भारतीय प्रबंध संस्थान बेंगलूर
INDIAN INSTITUTE OF MANAGEMENT
BANGALORE

Contemporary Concerns Study Report

Impact Assessment study of Open Innovation Platforms and their application in Bangalore's traffic management

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Problem Statement

The problem statement of this Contemporary Concerns Study is to assess the impact and role of open innovation platforms in solving traffic issues in Bangalore. The potential of using a larger community or crowd as a source of information at various stages of traffic management right from reporting to ideation and even strategizing is explored.

Objectives

Our objectives during this study are two-fold namely:

a) To develop a clear understanding of the issues involved in designing and managing open innovation platform and being able to apply this understanding in finding solutions to these issues

b) To be able to finally come up with a model for such a platform in solving Bangalore's traffic related issues

Need for the proposed work:

Cities are the engines of economic growth. In developing economies like India, there is an **unprecedented growth** of population coupled with a rapid increase in the income level. This has led to increased vehicular ownership in the cities. Quality of life can be impacted in cities where infrastructure hasn't grown as fast as the population to accommodate the new vehicles added year after year. Traffic problems affect everything from commute times to productivity, can diminish resident satisfaction and have adverse effects on health as well.

Bangalore being one of **Asia's most rapidly growing cities** is also facing similar problems with unplanned expansion of the city to accommodate the huge influx of the people every year leading to serpentine traffic jams every other day. Hence the emphasis on properly managed traffic infrastructure becomes highly relevant in this context.

There have been successful applications of open innovation in cities like Ahmedabad in India and Cairo which have contributed in finding the solutions to many traffic problems using crowd-sourcing. Hence there is also a good opportunity for Bangalore to leverage the technological strength of open-innovative platforms.

Introduction- The Evolution of Traffic Snarls in Bangalore City

Bangalore, the Silicon Valley of India is one of the fastest growing cities in India, as the base for many Information Technology (IT) related industries. With the advent of economic liberalization, the city has expanded to accommodate a **rapid influx of white collar workers** from across India in the burgeoning service sectors that it houses.

It would have been perfect in all respects, had it not been for the one issue uniformly cited by both residents and visitors- traffic. Being stuck at a single traffic junction for two hours, or even taking the same amount of time to cover a few kilometres is routine in the city. What ails Bangalore's traffic, and why is this problem so severe?

Drivers of Traffic in Bangalore

The statistics surrounding the same are grim- Bangalore ranks sixth worldwide in the IBM Commuter Pain Survey[1], ahead of much busier cities such as New York, Chicago, London and Montreal. According to the Bangalore Traffic Police[2], there is one vehicle for every two people on the roads of the city- a staggering 44 lakh vehicles in a city that was once called India's Garden City. The small size of the city in comparison to its vehicular traffic means that even though its roads are almost thrice as small as those of Delhi, the two cities have comparable **vehicular density**.[2]

The city's roads are often subjected to all sorts of **repair and maintenance** courtesy telecom operators, electricity lines or even sewage re-laying. This however means that the quality of the road deteriorates over time. One moderately heavy bout of rainfall is enough to render the city gridlocked due to the **potholes** that form repeatedly. According to the Brihat Bengaluru Mahanagara Palike (Bangalore's Municipal Corporation), there are more than 2,600 potholes on the roads of Bangalore, with this number only growing. Filled with stagnant rainwater, it becomes impossible for most of Bangalore's traffic- two-wheelers to navigate these potholes safely. For each set of potholes that is repaired, a new one is seen sooner than expected, with contractors using inferior quality of materials in filling these potholes.[3]

[1] http://www-03.ibm.com/press/us/en/pressrelease/35359.wss Last accessed 16th July 2015
[2] http://www.thehindu.com/todays-paper/tp-national/tp-karnataka/city-has-one-vehicle-for-every-two-people/article4448219.ece- Last accessed 16th July 2015
[3] http://www.ndtv.com/south/bangalore-helpless-as-silicon-city-turns-into-pothole-city-529496 Last accessed 16th July 2015

The problem does not end here- **vehicular accidents and road rage** is rampant too. According to the Police in 2014, at least two people die almost every day in road accidents.[4] Traffic experts attribute these accidents not only to lane indiscipline and rash driving, but also instances of illegal or badly placed road dividers and speed-breaker humps. Unregulated and without corresponding fluorescent signs, these can be a death trap for commuters in the absence of properly lit roads, which is often the case in the rainy summers the city faces each year.

Urban Planning as a solution

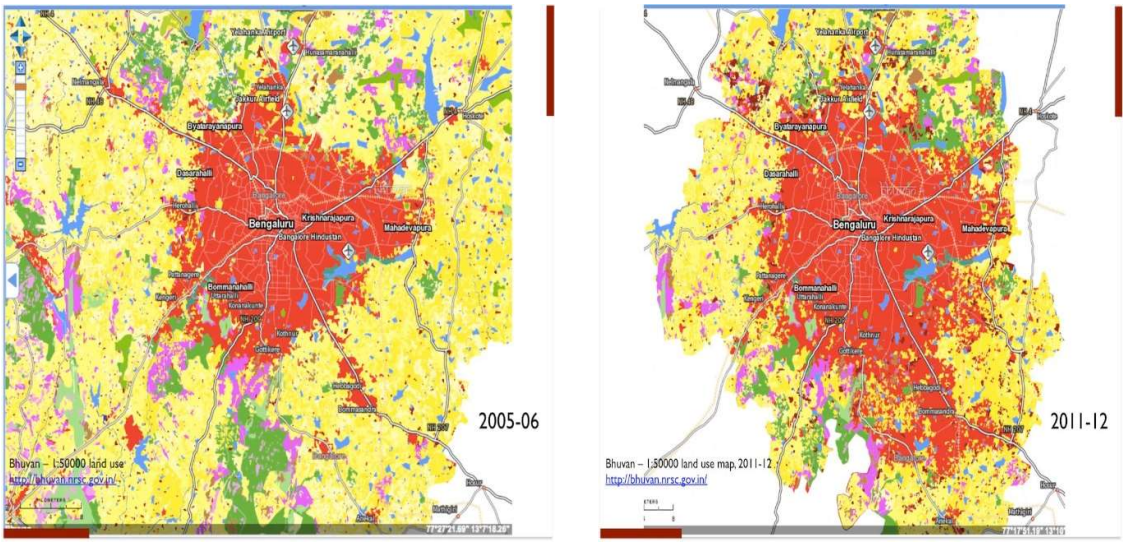
Bangalore's traffic is one of the most talked-off problems in urban planning circles. The reason is not only the scale of the problem, but the unprecedented rise of the same. If we study the evolution of Bangalore as a city, and study the various factors at play in its development, we see that Bangalore of the 1960s and 70s was a small, idyllic retirement city with abundant gardens and broad boulevards. Even the most crowded areas of the city were navigable in the few motor vehicles that belonged to the rich and famous of the city during that period. Fast forward 30 years and we have a concrete jungle, choking in the fumes of vehicular pollution and losing its lungs in the form of parks and gardens to big glass buildings. The question we then need to ask is very simply- ***was Bangalore planned to be able to take the population and transport traffic it currently holds?***

The city has authorities like the Bangalore Development Authority (BDA) and Bangalore Metropolitan Regional Development Authority (BMRDA) enacting state legislature that promotes the growth of the city and region in a planned manner. However, this still does not account for the unsustainable sprawl seen in various directions of the city, as illustrated through satellite imagery below.[5]

Figure 1. Bangalore City Map showing expansion from 2005-06 to 2011-12

[4] http://sites.ndtv.com/roadsafety/729-people-lost-their-lives-on-the-bangalore-roads-in-2014/ Last accessed 16th July 2015

[5] http://catalyst.nationalinterest.in/2014/01/04/the-growth-of-bangalore/#!prettyPhoto Last Accessed 16th July 2015



Implementing Policies- A One-For-All solution

The **Bangalore Traffic Police** is the governing authority for the city's traffic issues. They oversee and enforce the compliance with traffic safety rules within the city, and manage the flow of traffic during as well. The BTP as they are informally called, has a presence throughout the city in the form of mobile vans (Hoysala), bikes and beat patrol constables. Personnel within the force were given high-tech reporting facilities such as Blackberry PDAs and smartphones to be able to quickly capture and report traffic violations. A computerized system to pay fines and an interactive social media presence are some of the features that make the BTP one of the most responsive and publicly respected governmental law enforcement agencies among citizens in Bangalore.

However, as mentioned, the duty of the BTP has traditionally been more towards control and regulation than prevention of traffic snarls and congestion. This is due to a variety of reasons such as limited bandwidth of the police force or localisation of traffic problems or solutions proposed by citizens for the same. If we examine the city of Bangalore and compare it to Chandigarh, a well laid out city, we see that the network of roads in Bangalore does not lend itself to planning at a large scale. Each locality is different from the next, with many interlinked roads and neighbourhoods that vary in size. Factors such as road width, footpaths, one-way directions and other parameters can vary from one street to the next in the same neighbourhood, negating use of a one-for-all approach.

Figure 2a. Layout of Chandigarh- symmetrical, grid-like with parallel roads to divert traffic flow

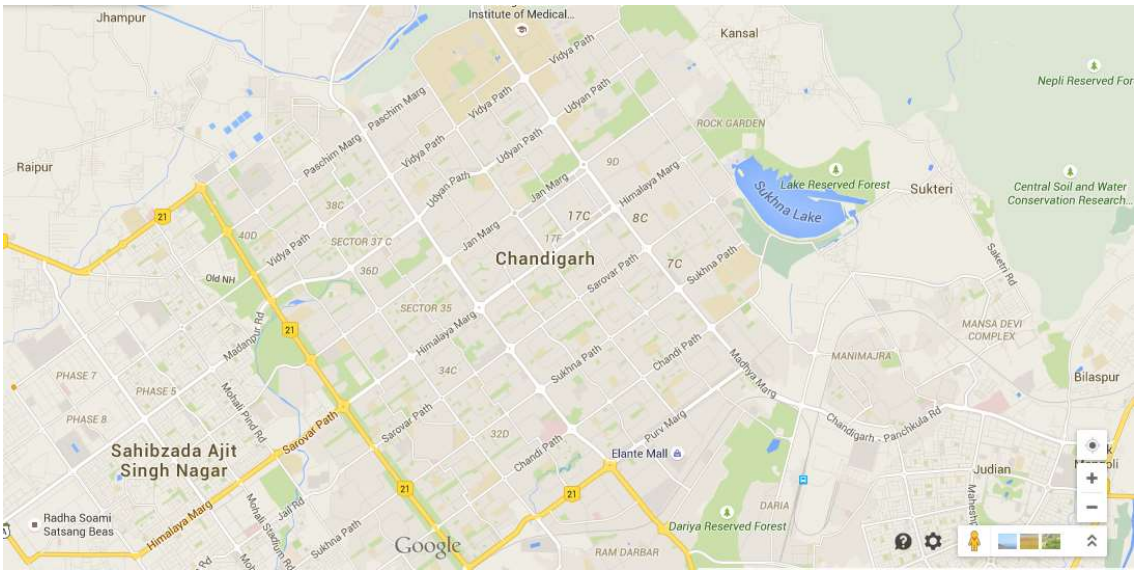
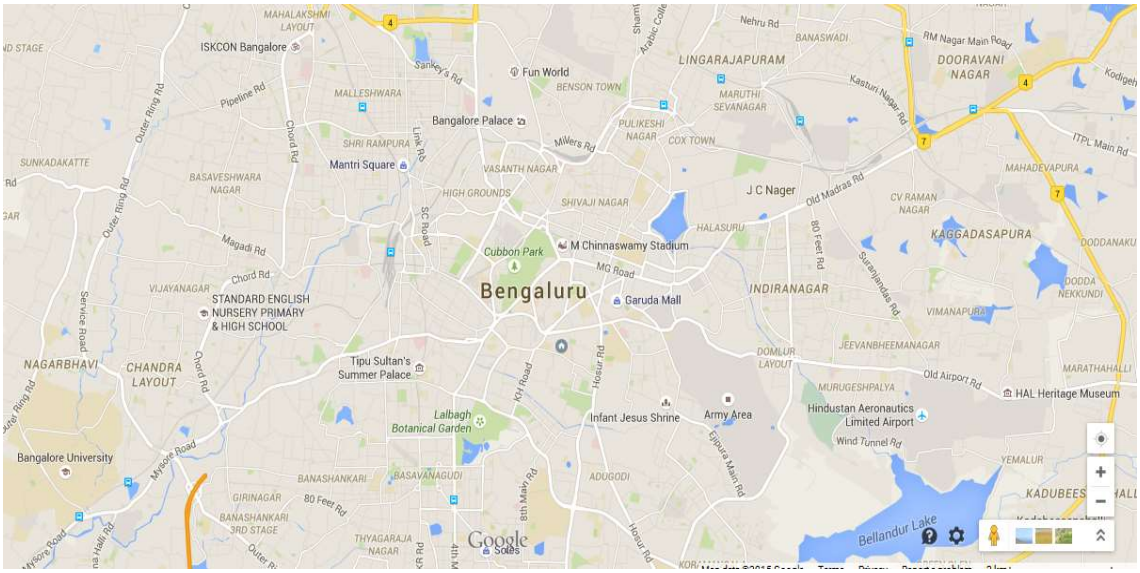


Figure 2b. Layout of Bangalore- roads are asymmetric, winding and do not have parallel connectors



***Source- Google Maps** last accessed 16th July 2015*

Micro Local Solutions as a way out?

As described above, the topography of Bangalore city's road network lends itself to more intricate and local planning. Each neighbourhood is most capable of identifying and correctly isolating both the causes for traffic issues they face and the consequences of any solution implemented. Taking the views of local stakeholders into account leads to a more effective way to manage traffic.

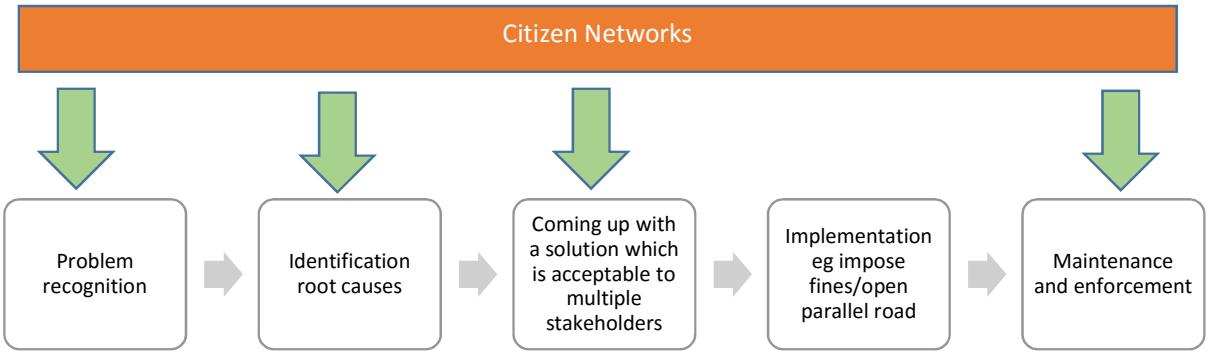
We describe the various **stakeholders** whose views need to be taken into account while proposing and implementing any local planning or infrastructural change be it widening of roads, laying new roads or even making a road a one-way:

- Residents
- Bangalore water supply and sewage board (BWSSB)
- Bangalore Electricity Supply Company (BESCOM)
- Bruhat Bangalore Mahanagara Palike (BBMP)
- Local MLA
- Cables of various internet service providers & telecom companies
- Pavement markets

However, the **final implementation** of the solutions mentioned above is not in the hands of these people even though their inputs and suggestions are most crucial to identifying and solving problems related to traffic.

If we look at the process employed by BTP in solving traffic issues, we can identify areas where the inputs of multiple stakeholders would come in useful.

Figure 3. How BTP works solving traffic problems- green arrows where citizen inputs will add value



We then identify **best way to use citizen networks**, we can list the various ways to do so as below. Each of these has an example, discussed later:

- Known problems & citizens provide solutions: (eg. Innocentive-like model)
- Citizens alert about problems– Aggregated and sent to authorities: (eg. BTP Public Eye)
- Citizens provide data about problems and solutions (eg. NextBangalore Gatishil)

In determining which of these is most applicable, we need to assess multiple factors such as incentive of contributors, how to disaggregate problems and aggregate problems, how best to scale and sustain such a system while maintaining the quality, recency and authenticity of data. We believe that the paradigm of **Open Innovation**, if applicable here can provide a framework to assess how to achieve all of these from citizens.

The Open Innovation Paradigm

Introduction

"*Open innovation is defined as the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively*"-[1]

The above definition by Henry Chesbrough, explains Open Innovation as nothing more than a thought process that advocates the use of external ideas from various people across the globe with diverse skill sets to accelerate the process of arriving at solution. The idea springs from the concept of 'broadcast search'- the process by which multiple people's solutions based on their past knowledge and experience are leveraged by throwing problems open to more and more people to solve and contribute.

The process of Open Innovation typically consists of the following steps:

a) Problem identification and statement
b) Decomposition into well-defined solvable sub-problems
c) Gathering solutions for sub-problems from the crowd
d) Re-integrating these solutions to arrive at a final solution

Literature Review

The beginning of research on Open Innovation is seen in [1] where the author describes how traditional innovation within a firm is not sufficient to sustain competitive advantage as it could lead to firms losing out on valuable inputs from outside its structure. In [2], the various combinations of what a firm can leave open for innovation are explored, in terms of exploring the role of R&D within the organization versus externally. The next step to making Open Innovation work is to establish a platform to accomplish the same, as done in [3] where the value add of the platform is discussed in terms of breaking down a problem into solvable sub-problems in a way that each one is a workable tangible problem that can be put out to solvers. How these solvers are then incentivized depends on whether a competition or a contest is carried out. The example of Innocentive.com is taken to explain how a platform needs to have the ability to recombine solutions from multiple sources in such a way that none of them is in conflict with the other and yet all the objectives of the system are satisfied. Finally, in [4] and [5], the authors examine how large crowds can better contribute in the innovation process as compared to a fixed set of people. If any such system of Open Innovation is to be implemented, the papers give suggestions on how it should be enforced as the size of the crowd becomes bigger. Also detailed are various examples of implementation and a

framework to decide which type of open innovation is best in which situation/scenario of the problem in focus.

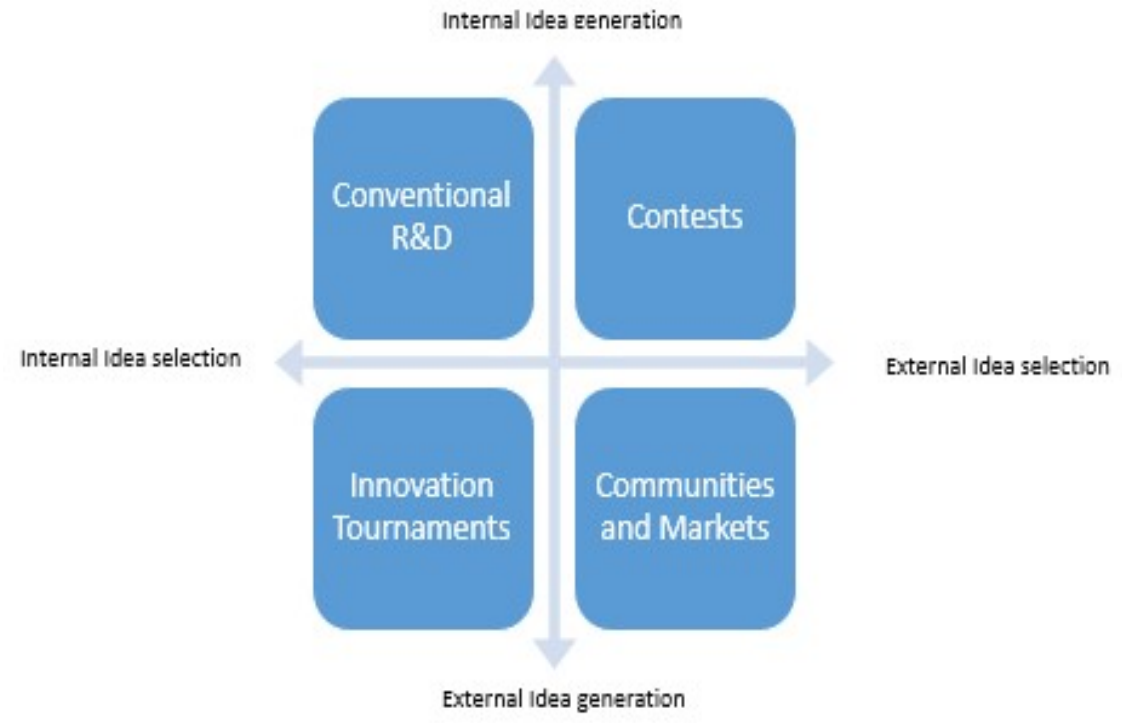
Different forms of Open Innovation[6]:

The various forms of Open Innovation with their purpose, applicability and challenges are listed below:

	Purpose	Challenges	Best Use
Contests	Conducting large scale independent experiments over diverse backgrounds to generate solutions to problems.	Problem must be generalised while maintaining the confidentiality of the company specific details	Highly challenging technical, analytical & scientific problems, design problems, creative or aesthetic projects Ex: Top Coder
Collaborative Communities	Combining a massive number of independent diverse solutions in such aa way that a creating solution	Difficult to synthesize a large crowd without a common culture. IP protection is burdensome.	Wikis, FAQS, Customer Support Communities, open-collaboration projects for information and software projects. Ex: Android
Complementors	Encouraging innovative solutions centred around the core product to various other user problems	Technological challenge to provide access to the functions and information in the core product while protecting your assets	Open operational, product or marketing data initiatives; applications Ex: iTunes store
Labour Markets	For discrete tasks through efficient and flexible mapping of talent	Identifying which problems to open out and who will manage the labour pool is a problem area	Tasks which are easy to articulate, divide and require heavy manual or machine effort without much intellectual effort such as captioning of photographs, cleaning data sets etc

[6] Boudreau, Kevin J., and Karim R. Lakhani. "Using the crowd as an innovation partner." Harvard business review 91.4 (2013): 60-69.

Selecting the right innovation platform – what to open[7]



Advantages of Open Innovation

- Spreads R&D expense of an organization over a larger pool of ideas, broader reach for firm
- Increase in the number of ideas that become available from diverse set of people all across the globe who bring past experience in multiple sometimes unrelated fields
- Possibility of getting lateral thinking approaches from the pool of numerous ideas
- Re-usability and refinement of solution with support from other solvers across domains
- Solution to offshoot related problems can be found by collaborating solvers to identify problems

Instances of Crowd Sourcing Implementations

Crowdsourcing is a popular alternate name for the paradigm of open innovation. It basically refers to the same concept of aggregating ideas from multiple sources to solve problems. There have been multiple instances of crowdsourcing which have caught the

[7] King, Andrew, and Karim R. Lakhani. "Using open innovation to identify the best ideas." MIT Sloan Management Review 55.1 (2013): 41-48.

eye of the media and public, however not all have been positive. A few such instances are detailed below.

Successful Implementations

1) Apple – has turned to large number of users and developers distributed around the world to propel its growth by creating apps and podcasts that enhance its products
2) Biologists at University of Washington – Used external contributors to map the structure of AIDS-related virus.
3) Innocentive – Cloud based innovation management platform that splits up the problems received from its clients into sub-problems and crowdsources innovative solutions from the smartest people globally who compete to provide ideas & solutions. It later integrates all the solutions to the sub-problems into a coherent whole and hand it over to the client.
4) TopCoder – Company that hosts different computer programming contests and pays royalties to the coders depending on the sale of the software they developed

Failed Implementations

1) PepsiCo, the food and beverage giant created controversy in 2011 when its crowdsourced entry into the Super Bowl Ad created controversy by featuring Doritos Tortilla chips being used instead of sacramental wafers during Holy Communion.
2) Kraft foods Australia division ran into problems when it launched a public naming contest for its cheese snack. The name that Kraft chose from the submissions iSnack2.0, attracted widespread ridicule and it had to be abandoned.

Concerns for moving towards crowd based solutions

1) Moving from a well-coordinated environment to a cloud platform which is decentralised & loose is a bit difficult
2) Protection of Intellectual Property is an issue
3) Integrating a crowd-sourced solution and putting into operation is a nightmare due to the difficulty in estimating the correctness of the solution based on unfamiliarity with people's skillset.
4) Arrow's Paradox is a major barrier – Fear of having the ideas copied unfairly & uncertainty regarding the ownership of ideas might discourage the talented innovators from participating & thus leaving a weak pool of contributors.

Platform Design

The next step in the study was to apply the understanding of Open Innovation gained from our understanding of theoretical constructs as well as our local understanding to then develop and implement a pilot platform for crowdsourcing solutions to traffic problems.

In order to do this, we first needed to answer some fundamental questions about the nature of the platform being developed.

Who are the end users? The Bangalore Traffic Police should be the end users of the platform

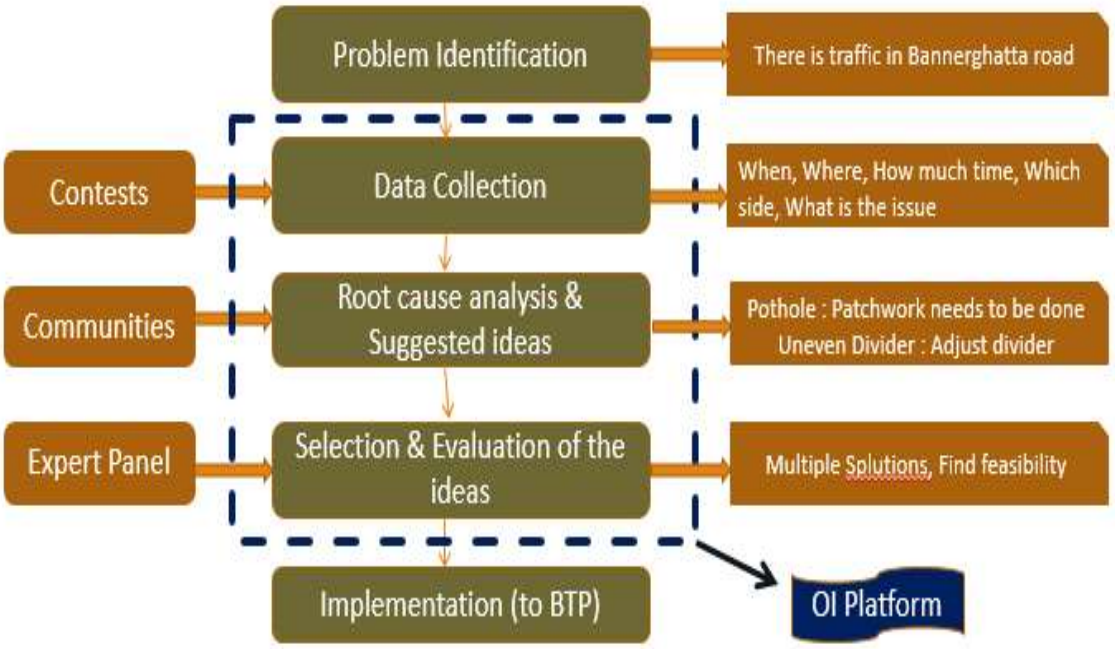
What is the platform? It must be a channel to crowdsource on-ground, real-time data from citizens who experience traffic in their daily life. We propose that the platform not only aggregates this data but also aggregates suggestions and potential solutions to these problems. For this, two types of Open Innovation models will have to be used namely contests and communities. **Contests** will be used to collect and create a continuous data stream which can then be analysed for further optimization and processing. **Communities** will be developed consisting of civic minded citizens who are willing to use this data or independently come up with ingenious local solutions to the traffic problems of the particular area in which he/she resides.
The role of the platform will be in **assessing and identifying** the multiple solutions received and determining which one is most feasible and ideally implementable for BTP. Since this would require a high bandwidth and also a high level of local familiarity and awareness about the implementation challenges potentially associated with any solution, we propose that this is done by **a group of experts including citizens, ex and current policy makers and BTP** representatives. They would broadly constitute the owners of the platform who would be responsible for the quality of solutions that emerge from it. The implementation can be handed back to the BTP and then local enforcement and maintenance can again be handed over to citizens to take care of.

How will it be built? The platform's inception will depend on finding a suitable 'owner' which we plan to do based on expert interviews, faculty opinions and interaction with NGOs and officials from BTP. Once this is put in place, it would be easier to establish the

incentive structures and the functional aspects such as who would state the problems and how the solutions will be curated.

Phase 1: Initial Design

As described above, we initially hypothesized the following architecture in order to implement **both contests and communities** in the process of solving traffic problems which were earlier shown having inputs from the crowd at multiple points or phases. This was done so that each level of involvement of the community with the traffic police can be handled separately, according to the unique nature of each interaction, for example the approach and needs of a data collection system would be diametrically opposite to those of a system that deals with a community of problem solvers. Using a single problem of Bannerghatta road, we broke it up into the sequence described earlier and suggested appropriate open innovation constructs for each stage.



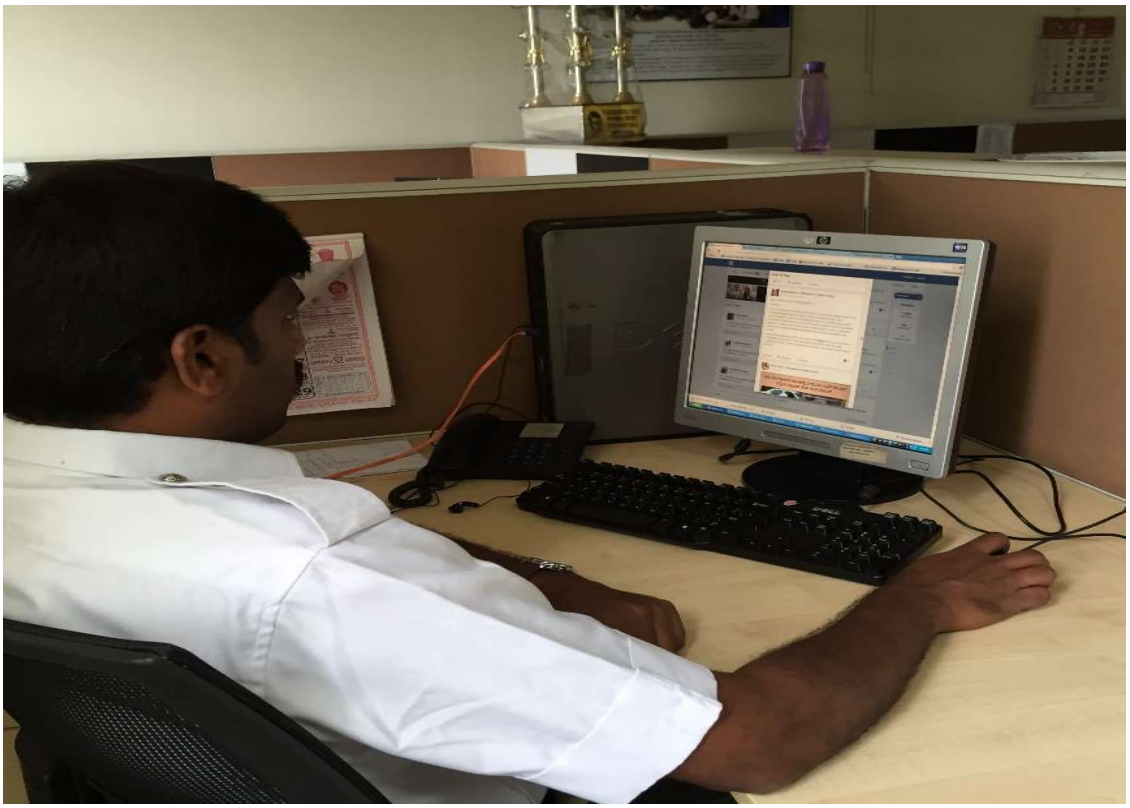
Primary Data Collected to assess the above architectural model

In order to test the practicality, efficacy, feasibility and impact of the above model, we conducted interviews with experts who would ultimately be the users and panellists of the above platform, namely distinguished academicians who have previously worked in the field of traffic management and route optimization, as well as the commissioner of

police himself, who would be responsible for whetting this proposal and then implementing it as a **top-down directive for the Bangalore Traffic Police** unit right till the beat patrol officers. In the course of the interview, we were pleasantly surprised to see the level of **technological advancement and agility of response** shown by the control room on social media, negating our earlier view that perhaps there is a lack of data coming as an input to solve traffic problems. We have shown photos of the control room and detailed our insights from our conversation below.

Figure 1a, 1b, 1c- Traffic and social media management at the, BTP Control Room


Bengaluru
COFFEE BOARD JN
MEKHRI CIRCLE-BELLARY RD



I. Insights from interview with Dr. M. A. Salim, Traffic Police Commissioner, Bangalore City

II. Apart from traffic, a lot of complaints on the BTP Facebook page pertain to other local bodies which **do not have a social media presence.**

III. There is a vast difference in expectations, attitudes, traffic behaviour and citizen proactivity between certain areas such as **Old Bangalore vs IT Developed Areas**

IV. Complaints about traffic along a particular corridor are coming from citizens who are **not residents of the corridor**

V. There are **enough** high resolution cameras, surveillance systems and real time update bulletin boards for informing the public about traffic situations in Bangalore but these are only for **traffic junctions and signals** and do not cover by-lanes or signal free roads which can be used alternatively

VI. **CTF- Citizens Traffic Forum** held every **third Saturday** of the month, for commissioner and senior officer across **42 police stations** to resolve traffic grievances and brainstorm about the same.

II. Insights from visit to Bangalore Traffic Police Control Center

1. Apart from traffic, a lot of complaints on the BTP Facebook page pertain to other local bodies which **do not have a social media presence.**
2. There is a vast difference in expectations, attitudes, traffic behaviour and citizen proactivity between certain areas such as **Old Bangalore vs IT Developed Areas**
3. Complaints about traffic along a particular corridor are coming from citizens who are **not residents of the corridor**
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Bangalore but these are only for **traffic junctions and signals** and do not cover by-lanes or signal free roads which can be used alternatively

5. **CTF- Citizens Traffic Forum** held every **third Saturday** of the month, for commissioner and senior officer across **42 police stations** to resolve traffic grievances and brainstorm about the same.

III. Interview with Prof Rajluxmi Murthy, researcher in Public Policy, IIM Bangalore

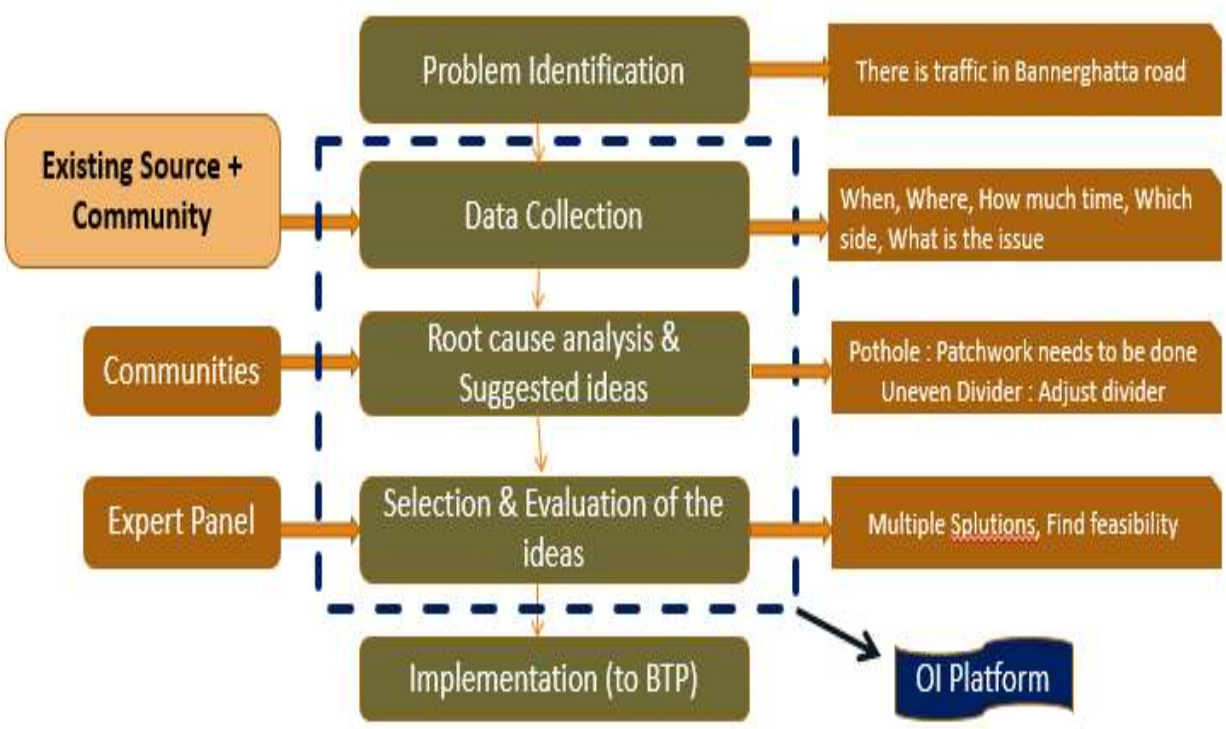
1. The composition of the **expert panel** should be such that it is replicable in other localities as well.
2. Too many **intermediate steps** as a part of the open innovation platform is not good. So we have decided that we will go ahead with a community and will incentivise people accordingly.
3. Since the people reporting the problem also have a good insight into the probable cause, they will be a good source to give **initial leads** to solve the issue.
4. **Ownership of the platform** should be given to multiple stakeholders so that even if one stakeholder drops out there is someone to care of the platform.
5. It will be difficult to involve **BMTC drivers** to help with giving the information unless the orders come from the top. This is again subject to a lot of vagaries – government changes etc.

Conclusions from interviews and need for redesign

One of the most striking insights that evolved from this stage of primary research was the fact that **there was simply no need to duplicate efforts related to data collection.** Any and all data that was required was already present as an input through multiple diverse sources. The need of the hour was to **collate and standardize** the form of this data and ensure that there was an integration between the various input sources. The quality of data was cited to be high but there will always be the need to ensure that it is **coherent, recent and valid**. The role of a community supersedes that of a contest in this scenario and hence we re-designed the platform to incorporate the same. This was accompanied by the realization that the very meaning of the Open Innovation paradigm meant that

people did not need to be incentivized to join the platform and contribute towards a cause. With this insight, the improved and final design is shown below.

Phase 2: Final Design



Gauging public sentiment and requirements in implementation

In order to understand essential features that users would like to see in the platform, we conducted a survey for commuters in Bangalore. We had **18 respondents** across students and working professionals who live in different parts of Bangalore city and commute every day. The insights from the same are given below:

- I have been a victim of a traffic jam at least once: **100%**
- Average Distance commuted everyday: **10 km**
- Average time spent in traffic per day: **half an hour**
- Most commonly cited area of traffic jam: **Silk Board Junction, Marathalli Accenture signal, Madiwala Total Mall Junction**
- Willing to contribute to solving traffic issues: **85%**
- Most preferred device to communicate from: **smartphone**

- Features suggested in website: **instant photos, provision to vote/down-vote, community, chatrooms**
- This will be very popular if created in the format of an app: **65%**
- The remaining respondents felt that giving some kind of blog-like informational and interesting content about each area of Bangalore and its uniqueness would be a better way to drive engagement so that people use the platform to report.

Bangalore Crowd Traffic Platform Model – Mockup

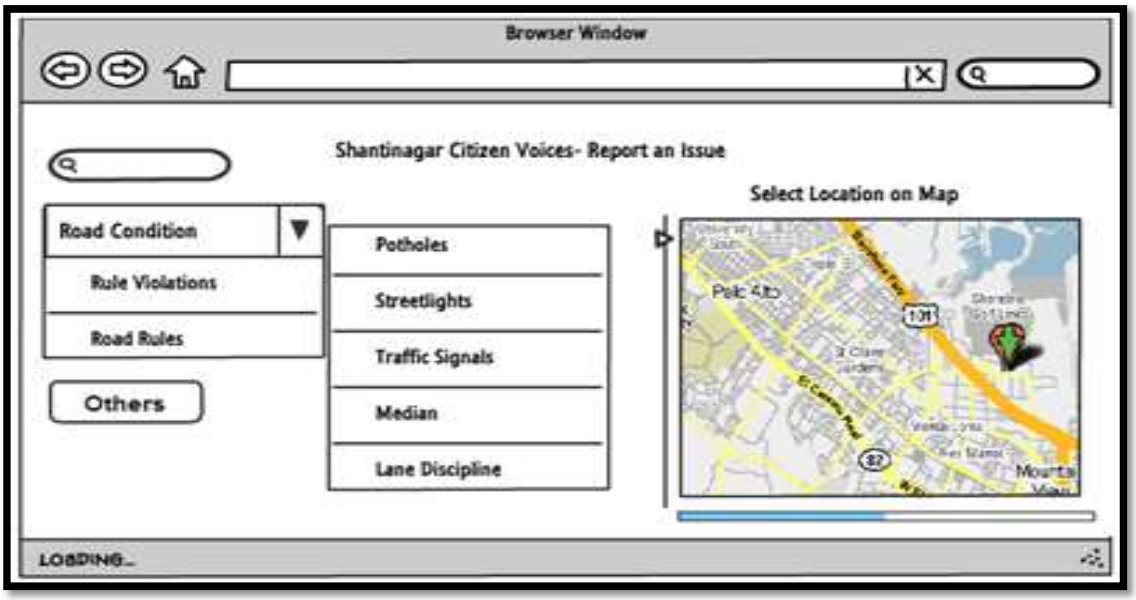
Based on the above architecture and insights, we designed multiple wireframes of the proposed website design in order to conduct an **A/B test** with users, or show multiple versions at the same time to different users within the same target group, with the aim of requiring the group to select what features are most important for them. The w

The Platform will have the 5 items on its launch page

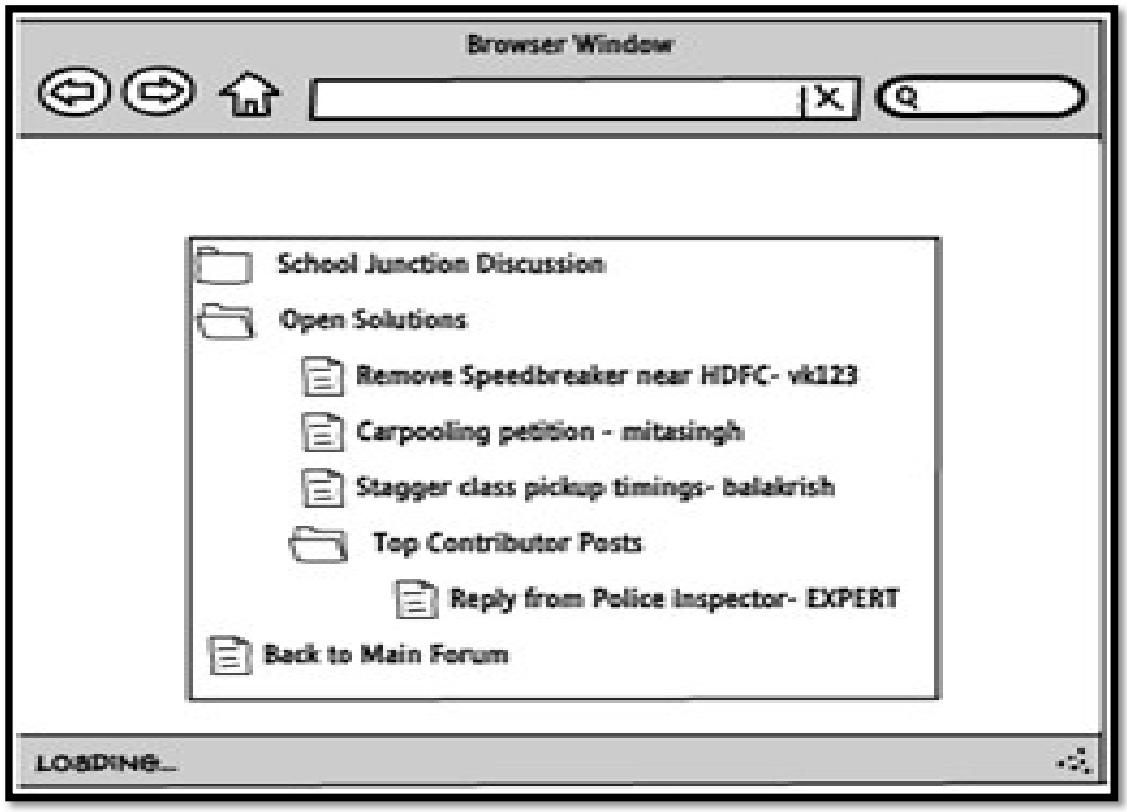
1) Forums – Where issues specific to particular locations are discussed
2) Dream projects – Citizens speak out their own ideal wish list for their locality/city
3) Contest winners – Every month three problems are identified and solved. The best solution is listed in this thread
4) Success stories – The change in situation after successful implementation of an idea that came from the platform is shown in this space
5) Miscellaneous

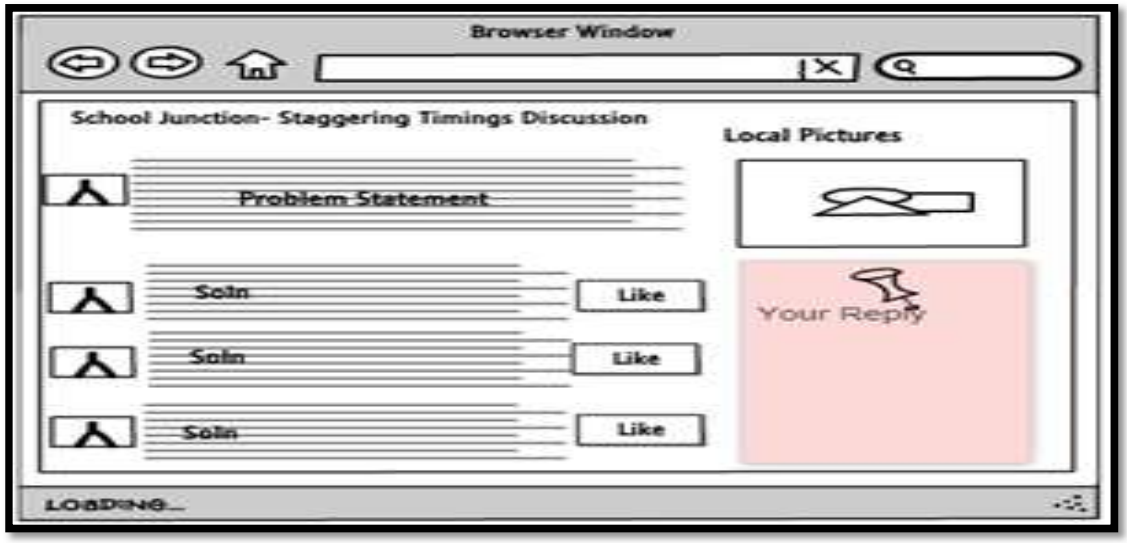
Once the Forum item is selected, it prompts the user to select his location on the map.

If the user has to contribute to the discussion of an existing problem, he will be given an option to select that thread. If it is an entirely new problem, a screen comes up which asks for the details to create a new thread relevant to that problem.



If it is an existing problem, the moment the users selects the problem the below screen would come up which already has the listing of open problems in that locality. The user can now contribute to the discussion.





Points Structure and system of self-moderation

As a start the **traffic police are given 500 points each** to put up the problems on the forum. For every post put on the forum the contributor gets **+1 points**. When a response

gets an up-vote the contributor gets an **additional 5 points** while a down-vote would fetch him a **negative 2 points**. This prevents the illogical spamming in the threads created. To also prevent people from randomly down-voting, the person who down-votes will also lose 1 point.

Like any other online forum, the contributors to the platform **are rewarded depending on the quality** of their contributions that are judged in terms of **relevancy, currency and implementability**. Initially, a board of experts such as police officers and the academicians and NGO owners are put in place as **forum moderators**, leveraging on their prior experience as a source of expert knowledge. The self-regulating democracy inherent in the above point structure will then come into play as users will rate each other and evolve their own set of leaders and forum moderators.

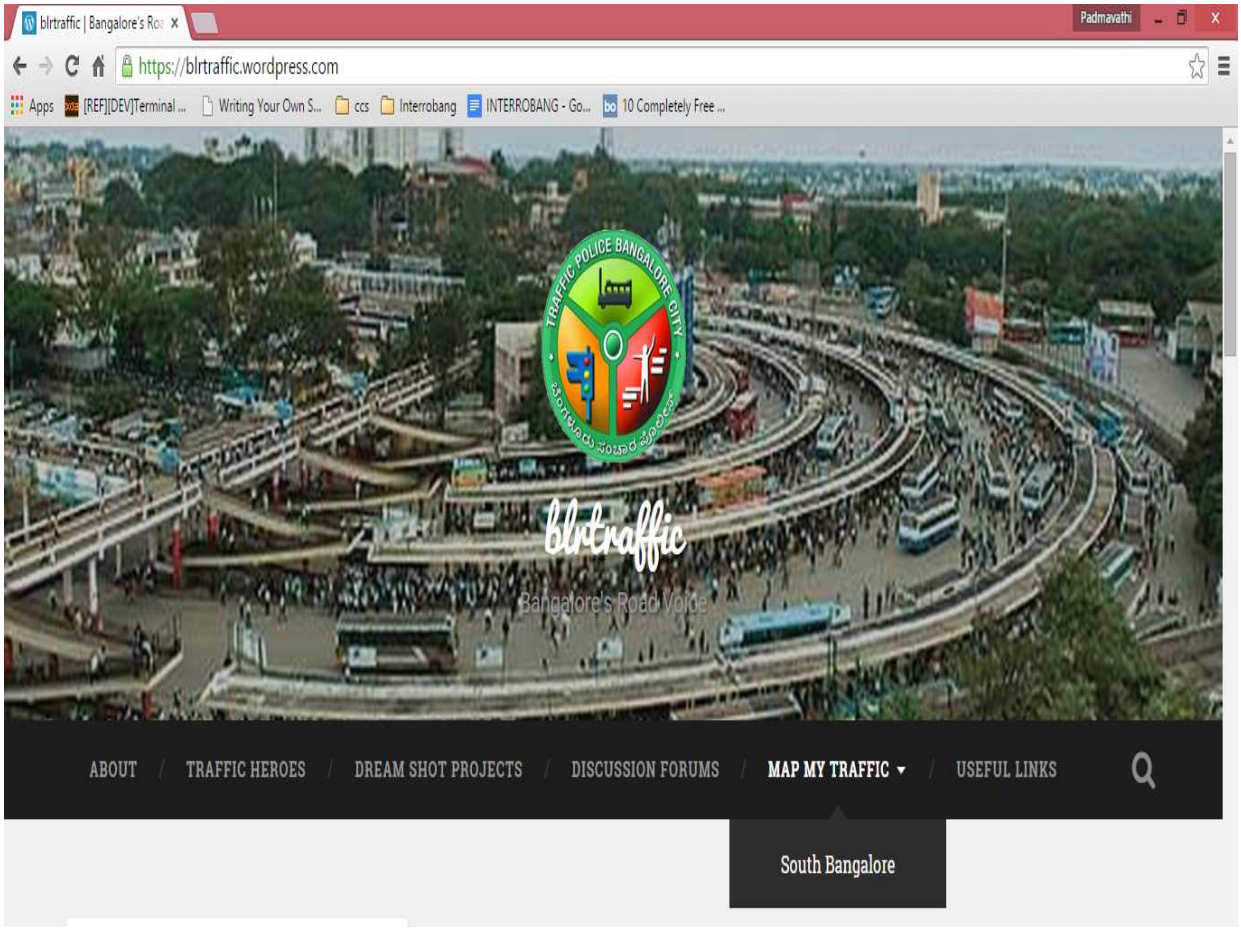
In order to refresh and replenish our data cache, we plan to have a **contest to identify the best 3 ideas every month** and reward them with points. For the entire platform, a tie-up with a popular taxi aggregator is envisaged wherein points can be converted into credit for those using the service of the aggregator. This would also drive a lot more first time users to the **aggregator and serve as an incentive** to users on the platform to contribute regularly, which might not happen otherwise if the respondents are otherwise occupied.

The screenshot of the profile will be as shown below

Website Interface Design

Based on the positive responses and feedback for the wireframe designs shown above, we then launched and created the forum design on the web. The current Wordpress website being used to host the site is compatible across multiple devices and screen formats. We suggest that it can later be modified to include more plugins such as **Google Maps integration**, and a more immersive social media integration such as a **live feed.**

The Landing Page of the same is shown adjoining where users have access to a number of different applications and can check for various localities and zones according to their relevance.

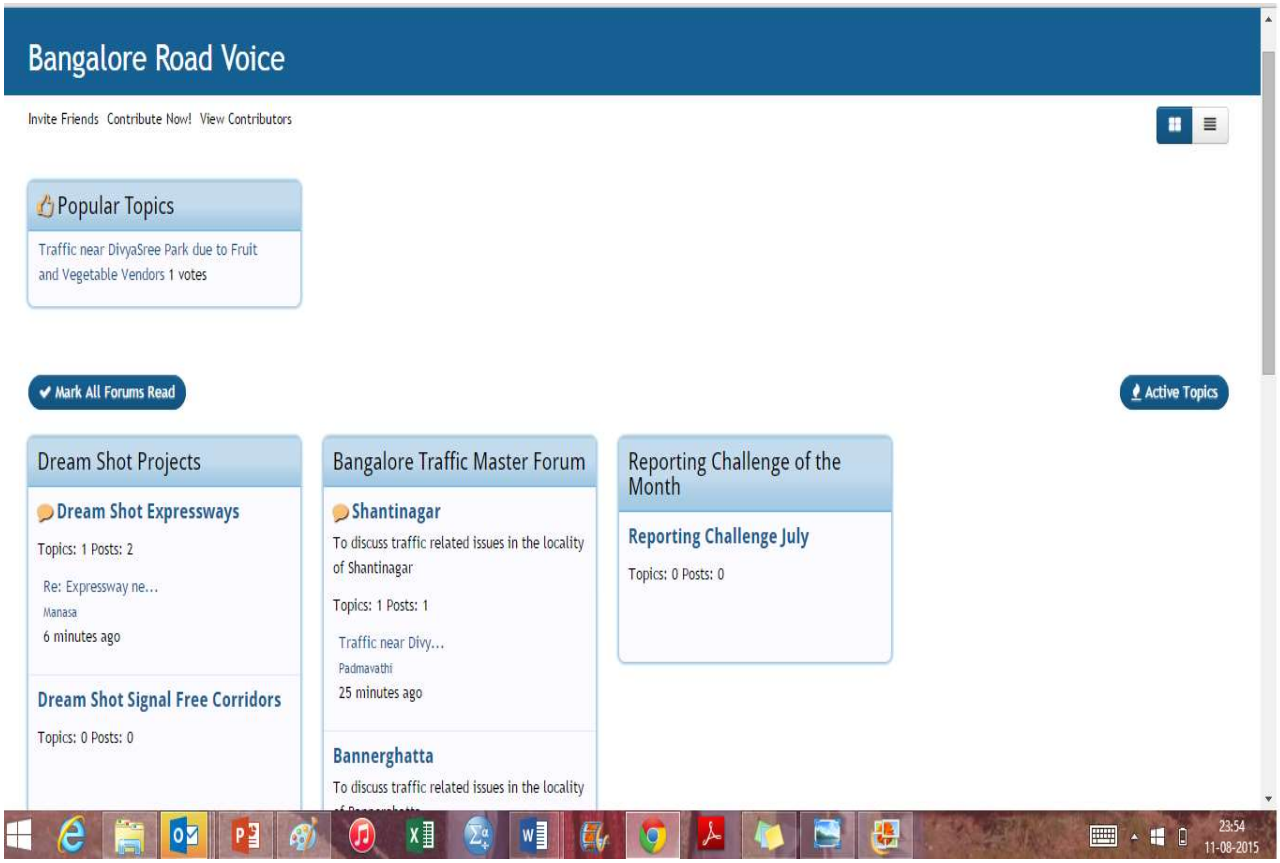


The above landing page can be made responsive and interesting using informative and creative ways **to share information about Bangalore** and maybe even tips like commuting, best places to visit when, do's and don'ts while shopping, etc. For each area they have a landing page with a link to **sub-domains** where they can go to Google Maps and pin point their location or that of the issue on the map, which they can share when posting in the forum.

When users click on Discussion Forums or Dream Short Projects, they will be redirected to the forum.

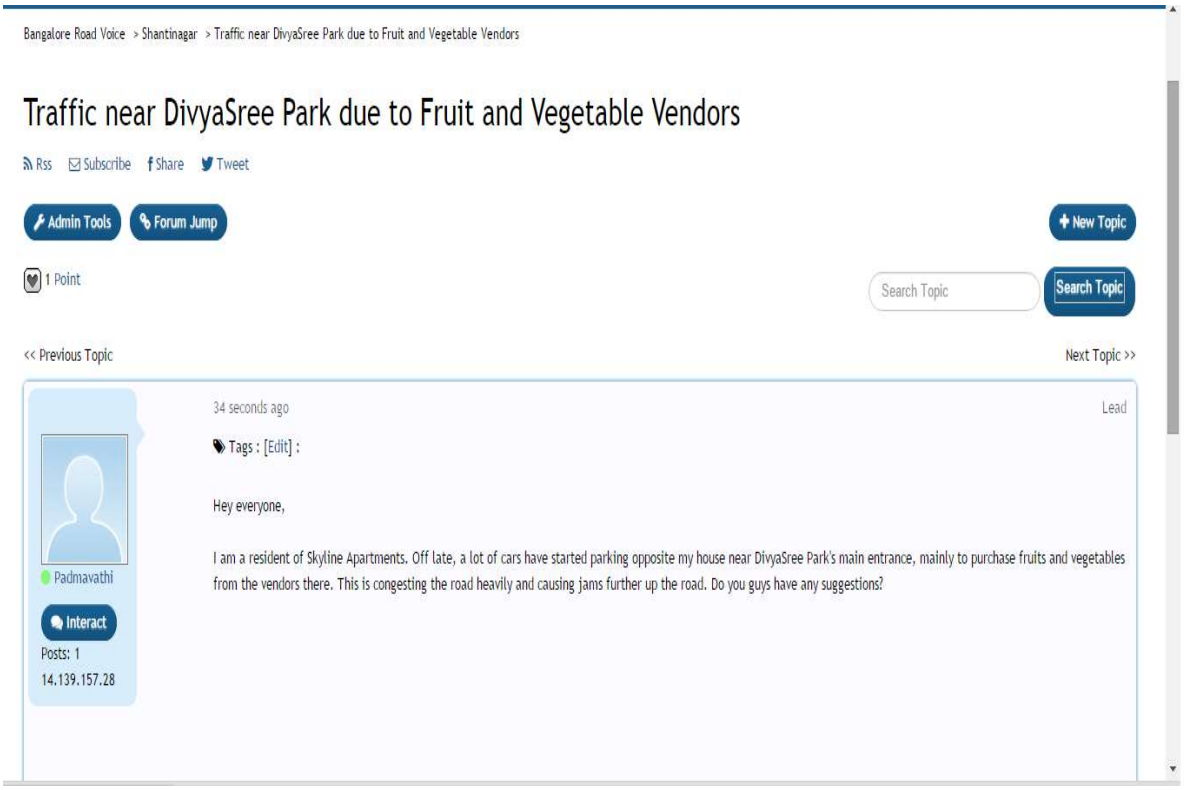
Using the example of the Indian Railways Informant System[8], we built a platform layout which showed the various discussion boards as shown below:

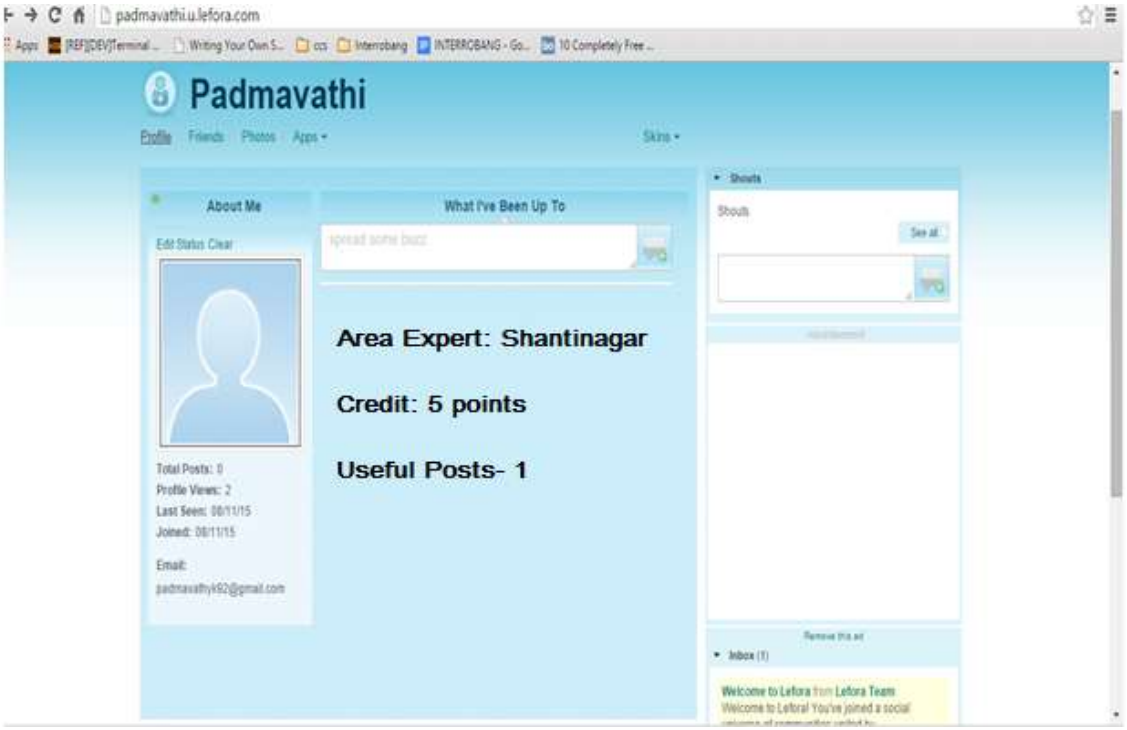
[8] www.indianrailways.informe.com



Once users reach a particular forum page, they are taken into the discussion threads for various posts. Some of the features include linking, up/down voting, commenting, posting, Sticky Notes, media sharing while posting and embedding map/social media links. This way users can engage in conversation with each other and create an **interactive community**.

An example of a sample post is shown along with user profile is shown below. In this, the user is identified by **IP address** but this can be replaced with **geolocation** or tags to identify the current location. Users can then be called experts for various localities where they **live, work or commute maximum.** Based on these, their profile will reflect only those forums where they are up-voted by local experts, hence eliminating irrelevant problems.





Having designed the forum this way, the next step is to ensure that the **publicity and adoption of the forum** is done well. For this, we conducted two interviews with a representative member of the community of cab drivers as well as with an NGO expert.

2. Insights from interview with Mahadevappa, driver whose brother is with Olacabs

1. Most cab drivers aggregate around a particular spot and refuse to move because **there is no designated area** for them near malls etc but they all want to be closer to commuters.
2. Drivers for cabs generally have **two phones**, one of which is a low-mid end smartphone which they keep switched on only when they are **on duty.**
3. However, they are **not very familiar** with the working of these phones and hence **do not open apps** other than Ola/their provider
4. They like to **listen to the local radio** when they don't have passengers, and use it as a source of traffic information updates
5. Most drivers in general **do not like to key in/type** in long posts or replies, or have to choose options from a screen to register complaints.
   When in traffic, most drivers **switch on their personal phone/call, play music if alone**
6. The **ideal complaint mechanism** should be a one-touch system for landing and registering complaints. For this, some of the features suggested include:
   a. IVR to record a voice message
   b. Whatsapp to post pictures
   c. Giving a missed call, will be called back to be asked about traffic
7. While posting complaints, drivers would like to have
   a. Some kind of **confirmation** and **updates** on the follow up action taken
   b. A one-stop place to see all the past complaints/others' complaints
   c. Prefer **face to face** discussion of issues and solutions rather than online

3. Insights from Interview with Mrs. Priya Krishnamurthy, Executive Trustee, Children's Movement for Civic Awareness - NGO

a) **Popularizing online forums** would require offline activation campaigns which target building by building or society by society and **incentivize them** with Ola Credit or discount coupons

b) **Don't suggest just another app** because hardly anyone will download and open it when they are faced with traffic. As a commuter, my first response in traffic is to go to **Facebook** so if you could put up something there it would help.

c) **Children in schools** are extremely enthusiastic champions of any cause that comes through their school or friends. Target them for spreading awareness in their localities and being on-ground crowd mobilizers through events.

d) **Traffic Policemen** may not be willing to accept this initiative unless it is integrated with their existing reporting and booking technology including Blackberrys etc.

e) **Morning joggers' parks** are a good way to target senior citizens but since they aren't tech savvy, you should have someone to **sit with them** and enter data into systems

Implementing solutions from the forum and platform

The final step of completing the platform architecture is to **adopt and curate** solutions from the crowd and get them ratified and integrated by the panel. From our interviews we realized that a **web based text/media platform is not sufficient** to capture data from a large segment of contributors, and something like a speech processing engine would be a better way to capture inputs. Based on the current capabilities of BTP, we recommend integrating the same with the myriad other features present in their portfolio of services.

We suggest using the monthly **Citizen Traffic Forum** as a vehicle to discuss and take forward the outputs of the community. The online discussions for the same will close **one week before** the CTF and then all inputs will be ratified and collated by the panel.

The traffic commissioner mentioned that the CTF panels have low attendance, mainly absenteeism of youth and relevant stakeholders. Therefore current CTF panels are reduced to grievance follow up meetings that do not add value to the community or organizers. If the CTF were to **prioritize top 3 issues with proposed solutions** for discussion every month, it would be easier to **rope in representatives of multiple civic bodies such as BBMP, BMTC, BESCOM and BWSSB** to discuss and ideate on the solution proposed from the forum as well as the next best alternative to the same.

In order to reduce the discussion required, the forum will itself have a **self-moderating** governance mechanism whereby posts will be up-voted based on importance to the community and these will in-turn be validated by the experts. A similar approach will be

followed for evaluating solutions, where the democratically formed board of experts will evaluate and propose the top 3 solutions in terms of their **practicality**, **relevance and feasibility.**

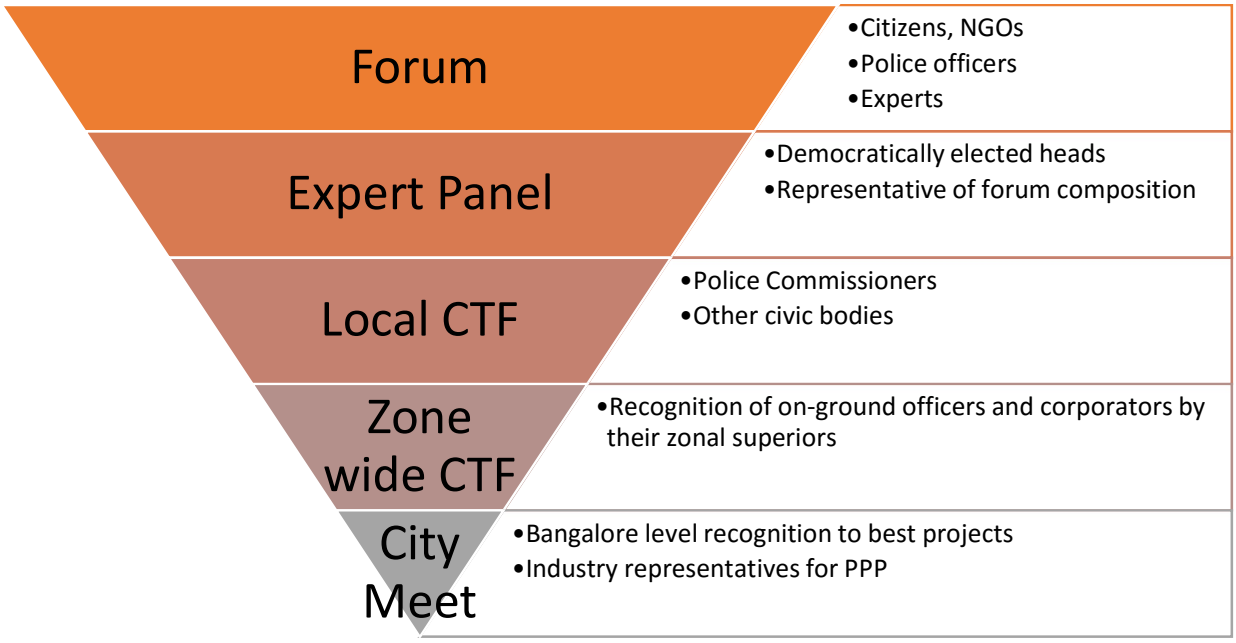
Integrating the forum with Social Media while differentiating its purpose from it

While all inputs uniformly pointed to the fact that social media is an effective way to **capture crowd attention and spread awareness,** the extent of integration with social media is still to be decided. In terms of purpose served, the forum needs to be clearly differentiated from traditional social networks where people interact. The reason for this is that primarily, social networks elicit three types of behaviour- **sharing of extraordinary experiences** in the form of brickbats and bouquets as is popularly done on Twitter, **information dissemination** in terms of updates such as weather, natural disasters, traffic etc for which Whatsapp proves ideal or **choice seeking behaviour** such as opinions on a new dress, place to eat and so on, as seen on Facebook. While these can each serve their purpose with respect to the forum, we believe that **looking for serious, dedicated and focused problem solvers** on social media might not yield results and might dilute the purpose of the forum. Hence we suggest the following measures:

1. **Integration of inputs** from the BTP Facebook page as forum posts
2. Facebook **mobile advertising** for the forum for commuters
3. Violation and immediate **reporting/information** on Whatsapp
4. Using all social media formats to **recognize efforts** of problem solvers

Hence social media can also prove as an effective tool in collating inputs received through other forms such as voice inputs, interviews, videos and audio clips. These can be **translated and shared in words** by forum members without compromising on the quality of inputs received just due to the format.

Conclusion- Expanding across Bangalore City and Future Scope



A **quarterly city-wide CTF** should be held in order to share and collaborate learnings across CTFs, with awards given to the **best locality** to implement solutions which have arisen from the CTFs. This would give an incentive to local corporation representatives, citizens and ward councillors to **follow up and implement** the solutions coming out of the forum much quicker and within a visible horizon. These could then serve as brownie points during **civic elections** for certain candidates and ensure that they build credibility and recognize the efforts of those within their community. This would also ensure that only the best replicable solutions make the cut and are shared across the city so that they can be discussed and modified as per each locality. This initiative effectively **rewards plagiarism through replication and customization** by awarding not only early adopters of solutions but also those who can tweak them to serve local community needs.

Hence we believe that the platform developed successfully leverages on the strength of the crowd as a source of innovation, collaboration and information coming together to solve a civic and socially relevant issue. Further work would include implementing the same for other issues such as healthcare, education and other areas to build a highly networked knowledge community.

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