

Table of Contents

1. Overview 3

2. Analytics Methodology- Phase wise 4

3. Reporting Requirements for Municipal Sector 4

1. Overview

With 54% of the world's population living in urban locations, city and local governments across the globe face the massive challenge of delivering the best possible public services to their citizens while working within the constraints of their annual budgets. Municipalities must coordinate and deliver the myriad services expected by citizens and business such as public water and power access, roadways and public transportation, public education, health oversight, public safety and emergency services, sanitation services, road maintenance and much more.

Some of the usecases where an IT service provider can use their expertise to churn meaningful insights for the municipality, by utilizing publicly available open data / from crowdsourcing platforms or from the data sources internal to municipalities, include but not limited to:

1. **Transportation Analytics-** As cities continue to grow, residents find themselves sitting in never-ending traffic or waiting for a less-crowded train. Municipal transportation authorities need a way to aggregate data on highway and transit systems to make informed decisions that help optimize resource usage and avoid the frustration and productivity losses associated with congestion.
2. **Inter-platform Analytics-** With the advent of IOT, interoperation of every single gadget / platform / technology has turned into a reality. The most important aspect of IOT is how to effectively slice, dice and make sense of the enormous amount of data emitted from IOT sensors. one typical use case is solid waste management. The "Dustbin Full" alert from a sensor in a dustbin installed in a park, can be made to notify the nearest solid waste collection unit before the dustbin gets overflowed.
3. **Municipal Revenue Analytics-** Municipal agencies and departments operate under tight budgetary constraints, oversee dispersed workforces, and are subject to constant public scrutiny. Leaders need real-time access to information to ensure that agency goals are achieved on time and on budget. Some of the open data coupled with data from municipal corps e.g. customer payment patterns, customer grievances, collection efficiency or bottlenecks, fraud analysis etc. can be a useful indicator of what would turn out to be key areas for a municipality to look into to improve on their revenue and reduce unwarranted expenditure.
4. **Citizen Analytics-** Citizens constitute the most important and largest stakeholder body in a municipal corp. Why citizens are unhappy? What new services should be evangelized by Municipality? How are the recently launched citizen / community programs performing / received by citizens? Why citizens are not paying on time? These are just some of the questions to be answered if a big data / analytics platform can be used to churn all the available citizen data across multiple dimensions.
5. **Municipal Governance Analytics-** How efficient is a municipal corporation from inside? Are their KPIs for every employee at every level? How those KPIs are monitored? Is there a readily available executive dashboard to have a department-wise progress snapshot? There is a lot amount of internal data with municipal Corps that never gets exposed due to variety of reasons. A slicing and mining of this data will expose some very interesting aspects of how municipal corp functions internally.
6. **Municipal Operations Analytics-** This in a way overlaps in some areas, with Municipal Governance Analytics with some key difference. While Governance Analytics looks into internal data which in most cases is not available publicly, Operations Analytics looks into real time operations performance with citizen perception playing a key role.

2. Analytics Methodology- Phase wise

1. Descriptive Analytics- The most basic form where the endeavor is to explain a phenomenon in more detail in a graphical way. Reports an output of this process. A monthly department-wise progress report for a municipality is an example of descriptive analytics.
 - a. Tools- MS Power BI, Tibco Spotfire, Tableau
2. Predictive Analytics- Based on the current operational situation, coupled with past data on how customers paid for municipal services or how customers have reacted to a public / community program, an elaborate algorithm can be written using a variety of techniques (clustering / classification trees / decision trees to segregate customers across categories (defaulters / on-time payers / delayed payers) or to segregate programs across categories (healthcare / public safety etc.) to predict:
 - How citizens would react to a new community program
 - Collection performance over next couple months / quarters
 - Schedule generation for collecting solid waste etc.
 - a. Tools- R, Python, SAS, Minitab, Matlab
3. Prescriptive Analytics- This is the real essence of the whole exercise. Given that we have predicted that the customers from a certain slum area are not going to pay for municipal services, what should be the prescribed actions to mitigate this situation? We have predicted that a dengue awareness program is not going to be very effective because a similar program on Malaria awareness failed. A drill down into malaria campaign data would point at loads of areas where we missed out and can cover those while doing the dengue campaign. Prescriptive analysis is a mix of predictive and descriptive analytics. Predicting a certain outcome and using descriptive analytics to describe and understand the phenomenon behind a similar outcome in past to sort out issues that may crop in, is prescriptive analytics.
 - a. Tools- R, Python, SAS, Minitab, Matlab, MS Power BI, Tableau, Tibco Spotfire, Qlikview

3. Reporting Requirements for Municipal Sector

1. Citizen Related
 - a. Periodic Citizen Satisfaction Survey and Resultant Satisfaction Scoring
 - b. Citizen Complaint Redressal Reports
 - i. Registered Complaints
 - ii. Resolved Complaints
 - iii. On Hold Complaints
 - iv. Disputed Complaints
 - c. Citizen Service Request report across categories to get an understanding on which category is "hot" category with max requests and thereby to increase man power in respective department
 - d. Number of Birth Certificates / Death Certificates Issued report for Census purpose
 - e. No. of Marriage Certificates issued for census purpose
 - f. Communication Channel usage report (Website visitors vs. Mobile App users)
 - g. Suggestions / Feedback report
 - h. Report on community programs held and citizen turnout last month
 - i. Report on future citizen initiatives planned over next month
2. Economic Development
 - a. New Trade License Issuance report to indicate extent of economic development or interest of new investors in the municipal area
 - b. Trade License Renewal report to indicate the rate of satisfaction of the traders /businessmen under the current municipal policies and sustained economic growth

- c. Business satisfaction survey report- To analyze the pulse of businessmen and traders and to understand the need of potential economic reforms (if any)
- 3. Building Permit Management
 - a. New Building Permit Issuance report
 - b. Building Completion Certificate Issuance report
 - c. Building plan deviation report
 - d. Building demolition report
 - e. Buildings per owner report for taxation purpose
 - f. Mutation Certificate Issuance report
- 4. Property Tax Management
 - a. No. of Property Tax returns filed report
 - b. Ward/ Mohalla/ Citizen / Business-wise Property Tax due report
 - c. Ward/ Mohalla/ Citizen / Business-wise Property Tax collected report
 - d. Ward/ Mohalla/ Citizen / Business-wise Property Tax defaulter report
 - e. Ward/ Mohalla/ Citizen / Business-wise Property Tax Collection Efficiency report
- 5. Other Revenue Sources
 - a. Number of Advertisement hoarding requests report
 - b. Advertisement hoarding permits issuance report
 - c. Hoarding Fee due Vs. Collected report
 - d. Tehbazaari Applications received report
 - e. Tehbazaari tax collected report
 - f. Crackers License Applications
 - g. Crackers License Fee collection report
- 6. Revenue Vs Expenditure
 - a. Budgeting Ratio Report
 - b. Debt Per Capita Report
 - c. Full Time Employees Per Capita Report
 - d. Municipal Tax Revenue Per Capita Report
- 7. Internal Governance
 - a. Department-wise Monthly Progress Report against preset KPIs
 - b. Policy / Code of Conduct Violation Report
 - c. Disciplinary Action / Departmental Inquiry against Employees Report