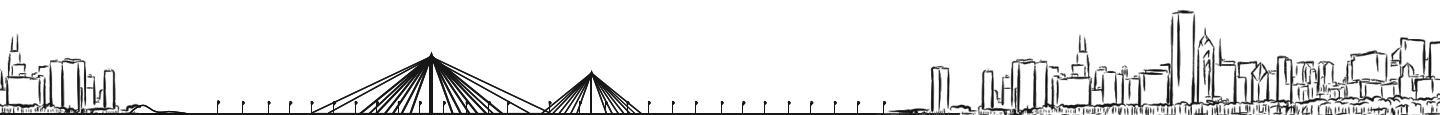
Health Security
Education Security
Infrastructure Security
Personal Security
Digital Security

Sustainability

Environmental
Security

**Economic
Growth**

Economic
Opportunity



c. Redefining IT Department's Role

The IT Department would be the keystone for driving IT initiatives within BMC and future-proofing the Corporation. It would play one or more of the following six roles:

Platform
Provider/
Facilitator

Advisor/
Consultant

Implementation
Agent

Innovation
Collaborator

Capacity
Development
Agent

Revenue
Saving/
Generation

1. Provide a Platform for Initiative Rollout:

In cases where the user departments would like to utilize and build their own applications, the IT Department would provide a platform as a service. This is envisioned to help the department rollout applications faster.

2. Create advisories, policy and frameworks for Technology Implementation:

Departments and wards can use this as benchmark and standards for implementing various initiatives. The IT Department would advise and guide other departments/ULBs on IT implementation.

3. Implement Large City-level Department Agnostic Initiatives:

Centralized Implementation of initiatives spanning multiple departments and across wards shall only be taken up by IT department. The IT department shall provide application development and management services to the various departments.

4. Collaborate with Market for Innovation:

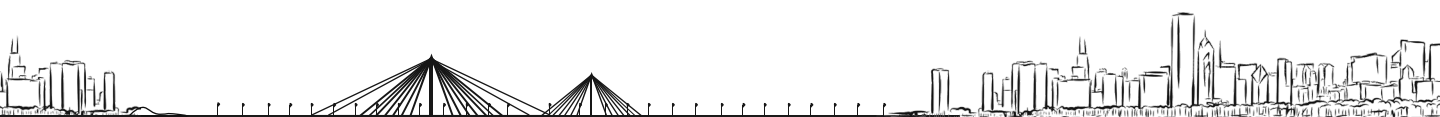
IT department shall collaborate with start-ups, technology leaders for innovative city initiatives and leverage new-tech solution for solving urban problems. The Department already has established connects with the leading industry corporations which are being used to usher in global best practices into BMC

5. Enable Capacity Building for Stakeholders:

Not only IT department employees, but also nodal officers from various departments and wards shall be trained in specific technologies for improving service delivery enabling creation of IT cells at ward level. Additionally, the IT Department would provide the necessary platforms to train the employees in the use of existing and future systems

6. Become a source of revenue:

By offering advice and guidance to other smaller Urban Local Bodies on IT initiatives that can enable them to be more efficient thereby their IT Departments can become self Sufficient. Another potential source of revenue would be the data generated from the various applications in use in BMC. As the use of data in decision-making matures within the organisation, so would the data. An enriched dataset would help deliver better revenue for BMC.



d. Redefining IT Department Resources

First, an acknowledgment that the IT Department should have a dual focus: supporting critical infrastructure that ensures the continuity of City business operations while also creating external, public-facing initiatives that impact the lives and experiences of Mumbaikars.

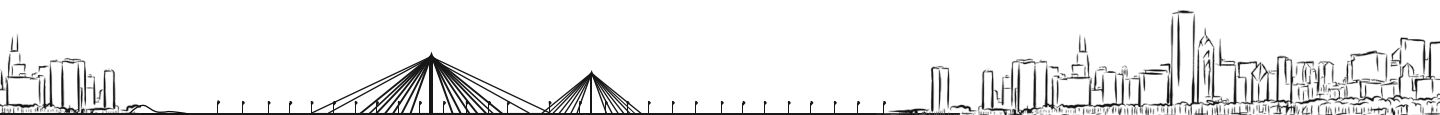
Second, the best way to learn what Mumbaikars want is to ask and involve them in the planning and solution process. Too often in the City's technology planning, government has not been as collaborative as it could be while formulating policies and programs. From a resourcing stand-point, the IT Department would require the following resources to be in place before the Vision can be made into a reality:

	REUTILISATION	HIRING	PPP
People	Restructuring IT Dept, Data & Analytics	Consultant	Interns
Process	Enhancing / Re-engineering	Consultant	Advisory Board
Technology	Optimization	Augmentation	R&D, POC, Incubation Center, Startup

The system that would need to be put in place includes the following:

System of Records	Core BMC System should be High performance, Robust, Reliable, Safe and secure
System of Engagement	Multiple Channels for engagement, Highly responsive, Engaging and Simple
System for Analytics & Monetization	Real time Multi system data without hampering core system performance
System for R&D	Innovative solutions to be developed without affecting delivery timeline and performance of core system

These resources would have to be planned and mustered in a timeframe of 65 days and initiatives would be prioritised, grouped, and delivered in cycles of 100 days each.



GAME PLAN

This implementation game plan has several components. These components may or may not be delivered sequentially but it will start with 'Preparing for the Leap' phase. This phase will lay the foundation for putting the vision into implementation. The four dimensions will help in making the IT Department and BMC as a whole, more agile. The primary objectives of this phase would be to:

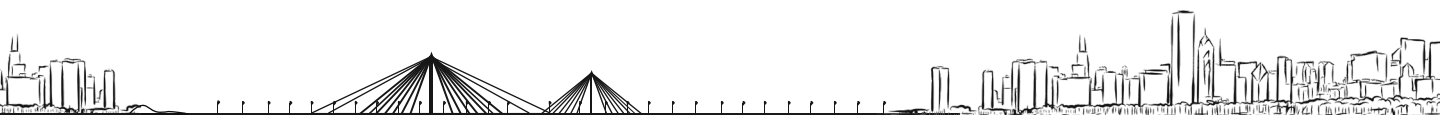
- Strengthen the administrative backbone to increase efficiency and productivity
- Strengthen the core function delivery making them cost efficient and timely
- Improve the citizen experience through exceptional service delivery
- Create and use data acquired from the various applications for service improvement, decision-making and monetisation

GAME PLAN 1: PREPARING FOR THE LEAP

Goal 1: Aligning Resources for IT Dept.	Goal 2: Preparing a culture of Data	Goal 3: Collaboration & experimentation	Goal 4: Prepping for Process Automation
Align people, processes, and technology for prepping the IT department for delivery of vision	<ol style="list-style-type: none"> 1. Building capacity for data analytics 2. Developing dashboards to track progress on key city priorities 3. Creating and implementing a data policy 4. Adopting a Smart City privacy policy 	<ol style="list-style-type: none"> 1. Listen Phase <ul style="list-style-type: none"> • Surveys, Hackathons, Focus Groups, etc. 2. Plan Phase <ul style="list-style-type: none"> • Create a Governing Board • Create an innovation lab • Allocate an Innovation Fund • Collaborate with Education Institutions/ Universities & Business Ecosystem • Run Pitch & Pilot Programs 	<ol style="list-style-type: none"> 1. Adopting an agile and modular approach 2. Organizational and Process Change Training 3. Standardizing Processes 4. Build Capacity

GAME PLAN 2: TAKING THE LEAP

Goal 1: Strengthening Administrative Backbone	Goal 2: Strengthening Goal Core Function Delivery	Goal 3: Improving Citizen Experience	Goal 4: Creating & Leveraging Data Reservoirs
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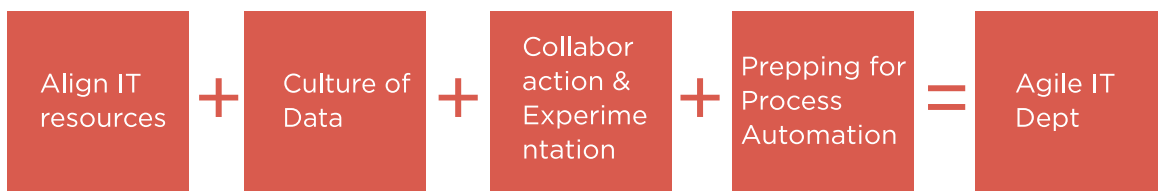


GAME PLAN 1

Preparing for the Leap

We are sufficiently aware that the world that we live in is fast-changing and so are the needs and expectations of its citizens. Unlike the past decade, the citizens as well as businesses and most of BMC departments have stressed on IT-based solution to address the business-as-usual and also disruptions, policy, technology or processes. To meet this surge in demand in a timely manner as well as delivering a trusted and an exceptional user experience, the IT department must become more agile.

In order to attain agility, this vision document lists three dimensions which would create the foundation for leapfrog into the future.



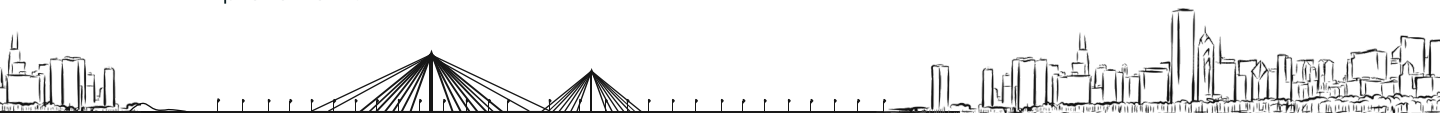
One of the major advantages of having an agile environment is that it will allow BMC to move fast and iterate as the requirements change. This approach will help BMC manage the IT ecosystem effectively.

There is a direct correlation between having an agile IT and increasing the Time to Value (the time between an initial request and the delivery of it) of a Corporation. While it is easy to see why minimizing the Time to Value may be important to organizations, it turns out that the best way to make this happen is through the IT systems.

IT agility is about far more than just adopting new strategic plans and development practices. It requires an entire rethinking of the IT organization to successfully meet the intended goals and move one step closer to complete enterprise digital transformation.

To help adopt this mindset, it is vital that the exploration of technology innovation be supported, as well as the continuous monitoring of systems. By being able to see potential problems that could arise down the road, or be aware of technology-based opportunities, IT is better prepared to create value for the business. In addition, they are also able to shorten development cycle times by adopting rapid application development methods.

Another way to help cultivate this shift early-on is to adjust to customer-centric delivery principles. By designing solutions around customer experiences, small steps must be made followed up by immediate end-user feedback. This practice ensures that the citizen's voice is heard loud and clear, and steps can be made during development to make changes and improvements.



Preparing for the Leap

Benefit

Enables the IT Department to be ready for the implementation of the Vision

Activities

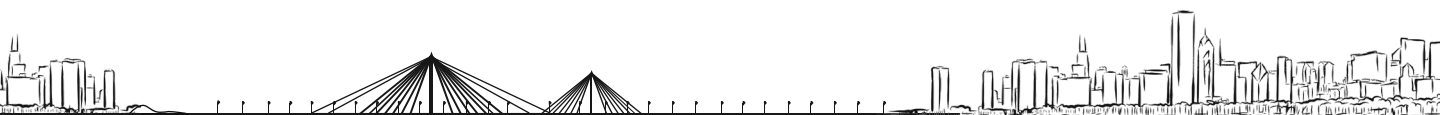
1. Map the roles and responsibilities of the current resources
2. Identify the resources, roles and responsibilities for the implementation of Vision
3. Redefine processes and policies for System of Record and System of Engagement
4. Identify and implement systems for Data Analytics
5. Create a separate ecosystem for experimentation

Goal 1 - Aligning resources for IT Dept

Resources would have to be augmented and aligned under People, Process and Technology. This would involve restructuring the IT Department, creation of a Data & Analytics Cell etc. Subject Matter Experts specially for Change Management and Urban Planning may have to be onboarded for effective rollout of the planned initiatives. The current applications, of which SAP is the core, would have to be reclassified. While the SAP system may become the System of Records, agile and user-friendly system would have to be created as Systems of Engagement.

New systems for processing and analyzing of massive data sets would have to be implemented. These would have to work in conjunction with the System of Records not only in the IT Department but with the other Departments as well.

In order to foster innovation and time-bound delivery, an ecosystem for experimentation that is separate from the current set-up would have to be planned and implemented. This would allow the current systems to continue to perform seamlessly.



Preparing for the Leap

Benefit

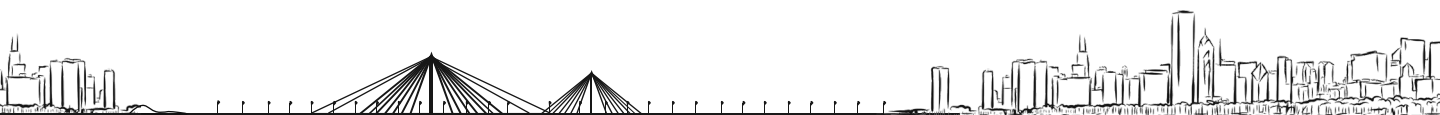
The IT Vision enables BMC staff to use data to make better, more timely decisions; improve services; and create a better user experience.

Activities

1. Empower the city-wide data analytics.
2. Launch a data training program, possibly through an external partnership (e.g., local university or technology training platform).
3. Focus training activities on working through practical solutions to be with departments for more “quick wins.”
4. Update training policies to include training for data analytics and visualization.
5. Establish a bench of on-call analytics consultants
6. Develop data sharing standards for procurement processes to support a data-driven BMC.

Goal 2 - Build capacity for data analytics

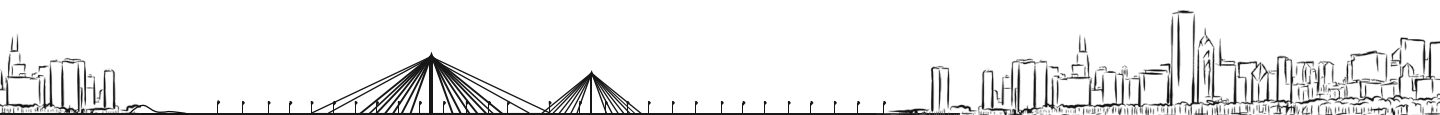
Smart cities evolved from the idea that real-time data can make it easier to manage resources and services efficiently by understanding how cities are working at any given moment. Yet, all the data in the world cannot help city government work better if the processes, tools, and skills to interpret the data are not in place. By adopting a performance management system, Mumbai City can begin by putting its existing data resources, **mainly static data** collected through forms, inspections, and other functions of government, to understand how its programs and services are working throughout the year. It is important to understand this data before adding “Big Data” to the same using different sensors like environment sensors, air quality sensors, rain quantity sensors etc. An effective performance management system will not only provide the BMC Leadership with an objective tool for understanding how the city is performing (and help with adjusting as the year progresses), but also provide it’s staff with the knowledge needed to assess if programs/ initiatives and services are falling short of targets. A transparent approach to tracking city resources and services further adds trust in the Corporation, laying the groundwork for a virtuous circle of collaboration and willingness to participate in the betterment of the community. Cities are inundated with data like never before. As we introduce new real-time “vital signs” to track how the city is functioning and serving the community, it is important to merge the lessons from historical data with the cascade of new data from social media, instrumented physical spaces, engagement tools, etc. This will help to identify patterns and high-return points of intervention for service optimization, cost-savings and cross-departmental collaboration. Local governments do not typically have data scientists on staff to lead this information revolution so it will be important for IT Department to support training and capacity-building within the Corporation.



Preparing for the Leap**Goal 2 - Build capacity for data analytics****Data analytics can be used to:**

- Find trends
- Predict outcomes
- Increase the speed by which you can make informed decisions
- Gauge Citizen satisfaction

These actions should complement and run concurrently with the next initiative, Develop dashboards to track progress on key city priorities, as the IT Department will help build an integrated approach to using data to manage and track outcomes across services, programs and functions and is essential to equip staff with the skills they need to be most effective and successful.



Preparing for the Leap

Benefit

The IT Department helps facilitate civic engagement and general understanding by openly sharing the ongoing progress in meeting key policies and goals for Mumbai City.

Activities

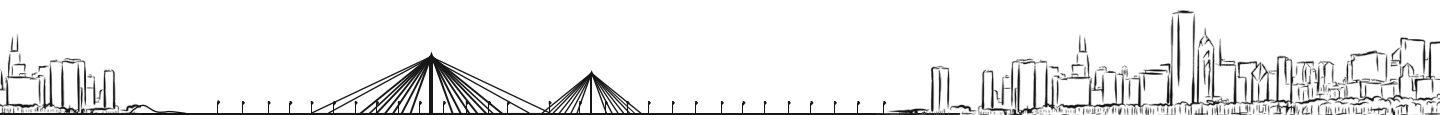
1. Identify key performance indicators (KPIs) for all departments.
2. Create an IT Department dashboard and develop other organization-critical dashboards.
3. Develop public-facing dashboards to track these metrics.
4. Track lessons learned and develop a standard operating procedure for replicating dashboards across city departments.
5. Identify other “early adopters” who are willing to get engaged as a way to launch a citywide performance management system.
6. Maintain and regularly share standards, assumptions and best practices across the organization.

Goal 3 - Develop dashboards to track progress on key priorities

This is a two-step initiative that should help build momentum for a future citywide/comprehensive data-driven management system which would include training, analytics, visualization and an online, shared dashboard for reporting. The dashboard provides staff and management with an at-a-glance tool by displaying the progress on key metrics (either real-time or scheduled). This not only enhances accountability and transparency for the general public but also provides commissioners, administrators and staff with a practical tool for overseeing and troubleshooting city services and programs.

It may take time to introduce this data-driven management style but it is important to work closely with BMC personnel to illustrate how it can empower them in their work. To start with, the BMC IT Department should launch a dashboard to track the various strategies herein, either through the City’s Open Data Portal or a standalone application. It will be important to document the processes and key lessons learned and then host an internal best practice exchange with other city departments. It can be challenging to identify the right metrics (and associated data) if they are not clearly defined but this exercise can benefit staff who are unfamiliar with this process by giving them an opportunity to participate in their development. IT Department would then build on this initial effort by developing a dashboard to track mission-critical efforts by the City. The ultimate objective is for IT Department to evolve these dashboards into a citywide performance management system. In the meantime, there is considerable value in the exercise of establishing metrics and identifying what data is being pulled; understanding the quality of data; and organizing it for sharing that can reveal inadequacies in available data and opportunities for future data collection.

The IT Department has already embarked on a journey to build a comprehensive Performance Management System by creating stand-alone dashboards for complaint redressal, e-tendering, Project Systems and Advertisement.



Preparing for the Leap

Benefit

BMC will use data responsibly and will establish clear procedures to protect personal privacy

Activities

1. Review existing city policies and best practices.
2. Draft a citywide data policy for BMC
3. Adopt an updated privacy policy that incorporates smart city technology along with staff training on the subject.
4. Integrate the privacy policy into the procurement process by adding the language to all future contracts requiring data sharing between parties.
5. Consider designating privacy stewards to work within city departments to help manage the policy, train on best practices, and support a culture of data.
6. Create a schedule for routine reviews of the adopted policy to ensure it is meeting the needs of the City and community.

Goal 4 - Creating and implementing a data policy and Smart City Privacy Policy

Creating and implementing a data policy

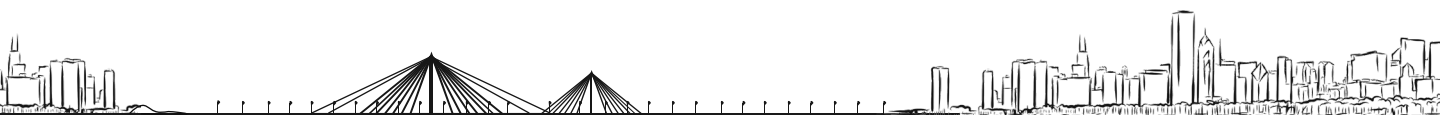
City Data Policy is the first significant step in the direction to provide conceptual clarity over accessing and sharing protocols over city data. Data Policy must address concerns like data classification, categorization, archival, security, privacy, ownership, etc. The absence of a City Data Policy also acts as a barrier towards setting up a data economy at the city level. City Data Policy provides clarity around ownership of data, legal framework, terms of use, etc.

A data policy has to be drafted, after examining the various databases. A data governance policy would be published by the BMC IT Department to facilitate the utilization and access of sharable data and information in both, human readable and machine-readable forms, for enabling evidence-based decision making and participative governance. This would result in improvement in the quality of lives of Mumbaikars, ease of doing business and operational efficiency within BMC

Adopt a Smart City privacy policy

Cities and communities generate data through a vast and growing network of connected technologies that power new and innovative services ranging from apps that can help drivers find parking spots to sensors that can indicate the water quality (pH levels). Such services improve individual lives and make cities more efficient. While smart city technologies can raise privacy issues, sophisticated data privacy programs can mitigate these concerns while preserving the benefits of cities that are cleaner, faster, safer, more efficient, and more sustainable.

The IT Vision includes advancing the citywide policy to define key principles for privacy and data sharing for the Internet of Things, networked

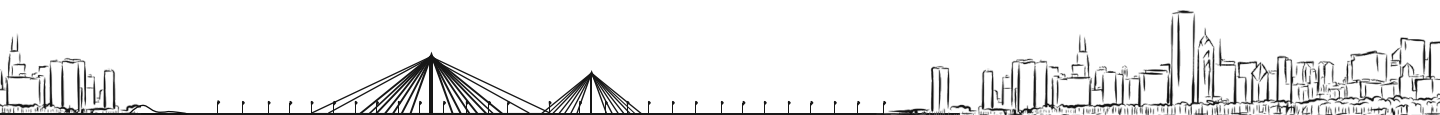


Preparing for the Leap

Goal 4 - Creating and implementing a data policy and Smart City Privacy Policy

devices and other data-exchanging smart city technologies. **BMC has already adopted a digital media privacy policy, but smart city technology introduces new considerations to be added.** The privacy policy should clearly articulate how all the major Smart City projects will meet a minimum disclosure and data sharing agreement as a “public good”. This should include what data is wanted, why it’s wanted, how it will be used, and recourse for the public to verify compliance.

As BMC launches more sensors and applications in the public realm, it will be important to have well-established privacy practices so the community understands what is being done and how the data will be used.



Preparing for the Leap

Benefit

The time-to-market for IT interventions is critical to BMC becoming more responsive and agile

Activities

1. **Solicit ideas** through various channels
2. **Create a Governing board** to monitor the implementation of the IT Vision
3. **Create an innovation lab.** The current **SMILE lab** would be leveraged for this purpose.
4. Education institutes would be tapped for **advisory, research, and capacity building**
5. Local businesses would bring in the **vibrancy and tech know-how** through advisory and technical support
6. Institutions would be used to **run pitch and pilot programs**

Goal 5 - Collaboration & Experimentation

This will involve a two-step process to be able to deliver the right outcomes and create a **vibrant Municipal ecosystem** which leverages participative governance to solve civic problems.

Listen

- As-Is Assessment
- Mapping expectations using surveys & Hackathons

Plan

- Legal commercial and policy documents for tying up with individuals, education institutions, corporates and businesses for incubating & adopting solutions



1. Listen Phase

This would be a call to action for businesses, public servants, academia, civil society and practitioners for solutions to the city's growth challenges. Ideas would be solicited using multiple tools and techniques.

2. Plan Phase

2.1 Creating a Governing Board

A governing board of a mix of start-ups, corporates, academicians, civil society and consulting partners would be constituted to monitor and drive the implementation of this vision document.

Preparing for the Leap**Goal 5 - Collaboration & Experimentation****2.2 Creating an InnovationLab**

The City's Innovation Lab (SMILE) will provide a space for both formal and informal collaboration and cross-departmental work, and support creative activities and workshops around topics like strategic planning, project development and implementation, performance management, and process improvement.

2.3 Allocation of an Innovation Fund

Through the SMILE Initiative, BMC will offer financial and capacity support to innovative pilot projects that seek to improve a City program or process. Individuals and Corporates can work with BMC on solving the problems of the city through their own startups and provide their own funding to upcoming entrepreneurs in the social sector.

2.4 Collaborate with Educational Institutions/ Universities & Business Ecosystem

The entrepreneurial and university communities bring a unique set of talents and creativity to the Mumbai technology ecosystem and potentially to government as well. These communities often seek meaningful ways of testing ideas, services, and products, and Municipal government offers an engaging partner for conducting research and piloting initiatives in a real-world environment. Businesses can provide internships to individuals interested in solving urban problems and thus induce a fresh perspective to solving age old issues. The BMC has already initiated MoU discussions with the likes of the University of Mumbai and signed MoUs with the Indian Institute of Technology Bombay.

2.5 Run Pitch & Pilot Programs

The IT Department will launch the Pitch & Pilot programs to create a pipeline for entrepreneurs, startups, and other innovators to pitch ideas and technical solutions that address Municipal challenges. Urban Hackathons would be conducted to spark new business, generate policy ideas, and co-create innovative urban solutions. A hackathon in collaboration with the University of Mumbai is already in the pipeline in first half of 2022.

Preparing for the Leap

Benefit

BMC is using technology to enhance collaboration and make workflows more streamlined to ensure it will continue to deliver the highest quality services possible

Activities

1. Adopt an **agile and modular approach**
2. **Train the staff** in organisational and process change management
3. **Standardise processes** and establish protocols for improved performance

Goal 6 – Prepping for Process Automation

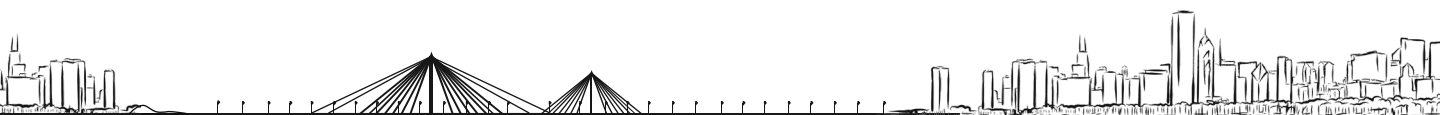
Modernizing legacy business applications requires an especially complex planning and execution process. The city workforce faces demand on its time that are often not understood by IT vendors and even other City workers themselves, and participation that is required during technical development and testing often falls short of what is needed. The result is overly designed applications, delayed projects, and cost overruns. To overcome these challenges and deliver timely and well budgeted solutions requires a change in the way the City manages these projects.

3.1 Adopting an agile and modular approach

A modular approach allows for a product or application to be launched at a much shorter lead time, as the project can be launched with the basic functionalities, to be updated when others are completed. The biggest advantage of an Agile project is that it allows for new ideas to be introduced at any stage. The IT Department will look to adopt this approach in developing and delivering the required solutions to BMC departments.

3.2 Organizational and Process Change Training

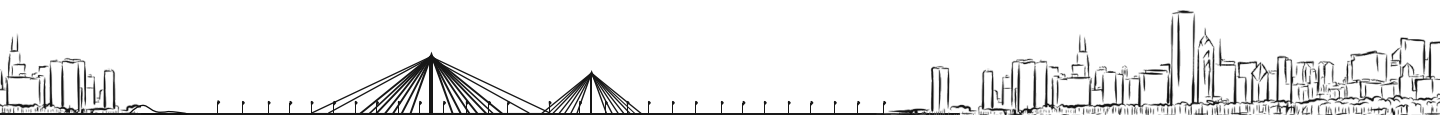
Because managers set behavioral standards in the workplace, it is important that they are on-board with change and are setting the best example and tone for how change is to be received by their teams. Managers should be trained in how to deliver the change message incrementally to their teams, then they should gather feedback from individuals and use this input to influence change. Handling organizational change effectively will significantly reduce associated fear and negativity. Post the training, the managers they will be ready to support their teams as they adjust to change and learn new ways of doing things while feeling secure in the process.



Preparing for the Leap**Goal 6 – Prepping for Process Automation****3.3 Standardizing Processes**

Standards and specifications represent knowledge in the form of regulations and guidelines that are documented in writing and can be easily distributed in both printed and digital formats. Since they are also accessible to everyone, they help people throughout the organization understand each other better so they can react faster and act accordingly. Standards allow technology to work seamlessly and establish trust so that the stakeholders can operate smoothly. They:

- provide a common language to measure and evaluate performance,
- make interoperability of components made by different companies possible, and
- protect citizens by ensuring safety, durability, and equity.



GAME PLAN 2

Taking the Leap

Benefit

Reduces the employee-citizen interaction - a major cause of friction - while improving the turn-around time for menial, repetitive activities

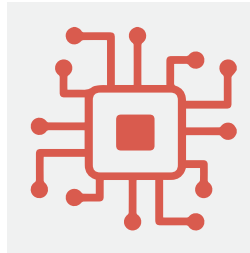
Activities

1. **Survey the departments** and their vision/plans for IT enabled interventions
2. **Review IT Department's role** in enabling the other departments
3. **Plan the rollout** of applications
4. **Provide assistance and training** in adoption of the new applications where required

The IT department would help the various departments to address the social, economic and environmental aspects critical to improving the Quality of Life of the citizens and working sustainably for the long term. This would entail a four-pronged approach as shared below:

Strengthen Administrative Backbone

Strengthen Core Function Delivery



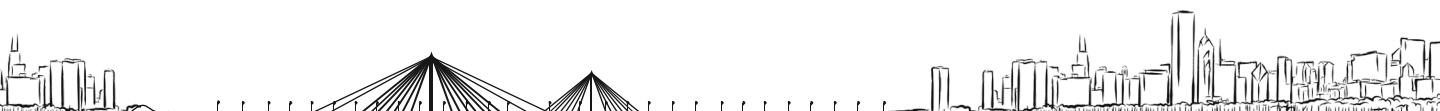
Create & Leverage Data Reservoirs

Improve Citizen Experience

Strengthen Administrative Backbone

Initiatives targeted at improving efficiency and increasing productivity shall be clubbed under this head. Improving the overall productivity of BMC staff would help the staff focus on delivering the core services the various departments provide - from drainage to documentation and from sanitation to safety. The IT Department shall do this by:

1. Making the right technology available to BMC employees for
 - Document tracking
 - Project Monitoring and Contract Management
 - Appointment Management
 - Standard libraries like circulars, meeting, documentation, contract documentation, etc.
2. Incorporating automation wherever possible
3. Enabling collaboration tools for better coordination
4. Increasing employee engagement using channels that are easy to use



Strengthen Governance & Core Function Delivery

Each department provides at least one core service. Applications and technology-led solutions can be leveraged to strengthen the delivery of these core functions. Interventions have to:

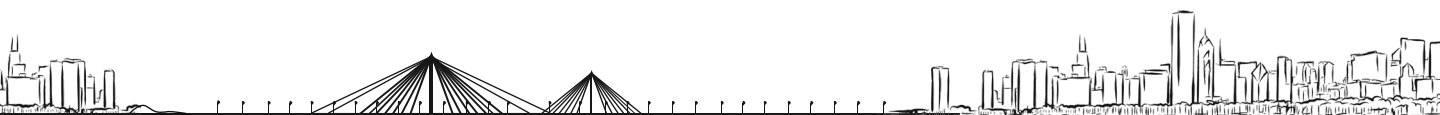
1. Unify BMC across departments and improve the transfer of knowledge and skills among them
2. Help employees understand city's priorities
3. Help make outsourcing, divestment and partnering decisions
4. Enhance BMC's image and build citizen loyalty

The metrics that are part of the various indices and KPIs that are finalised would also be tracked through such solutions and applications, reducing human effort and intervention where possible.

Improve Citizen Experience

The focus on user experience and user interface, beyond the functionality has grown over the last decade. The use of technology must be inclusive and simplified. The platforms must be reliable and secure. Citizens have to be front-and- centre to every citizen-facing intervention and the automation has to be enabled where possible. Through this vision document, the IT Department envisions user-centred design across all citizen applications for a pleasant user experience. The introduction of new services and platforms is also envisioned to drive wider citizen engagement.

One of the guiding principles for this IT Vision is inclusivity. A large number of end-users of the services that BMC provides rarely, if ever, interact with BMC. For example, housewives are most impacted by water-cuts but generally do not interact with BMC. Their interaction is through society offices or other members of the community/family. Similarly, a large number of children that are studying in BMC schools, never interact with the Corporation staff beyond their teachers. They seldom are aware of the work that BMC undertakes beyond the road maintenance, sanitation, and flood prevention. IT interventions have to be designed to engage such citizens.



Taking the Leap**Goal 1 - Strengthening the Administration**

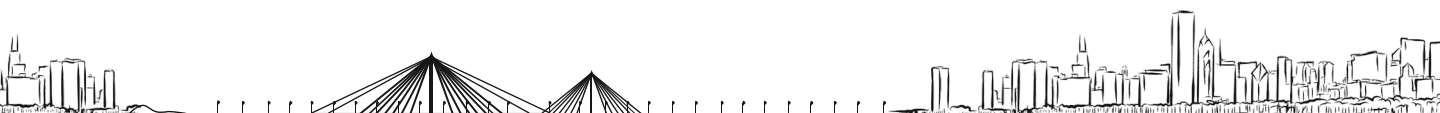
The IT Vision endeavours to make BMC more efficient and productive by using tools for planning office work, tracking and tracing notings, files and letters (dispatch management), from digitizing HR-related activities to the process of procurement, and setting up meetings and appointments.

From an employee stand-point, the IT Department has kept employee welfare in mind and proposed having a mobile-based approach for viewing and submitting travel information, personal HR information and a learning platform for upskilling/refresher trainings.

Goals:	Initiative	Benefit
Goal 1 Public	Online Tracking of application status Digital Appointment system Video Conferencing	Ease and Reduce physical interaction
Goal 2 Employee	Digitalizing HR interaction with local establishment department	Ease and Reduce physical interaction
Goal 3 Administration	Template of Frequently used document related to conducting of Meetings, Presentation, Reporting etc.	Ease, Fast and Reduce physical interaction
	Collaboration tool for Data Collection	
	Online Recruitment - Nursing & all category	

Technology Interventions:

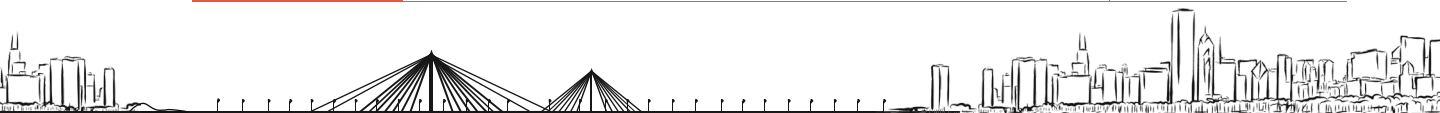
E-Office	Digital Calendar & Appointment Mgmt.	E-Mail solution with collaboration features	Video Conferencing
Shared Drive	Dashboards	Online Recruitment	Online induction Program
Learning Platform	Knowledge Library	Robotic Process Automation	IT Asset Management
IT Policies	IT Policies and Procedures to be documented		



Taking the Leap

Goal 1 - Strengthening the Administration

	Description	New Initiative/ Enhancement to existing application
E-Office	Citizens, Vendors and BMC employees find the current system of tracking files and applications very tedious. Using e-Office for end-to-end dispatch management will bring transparency and efficiency within the ecosystem	Enhancement
Digital Calendar & Appointment Management	Citizens would prefer to be empowered to interact with their ward representatives in a seamless, digital manner. Without having to come to BMC Office, citizens would be able to book appointments with their representatives, and save time and effort.	New
E-Mail	A reliable e-mail system would enable transactions in a reliable manner. Adopting e-mail standards would bring in efficiencies in interactions through the usage of collaboration tools like Sharepoint, Office365 etc.	Enhancement
Video Conferencing	Citizens, vendors and BMC employees, not having to travel long distances for attending meetings but leveraging the power of technology will save time, and effort.	New
Knowledge Library	The IT Department envisions having a one-stop knowledge portal with all circulars and templates for employees to access on-the-go	New
Shared Drive	Using shared drives, employees will be able to work collaboratively, create and share documents, presentations etc. across BMC	New
Dashboards	A cornerstone of data-driven decision making, the IT Department shall help departments to visualise their data in dashboard formats for enhanced decision-making.	New
Robotic Process Automation	A software technology that makes helps to manage mundane & routine activities through automating the same. It increases employee satisfaction, engagement, and productivity by removing mundane tasks from their workdays.	New
IT Asset Management	Set of business practices that combines financial, inventory and contractual functions to optimize spending and support lifecycle management .	New
IT Policies	For streamlining processes and standardising them, the IT department is in the process of drafting IT policies	Enhancement



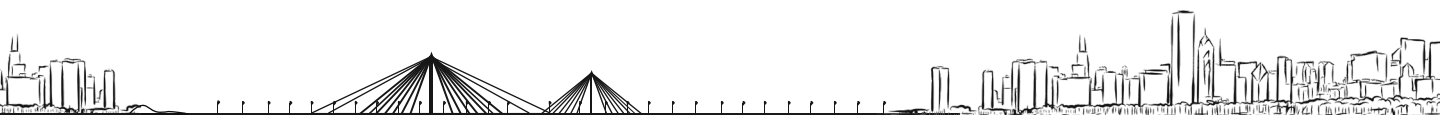
Taking the Leap**Goal 2 - Strengthening the Core Function**

The core function of delivering physical services to the citizens has a huge scope for automation, elimination of redundant activities, standardization and increased efficiency.

The IT Department is not only looking to create new sources of revenue but also optimizing the expenses for BMC along with other ULBs.

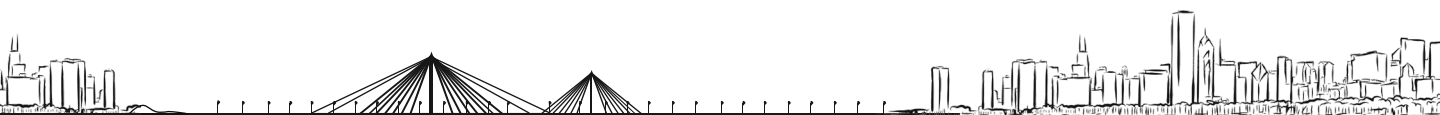
Overall, the IT department will be the enabler of departments to help them achieve globally accepted benchmarks of service quality and city administration. It will look to being more agile while responding to emergencies and disruptions. It will work to create policies, SOPs and frameworks to manage business as usual as well as incidents. It will look to touch the lives of every Mumbaikar from cradle to grave.

Goals		Initiative	Benefits
Goal 1	HOD & Operations team	Interactive Digital KPI driven Service, dept, Project Dashboard	Monitoring and Analysis
Goal 2	Project Management team	Digital Contract Management tool - Scope, SLA, Exit Management	Monitoring
		Project Management Tool	Monitoring & Efficiency
		Repository of circulars	
Goal 3	Department internal working	Digitization of departments Core Function	Efficiency, Reduce Duplication & accountability
Goal 4	Inter department	Integration of services	Efficiency
Goal 5	Employee	Online User Training Security Awareness	



Taking the Leap**Goal 2 - Strengthening the Core Function****Technology Interventions:**

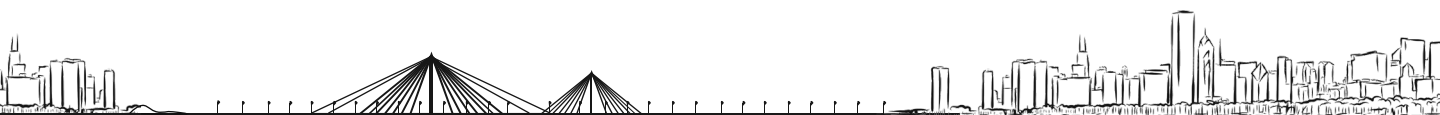
Digital Contract Management	Digital Project Management	Digital Twin (GIS & 3D Mapping)	GIS & Sensor Grid
Collaboration Tool	HMIS & Pandemic Management Applications	AutoDCR	VTMS
Student Lifecycle Management	Integrated Survey Application	Drones	Data Warehouse for Data Management
UID for structures	Digitization of data from multiple Departments (e.g. colony Department)		



Taking the Leap

Goal 2 - Strengthening the Core Function

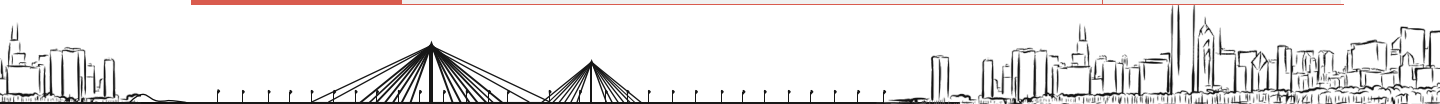
	Description	New Initiative/ Enhancement to existing application
Digital Contract Management	Digital contract management refers to an information system that stores and manages a company's contracts and other contract-related documents. The purpose of the system is to enhance the monitoring of a contract's life cycle from contract negotiations to electronic signature. The system also provide information on the status and development of the contracts so that the company's business operations are managed as efficiently as possible, not forgetting risk management.	New
Digital Twin	A digital twin is a virtual representation that serves as the real-time digital counterpart of a physical object or process. Visualization technologies such as augmented reality (AR) systems are being used as both collaborative tools for design and planning in the built environment integrating data feeds from embedded sensors in cities and API services to form digital twins. For example, AR can be used to create augmented reality maps, buildings, and data feeds projected onto tabletops for collaborative viewing by built environment professionals.	New
Using the GIS system and a sensor-grid	<p>Applications of GIS can be critical to many aspects of governance and a city's development and can help citizens which are distributed across in different parts of the city in the most scientific and transparent manner. Thus, GIS can power and support open-governance methods by involving citizens, enabling information in an easy-to-understand map formats and assist to bring in accountability and responsibility of public and governance activities. Citizens can benefit from the GIS maximally by enabling the mapping of their aspirations, demands, complaints, suggestions and become important stakeholders in a city's development. While different departments in MCGM can represent their asset in digital maps, plan their operations & maintenance effectively & monitor critical assets in order to deliver better services to citizens.</p> <p>Different environmental sensors like temperature, humidity, precipitation, flood management sensors, pollution, air quality would be included integrated with GIS applications to provide us different insights like chronic flooding spots, high-temperature areas, most-polluted areas, etc. These insights will help BMC in taking necessary interventions at those locations.</p>	Enhancement



Taking the Leap

Goal 2 - Strengthening the Core Function

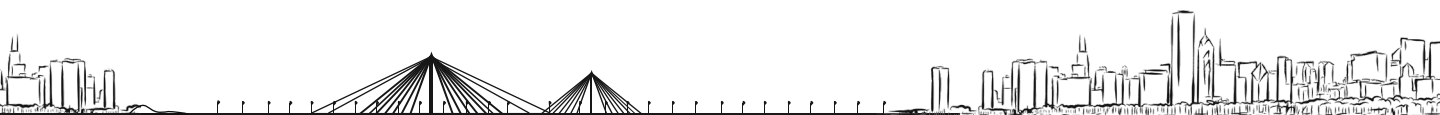
	Description	New Initiative/ Enhancement to existing application
Integrated survey application	This is a standard mobile-based application for carrying out surveys on the GIS platform. This application would be compatible with mobile devices and tabs. Additionally, professional agencies may be empanelled for conducting surveys and capturing public opinion	New
Implementation of Hospital Management Information System	Medical records can be a treasure-trove of information for proactively tracking spread of diseases, sharing of best treatment practices and managing resources effectively. Integration with state and national schemes will save efforts for BMC doctors and allow increased focus on patient management.	Enhancement
Integrated applications for efficient service delivery	Vehicle Tracking and Management System will be integrated with SAP Fleet Management and GIS application. This will enable efficient service delivery.	Enhancement
Student Lifecycle Management application	Student lifecycle management or SLM is a comprehensive data-driven approach that helps manage ' student success ' through their entire journey from admission to alumni.	New
Drones	Drones could provide important and diverse contributions to cities, offering cost-efficient services for everything from environmental monitoring to traffic management. These are involved in a wide range of applications and functions in smart cities. Some of these applications are monitoring traffic, key infrastructures and monitoring development work on a regular basis.	New
New technologies to be adapted	New technologies like artificial intelligence, machine learning and voice and text-based chatbots would be used for efficient and enhanced user experience	New
Data Warehouse for Data Management	A system used for reporting and data analysis. This is considered a core component of business intelligence for data visualization and dashboards. While managing this data, BMC will ensure data privacy & security is maintained at all stages	New



Taking the Leap

Goal 2 - Strengthening the Core Function

	Description	New Initiative/ Enhancement to existing application
Unique ID for structures	A system for assigning unique identifier for all the structures within the city. This would help in removing the duplication of data maintained across multiple departments, maintain appropriate certifications for that structure, arrest revenue leakages and help in efficiently managing the individual units through the unique identifier.	Enhancement
Digitization of data from multiple Departments (e.g., colony Department)	Data across multiple Departments continue to be maintained manually thereby limiting the access, usage, visibility of its data. Digitization would help in adding efficiency to the data maintained by the Departments and increase the transparency of data. This data can be visualised through dashboards and enable BMC leadership to make informed decisions.	Enhancement



Taking the Leap**Goal 3 - Improving Citizen Experience**

Develop additional opportunities for STEM (science, technology, engineering, and math) engagement & programming.

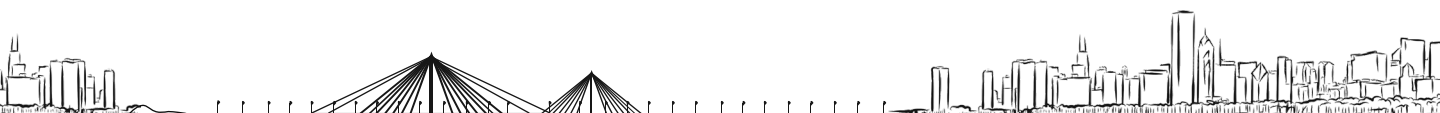
Increasing the quality and scale of STEM teaching/mentoring between professionals and underrepresented students has quickly become a national initiative with the goal of expanding and diversifying the workforce in these professions. In Mumbai, STEM programming has as its primary focus cultivating the next generation of experts and thought leaders in science, technology, engineering and mathematics fields, while also making Mumbai a globally competitive city that fosters economic opportunities for all.

Goals:

Goal 1 Public	<p>Multiple Channels of service Delivery</p> <hr/> <p>Knowledge Channel - BMC Coursera, TEDx, Do-It-Yourself (hobbies and activity videos) College festival</p> <hr/> <p>Information dissemination of Public service Facilities</p> <hr/> <p>Cohort based single window services e.g. Event, Corporate, Student, resident etc.</p> <hr/> <p>Health Management in Slum - Drone</p>	Inclusivity, Future ready citizen, Simple
Goal 2 Administration	Surveillance	Safety, Policing, Planning

Technology Interventions:

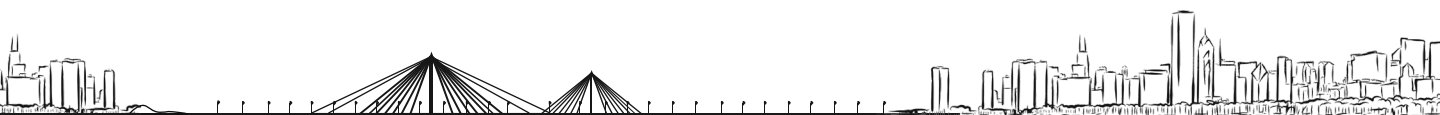
Chatbot & Mobile App	Video Sharing Platform	Customer Relationship Management, AI & ML	Video Analytics
Government Citizen Collaboration Platform	Virtual Classroom	Telemedicine	Smart Payments
BMC Facilities on maps	Career Day booking platform	Smart Elements	



Taking the Leap

Goal 3 - Improving Citizen Experience

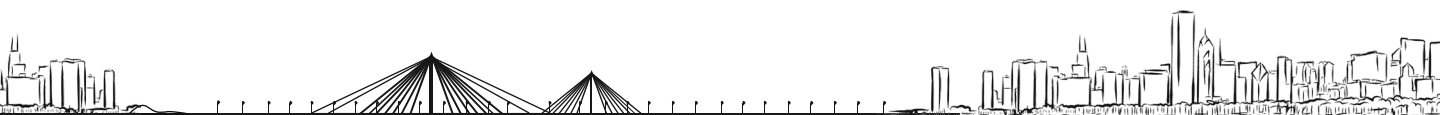
	Description	New Initiative/ Enhancement to existing application
Career Day	<p>Students on the cusp of selecting a career path need guidance and an understanding of the roles of professionals in organisations.</p> <p>BMC, being the employer of professionals like doctors and engineers, can provide such guidance in-person.</p> <p>An online platform to schedule a session with professionals is envisioned by the IT Department. The best of BMC's professionals – MBBS, MD, PhDs, Civil Engineers, Environmental Engineers, Hydraulic Engineers, Urban Planners – can become role models for the young minds.</p>	New
Knowledge Dissemination	<p>BMC is a storehouse of knowledge – be it composting or gardening. The IT department will work with national and international platforms such as (National Programme on Technology Enhanced Learning), YouTube, Coursera, etc. to upload Do-It-Yourself videos and learning modules to monetize the knowledge.</p> <p>Departments will be aligned to create the required videos and content. This would help interested citizens across backgrounds develop a connect with BMC.</p> <p>Since the Gazetted officers of BMC are selected through competitive exams and have first-hand knowledge of working in the administration. Their videos would be used to provide mentorship, guidance and grooming to aspiring candidates in the competitive exams. They would inspire potential future candidates to work with BMC.</p>	New
Virtual Classroom and uploading of lessons to platforms such as YouTube	<p>Use of appropriate technologies to provide students with a virtual learning experience that is on-par with global massive open online courses.</p>	New



Taking the Leap

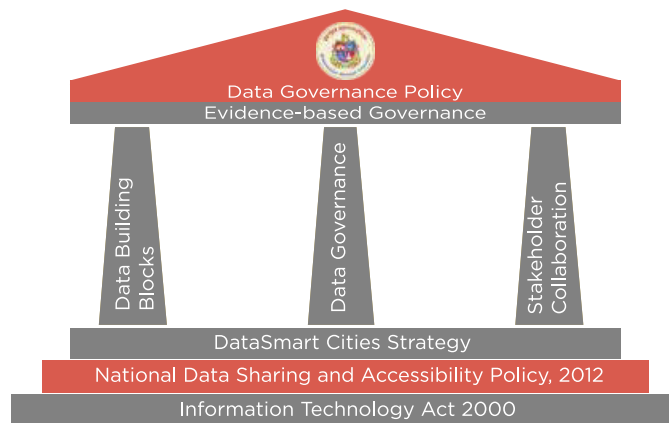
Goal 3 - Improving Citizen Experience

	Description	New Initiative/ Enhancement to existing application
Telemedicine	Remote access to a healthcare facility would enable specially-abled citizens to get treatment at the right time, at affordable rates.	New
Smart Payments- Digital Payment	Adoption of new payment channels would provide ease-of-convenience for citizens	New
Providing on map all BMC facilities and collaborate with private platforms like bookmyshow	Recreation facilities help provide better mental health for citizens. Once, integrated with private platforms, the use of such facilities would increase. It would also increase awareness in citizens of the facilities available in the city for recreation.	Enhancement
Smart Elements	Implementation of smart elements including but not limited to Variable Messaging Displays, Unipoles/Smart Poles, etc. would be considered for implementation	New



Taking the Leap**Goal 4 - Creating & Leveraging Data Reservoirs****Creating & Leveraging Data Reservoirs**

Data is the new oil of the 21st century. In a post Information age, data would be stored, traded and commoditized. To facilitate the utilization and access of sharable data and information in both, human readable and machine-readable forms, for enabling evidence-based decision making and participative governance resulting in improvement in the quality of lives of Mumbaikars, ease of doing business and operational efficiency within BMC, a data governance policy would be published by the IT Department. This would govern both spatial and non-spatial data across BMC. It is envisioned to be based on three pillars as shared below:

**Data Building Blocks**

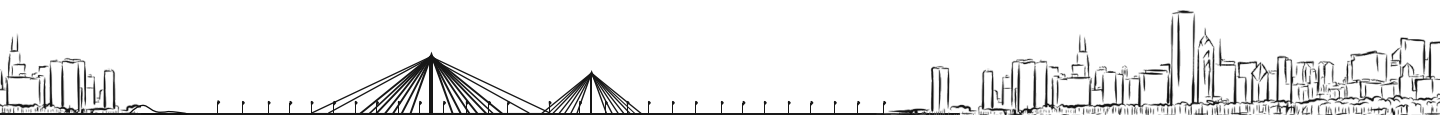
This pillar describes the various aspects that must be addressed while working with the data including ownership, standardization, categorization, classification, access publication, archival & retention, and security & privacy.

Data Governance

This pillar describes the governance structure to be established in BMC to lead, monitor as well as guide the implementation of evidence-based decision making in BMC.

Stakeholders & Collaboration

Several agencies are operating within the city of Mumbai to deliver various projects and services to the citizens of the city. This pillar describes the collaborative approach which must be adopted to ensure evidence-based decision making becomes a cornerstone for effective governance in the city.

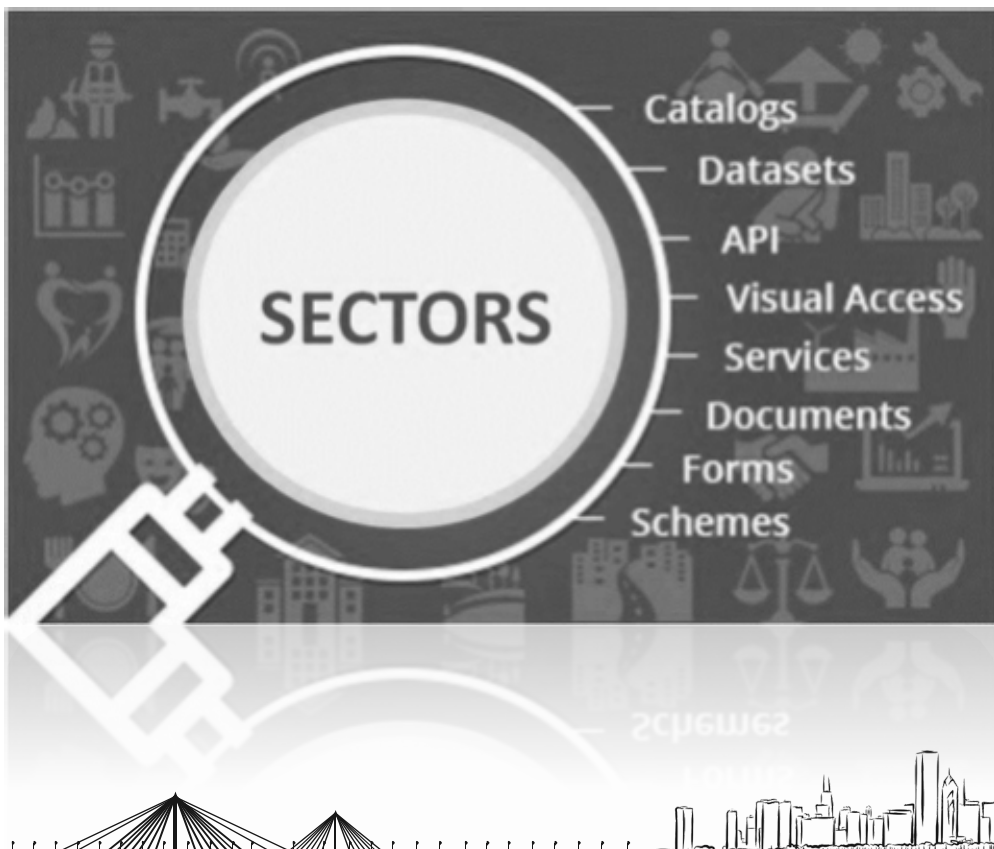


Taking the Leap**Goal 4 - Creating & Leveraging Data Reservoirs****Open Data Portal**

Open Data Portal will help in making the data more accessible. By releasing datasets, we move from paper reports, PDFs, and spreadsheets that reside only on multiple systems, none of which can be easily analyzed or made into applications by others. To release this data, we assist departments in reviewing its quality and providing machine-readable formats that the public can use. Additionally, to contextualize datasets we offer a metadata catalog explaining the meaning of data fields and values and offer tips to the public on how to use the information.

The portal helps BMC's Departments to publish datasets, documents, services, tools and applications collected by them for public use. It intends to increase transparency in the functioning of Government and open avenues for many more innovative uses of Government data to give a different perspective.

Open Government Data Platform by the Govt of India is one of the initiatives under Pillar 6 (Information for All) of the Digital India initiative. The Open Government Data Platform India is a joint initiative of Government of India and US Government.



Taking the Leap

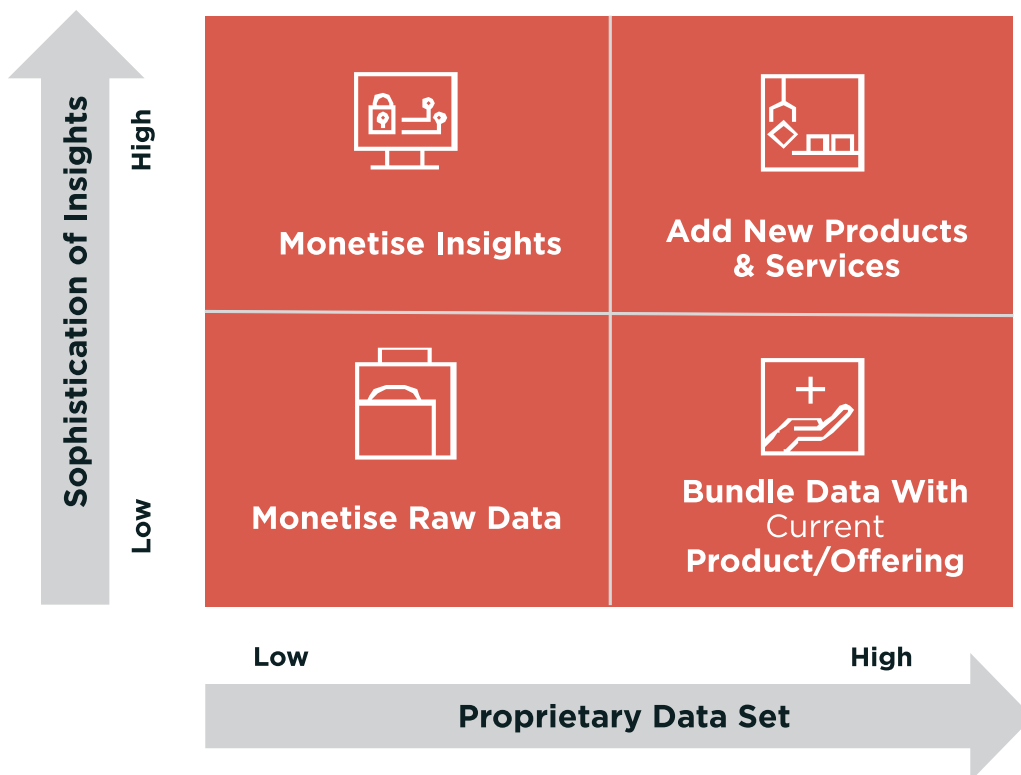
Goal 4 - Creating & Leveraging Data Reservoirs

A separate wing/department may be established to drive the implementation of this intervention.

Once the data policy has been established, the various databases would be examined and standardised across BMC. The IT Department envisions viewing the data residing in the databases, not only as stand-alone data focusing only on the department, but also in conjunction with data from various departments thereby revealing insights that would enable better governance. It would also help in identifying new services or channels to meet and surpass citizen expectations.

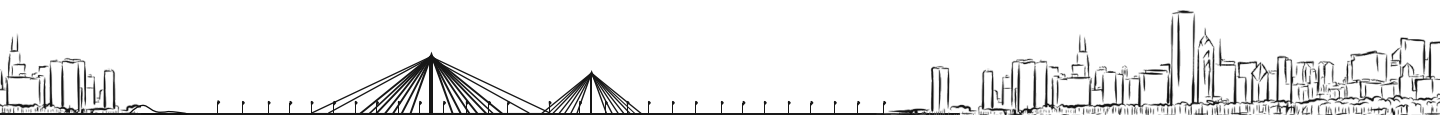
As the activity of data governance and data mining matures in BMC, the insights would also improve. BMC would make raw data (after processing and removing Personally Identifiable Information) available to the public through open data portal. BMC would also look to monetise the insights gained from the various databases. A reference monetisation matrix that the IT Department shall consider is shared below.

Data Monetization Matrix

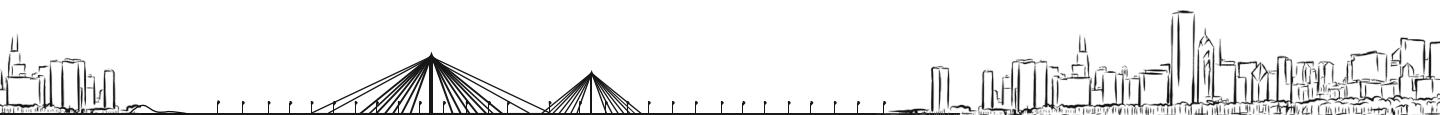


CONCLUSION

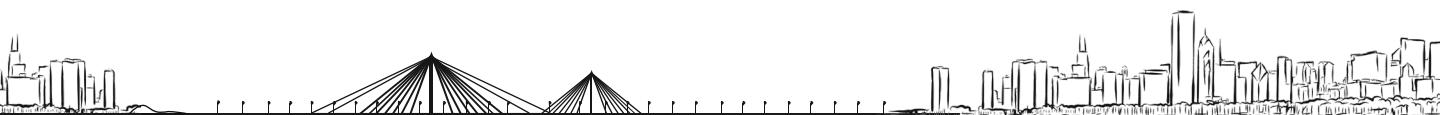
- This vision document will help BMC improve its standings not only in national but also international benchmarking studies.
- The principles in this document will help BMC deliver benefits of technology and better services to the citizens and all other stakeholders in the Municipal ecosystem.
- The actions in this document will make the IT Department in particular, and BMC in general, to become more agile to handle business as usual requests efficiently, disruptions in the business in a nimble manner and adopt new technologies innovatively.
- This IT vision, for the first time in BMC, provides a holistic view of the Municipal services under various themes. This is expected to help plan service delivery collaboratively at the ward level.
- Lastly, the data for the proposed interventions would mature over time and as BMC begins to use the data for decision making. As the practices mature, data would begin to be more meaningful.
- These interventions and their benefits are documented in the table on the next page. However, this is only illustrative of the change that IT department intends to bring.
- Eventually, the fundamental goal of simplifying Mumbai would be met when the vision document is implemented in letter and spirit.



Themes	Intervention	Benefits
Health/ Wellness	<ol style="list-style-type: none"> 1. Hospital Management Information System 2. Data Management for pandemic 3. Vaccination Management 	<ol style="list-style-type: none"> 1. End-to-end data management (prescriptions, reports etc.) of patients across hospitals -- Hospital Management Information System 2. Data Management of citizen lifecycle (Birth to Death) 3. System based alerts for preventive measures like fogging, rat control etc. 4. System based alerts for expiry of validity of multiple licenses (Eatery, Dog, Nursing Homes etc.) 5. Proactive management of infectious diseases
Recreation/ Leisure	<ol style="list-style-type: none"> 1. Online ticket booking system 2. Mobile app & Chatbots 3. Single window clearance 4. One window for health and fitness 	<ol style="list-style-type: none"> 1. Convenience through online booking of tickets for BMC's Auditorium, Zoo, Museum etc. and reservation of facilities at sports facilities 2. Hassle-free processes for conducting community events by enabling single window clearance
Education	<ol style="list-style-type: none"> 1. Student Lifecycle Management 2. Virtual Classrooms 3. Learning Platforms 4. Career Day 	<ol style="list-style-type: none"> 1. Ease of portability of students through end-to-end student lifecycle and minimal documentation to be carried around 2. Online Learning Platform to enable citizens to learn at their convenience 3. Dashboard for students' performances for BMC to make informed decisions related to student drop- outs, student health etc.
Safety	<ol style="list-style-type: none"> 1. Sensor grid 2. GIS 3. Smart Poles 4. 3D mapping of the city 5. Drones 6. Video Surveillance & Video Analytics 	<ol style="list-style-type: none"> 1. Timely information related to weather events and natural disasters allowing citizens to take necessary mitigation steps 2. System based alerts for health of buildings and other infrastructure for improved safety of citizens 3. Improved safety & security through video analytics



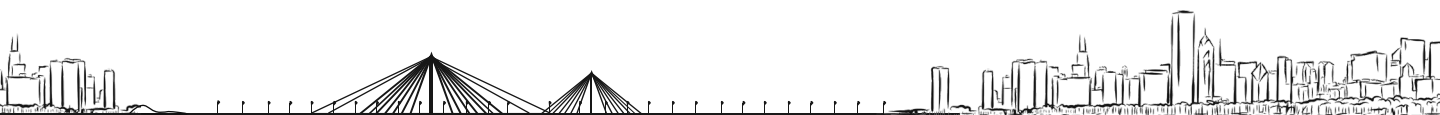
Themes	Intervention	Benefits
Buildings	<ol style="list-style-type: none"> 1. Online applications for Building Development & Maintenance 2. Unique Identity Management for buildings 3. Sensor grid 	<ol style="list-style-type: none"> 1. System based alerts for health of buildings and other infrastructure for improved safety of citizens 2. System based alerts to citizens for payment of taxes and dashboards for BMC for better visibility
Sanitation	<ol style="list-style-type: none"> 1. Online Contract Management & Project Management 2. Dashboards 3. Sensor grid 	<ol style="list-style-type: none"> 1. Information related to cleanliness, air quality etc. would be available at citizen fingertips 2. System based tracking of initiatives to allow timely action and risk mitigation
Water	<ol style="list-style-type: none"> 1. Sensor grid 	<ol style="list-style-type: none"> 1. Sensor based monitoring for clean potable water 2. System based alerts in case of any contamination
Transport	<ol style="list-style-type: none"> 1. Online Contract Management & Project Management 2. Dashboards 3. Sensor grid 4. Parking Management 	<ol style="list-style-type: none"> 1. Visibility of the progress of the projects for increased transparency 2. Visibility on the health of the infrastructure for improved safety 3. Convenience and visibility of available parking space
Business	<ol style="list-style-type: none"> 1. Single Window Clearance 2. File Management through eOffice 3. Video Conferencing 	<ol style="list-style-type: none"> 1. Hassle-free processes for corporates to set up their business by enabling single window clearance 2. System based visibility on the status of application



ANNEXURE

Key Highlights: GIS & 3D Mapping of The City

- While there are many components of a smart city, 3D visualization is becoming increasingly important as a means of making this concept accessible to a much wider audience. Smart 3D city models are being developed by cities such as Hamburg, Helsinki, Chicago and London to help streamline urban master planning and gauge the impact of new developments and public services.
- Applications of 3D city modeling create digital replicas of the urban realm. Like a virtual city, they are built from a combination of aerial LiDAR, terrestrial laser scans and oblique high-resolution photographs, making it possible for residents to visualize and comment on the impact of proposed developments and factors such as the amount of parking or open space provided.
- The smart 3D city model developed by the City of Helsinki was built in the OpenGL format to add a layer of intelligence and BIM functionality to the 3D geometry. The model includes semantic information on over 80,000 buildings, plus ground surfaces and waterways.
- Architects are being invited to insert BIM models of proposed buildings into the model to calculate the impacts on factors such as wind movement, sunlight and traffic.
- The ability to illustrate a scheme and its impacts within the context of a broader model is in stark contrast to the way the construction industry currently operates, with urban planning and building/infrastructure design often treated as separate entities.
- This siloed approach increases the likelihood that topographic surveys and utilities surveys are duplicated, while areas mapped previously are not readily available. The ability to build and maintain data in a single city-wide model into the future could enable significant efficiencies.

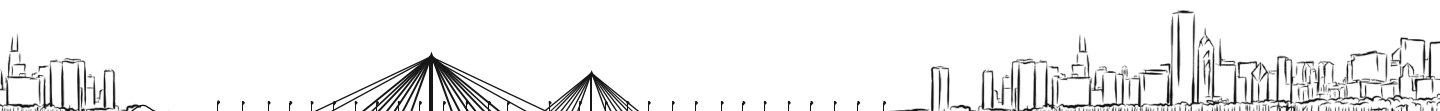


Key Highlights: IT Security of Mumbai City

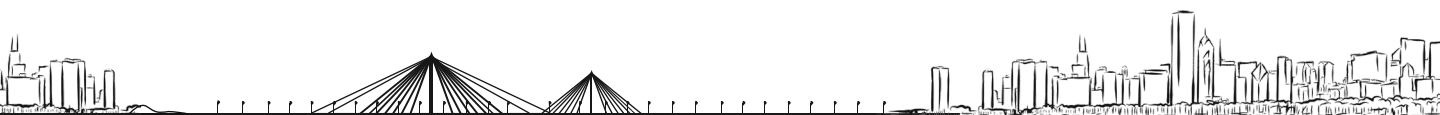
- India reported 1.16 million cyber security cases in 2020, that's 3X more than 2019, as per government data presented in parliament. Approximately, 3k cyber security-related issues were reported every day during the year. And the situation is not just alarming in India, but world over, including the United States.
- While the trend was already on the rise, Covid-19 has accelerated it. With WFH becoming the norm world over the heavy dependence on technology was inevitable. In addition to that the increased adoption of 5G, interconnectedness of devices, new processes and procedures, updated employee profiles and less-controlled work environments - have all led to an increase in vulnerabilities.
- Cyber experts say there's a good reason Mumbai is on the radar of Chinese hackers. It is India's financial capital and houses the headquarters of all of India's major financial institutions. The two biggest financial markets, Bombay Stock Exchange and National Stock Exchange, are located here.

BMC has recognized this as a threat and is working on securing Mumbai through:

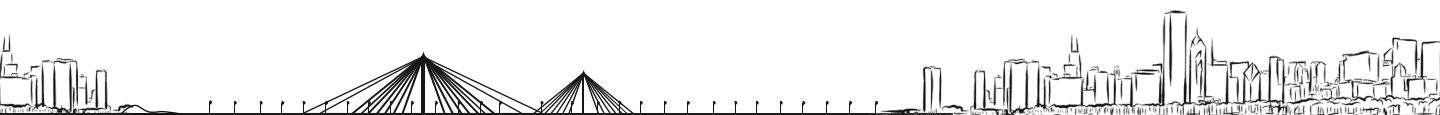
- Zero Trust Zero Access Architecture
- Dev Sec Ops - Early Security Validation with continuous upstream security assurance
- AI/ML monitoring
- IoT device, mobile and cloud security for Edge computing.



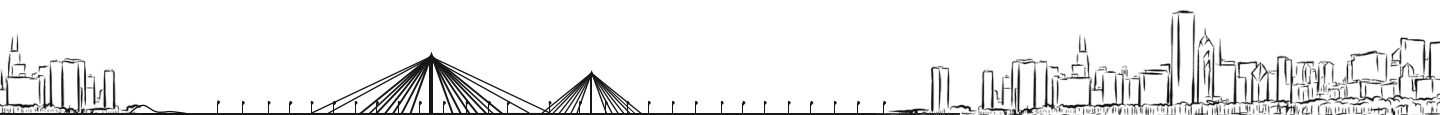
Category	Initiative	Implementing Body/ City/ State	Scope of Initiative
Recreation/ Leisure	Smart urban street furniture	Boston, USA	This includes digital signs, smart benches or even fully-integrated smart bus stops – there are a lot of new products available in terms of smart urban street furniture. A growing number of cities and communities throughout the world are adopting these self-powered products to make life easier for citizens and visitors and to optimize the management of public infrastructure or to provide connectivity such as free Wi-Fi. The smart furniture can be installed at various public places like the parks, bus stops, city squares, sports arenas, resorts and universities.
	Smart Sensor to assist watering of plants in public parks and gardens	Santander, Spain	IoT devices planted throughout parks and gardens work behind the scenes to automatically coordinate services and maintenance. Humidity sensors in public parks and gardens ensure that green spaces are watered only when the soil is dry.
Health/ Wellness	Sensors to assist parking and reduce congestion & pollution	Santander, Spain	A system of IoT sensors hidden under the pavement identifies free parking spots and directs nearby drivers to available spaces via digital street signs. The initiative, along with other transit projects, is significantly reducing congestion and CO2 emissions in the city. IoT sensors are also embedded in buses, taxis, and streetlights—collecting data on traffic patterns, maintenance needs, noise-levels, and other environmental conditions. This data is then used to optimize public transit routes, share real-time traffic data with the public, reduce congestion, and respond to mechanical problems.



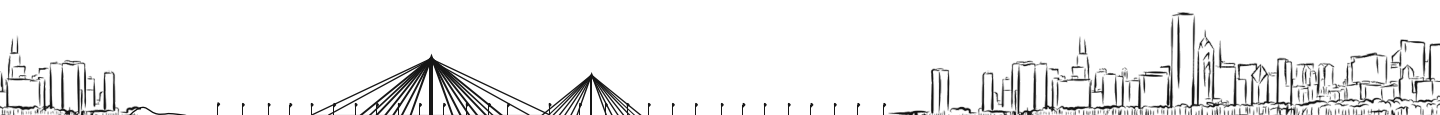
Category	Initiative	Implementing Body/ City/ State	Scope of Initiative
Safety	Real-time street parking facility	Seoul, South Korea	Efficient parking reservations with sensors providing real-time occupancy information with dedicated apps for drivers and parking space owners.
	Multi-functional Smart Lamp post	Hong Kong, China	Multi-functional smart lampposts include 5G base station, surveillance cameras, a weather station, thermal traffic detectors, and a Wi-Fi antenna.
	Smart Kiosk for IT utilities	New York, USA	The Link NYC project in New York, focuses on replacing typical payphones with kiosks that provide citizens with a Wi-Fi connection, an android tablet for web browsing, free calls to all the US states, an emergency call button, and two USB ports for phone charging.
Health/ Wellness	Smart App for Animal Services	Calgary, Canada	Use Case: Calgary's Animal Service in Canada put out City of Calgary Pets to make it easy for locals to find adoptable pets, as well as track down lost cats and dogs. For missing pets, owners can see if their cat or dog is at a shelter waiting to be reunited. There is also a map with where off leashing is allowed, a section to report aggressive animal incidents and a guide to find the closest 24-hour emergency vet clinic.
	Smart Beacons for Blind	Google + Royal London Society for Blind People, London, UK	Visually impaired navigate the city's transportation network using beacons to provide audio instructions via a smartphone application. A network of interconnected beacons on top of existing infrastructure like public spaces and public transport, which then work together to assist citizens in navigating their way around the city, by using the city's transportation service systems and providing several other support services.



Category	Initiative	Implementing Body/ City/ State	Scope of Initiative
Safety	Biometric Face Recognition to access public spaces	Seoul, South Korea	Provides biometric recognition technology in digital door locks and access control systems. Infrared light-based facial recognition and iris recognition technology can be used for contactless access.
	Geocoding of residences of the Marginalized	Kolkata, West Bengal (Start-up)	Provides postal addresses to slum residents using geocoding technology, helping them obtain documentation to access government services, open bank accounts, and register to vote.
Transport	Smart Card for tourists/travelers	Dharamshala, Himachal Pradesh	Smart Card for Tourists - access to tourist infrastructure and facilities like transportation and tickets for recreational activities
	E-vehicle module (ICT)	Faridabad, Haryana	e - rickshaws fitted with GPS tracking devices and meter. No. of e-rickshaw charging points constructed.
Safety	Emergency response system (Early warning/ evacuation)	Jammu, Jammu & Kashmir	Rapid warning dissemination through multiple media, including SMS, USSD, social media & instant messaging apps.
	Change in conventional lighting with LED and with smart solutions	Aligarh, UP Ahmedabad, Gujarat	Smart Pole and LED street lighting with Solar PV Panels - capacity to auto self- adjust to light intensity depending on movements on roads
Health/ Wellness	Call Centre & Data Analytics with a Human Touch	Emergency response system (Early warning/ evacuation)	A human face to technology simulated grievance redressal mechanism and information provision
Sanitation	E-toilets	Ahmedabad Municipal Corporation, Gujarat	Smart Toilets- Coin operated entry self- cleaning Solar Powered, GPRS connected with Display Boards and Voice Guidance



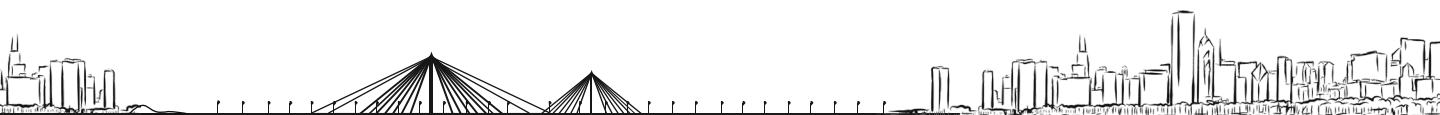
Category	Initiative	Implementing Body/ City/ State	Scope of Initiative
Education	Predicting school dropouts through Machine Learning & AI	Andhra Pradesh	The Andhra Pradesh (AP) government is making concerted efforts to bring down the school dropout rate in the state. It has tied up with Microsoft to address this complex challenge. Based on specific parameters, such as gender, socio-economic demographics, academic performance, school infrastructure and teacher skills, an application powered by Azure Machine Learning processes the data pertaining to all students to find predictive patterns. With these data insights, the district education officials can intervene and help students who are most likely to drop out. A variety of programs and counselling sessions could be conducted for these students and their parents. The Andhra Pradesh government, based on machine learning and analytics, has identified about 19,500 probable dropouts from government schools in Visakhapatnam district for the academic year (2018- 19).
Health/ Wellness	Smart Mosquito Control Management Solution	Municipal of Corporation of Greater Mumbai	From the record of incidence of malaria in the vicinity of inaccessible properties in G/South ward before the use of drone for rendering insecticide treatment and after the usage of drone for rendering insecticide treatment it is observed that there has been a distinct reduction in the incidence of malaria in these areas. It can therefore be concluded that the systematic use of drone for insecticide treatment in these inaccessible properties has resulted in better control of vector mosquito breeding thereby keeping the incidence of malaria in control as compared to the past.
Safety	Seismic Vulnerability Tool for City Buildings	Dharamshala, Himachal Pradesh	Disaster risk reduction by leveraging ICT tools for seismic vulnerability analysis and multi hazard community level risk assessment.



IT Policies

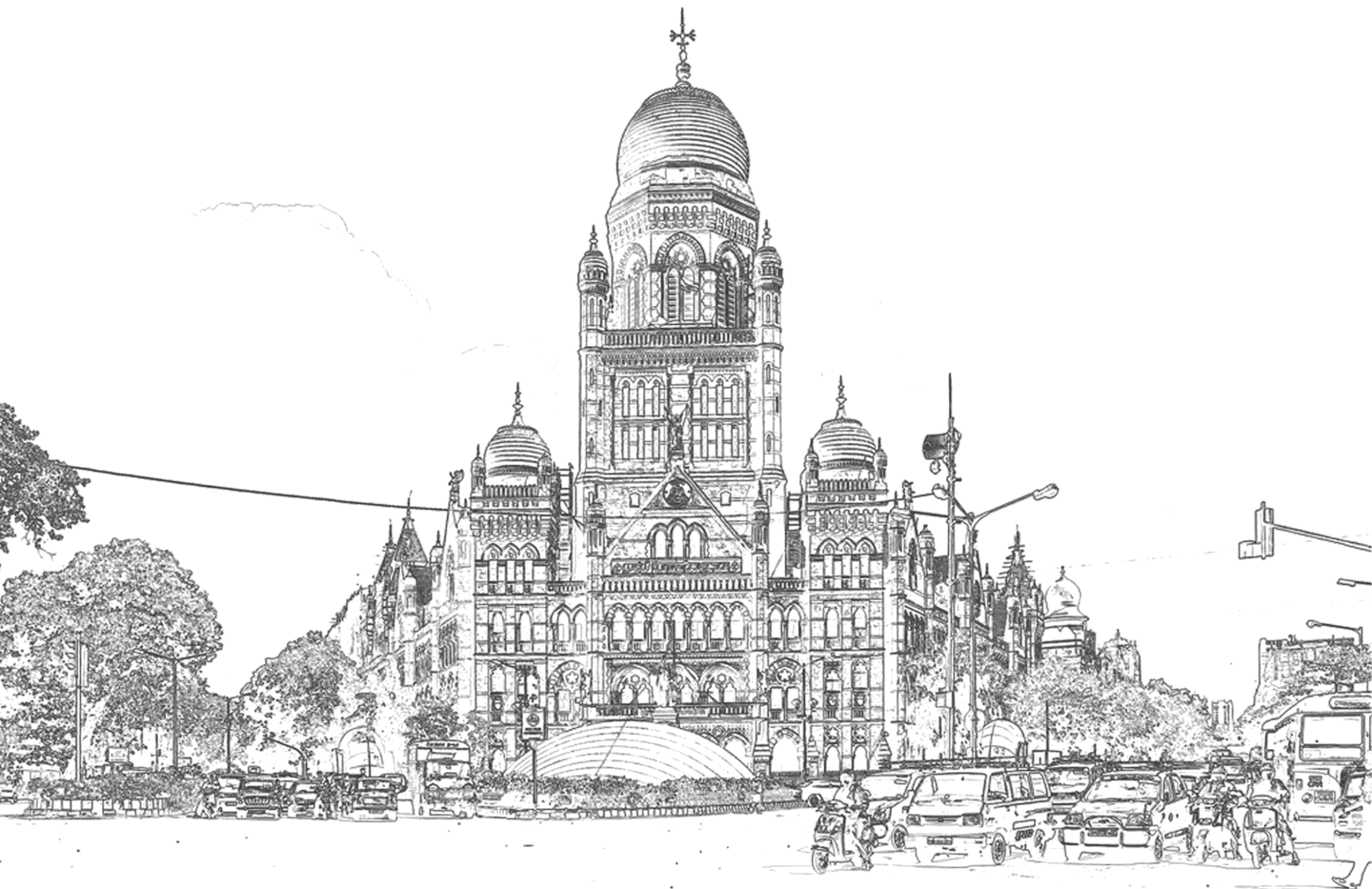
Department has prepared draft policies covering the following:

01. BMC_IT_Policy Framework
02. BMC_Information Security Policy
03. BMC_IS_Application Access Management Policy
04. BMC_IS_User and Infrastructure Access Management Policy
05. BMC_IS_Systems Acquisition, Development and Maintenance Policy
06. BMC_IS_Operations and Maintenance Security Policy
07. BMC_Change Management Policy
08. BMC_IS_Asset Management Policy
09. BMC_IS_Information Transfer Policy
10. BMC_Digital Signature Policy
11. BMC_IS_Incident Management Policy
12. BMC_IS_NetworkSecurity Policy
13. BMC_Backup Management Policy
14. BMC_Log Monitoring Policy
15. BMC_IS_Acceptable IT Usage Policy
16. BMC_IS_Physical and environmental Security Policy
17. BMC_IS_Vendor Management Security Policy



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- Sustainable Development Goals - National Indicator Framework 2021, Government of India
- Doing Business 2020 - Economy Profile India, The World Bank Group
- Safe City Index 2021, Economic Intelligence Unit



“IF YOU WANT TO GO FAST, GO ALONE. IF YOU WANT TO GO FAR, GO TOGETHER”

The journey of this IT Vision Document was not covered alone.
We express our heartfelt gratitude to the individuals that made this document possible.

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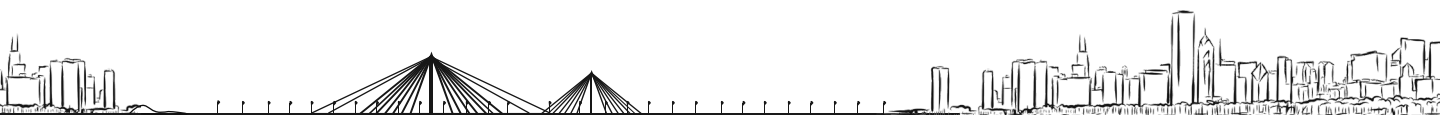
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