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Research Master Planning and Sustainability: Urban and Regional Planning

BUILDING SMART URBAN ENVIRONMENTS, INSIGHTS FROM INDIAN CASES.

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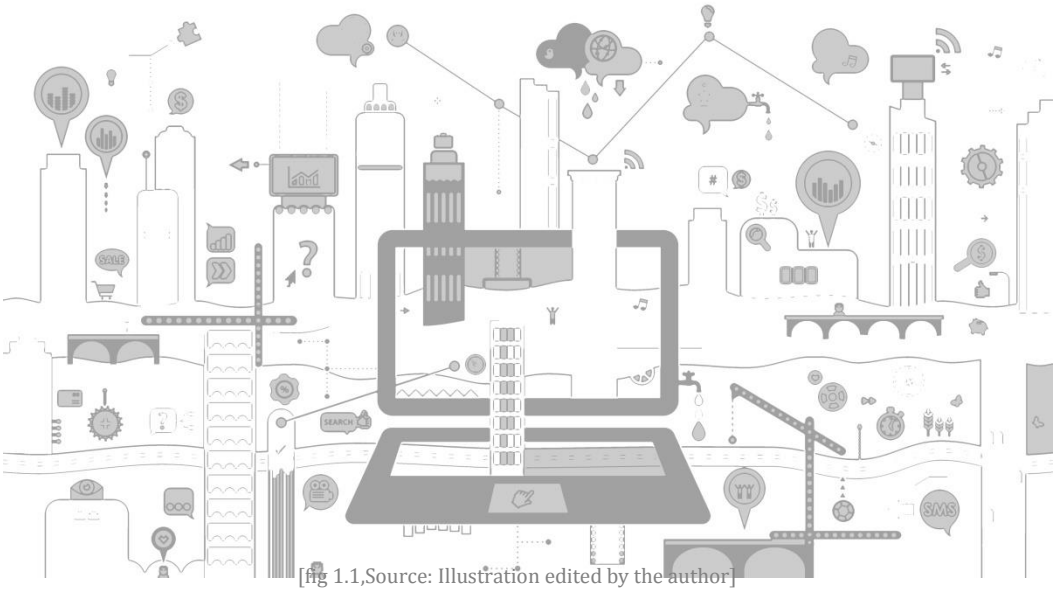
ABSTRACT

Use of Interactive Technology in urban planning is relatively an innovative idea when it comes to implementation in finding usage in social collaboration. The use of intelligent systems in public spaces for different domains like energy conservation, education, healthcare and the domestic environment is quite common in western countries. The present study investigates the idea of using interactive and persuasive technology as aids and catalyst to facilitate social interaction and collaboration, to find solution for themselves to different social problems that people face every day.

There exists little data on documentation, process and outcomes of use of interactive and persuasive technologies and their usage for urban planning. Living in a space with embedded systems and communication devices, where sensors are embedded into physical object and computation is seamlessly used to enhance an ordinary function or activity. The argument and the findings of this paper is that the practice of technology on physical space which does not involve or require human input and collaboration does not necessarily make the environment intelligent or based on the examples of usage of technology on previous cases in India as a field of reflection. The results of this research and the proposed ideas might lead to opening up better understanding and provision for the use of interactive technology in an urban environment.

Keywords

Smart Urban Environments, technology, Social collaboration, Problem solving, Intelligent environments



[fig 1.1,Source: Illustration edited by the author]

1. INTRODUCTION

The embedded systems, interactive and persuasive technology in an urban space are currently used to seamlessly enhance an efficient use in a physical area or social context. The interest in such type of technology has been constantly increasing since the systems not only make everything genuinely user friendly but they are also invisible to the user. But does just having this advanced technology make a "physical space" intelligent than the users? Does having mere technology is what makes an environment or a "physical space" smart? People's use of the interactive technology and of the collective data available on the network can be altered and used effectively by better designing both the persuasive tech system and the physical spaces.

Why do we require smart urban environments? What are the ways of optimizing technology usage to facilitate better social collaborative interaction for the social problems that people confront in daily life? There is certain necessity for change in ways of using and implementing technology in favor of physical spaces. People live in physical spaces, not virtual. Here we mostly refer to physical spaces, in all its diversity, such as house, building, street, a field, and an area in the sea or space. Our use of the word "intelligent" applied to Environments mostly refers to Artificial Intelligence. "An intelligent environment is one in which the actions of numerous networked controllers (controlling different aspects of an environment) is orchestrated by self-programming pre-emptive processes (e.g., intelligent software agents) in such a way as to create an interactive holistic functionality that enhances occupants' experiences." - Augusto, Juan C; Callaghan, Vic "Intelligent Environments: a manifesto". Human-centric Computing and Information Sciences (Springer) (2013).

To understand the core of this research, one ought to know the already existing pieces of content that deny and make this content and methodology work. The vital contrast between already existing "intelligent environments" which is in use in most European counties and "Smart Urban Environments" is proposed and explained in this paper.

1.1 What makes an environment intelligent?

According to several definitions found in the various literatures, Intelligent Environments (IE) are spaces with embedded systems and information and communication technologies that create interactive spaces and bring computation to the physical world and enhance occupant's experiences. "Intelligent environments are spaces in which computation is seamlessly used to enhance ordinary activity."- Steventon, A., and Wright, S. (eds) (2006) Intelligent Spaces: The Application of Pervasive ICT, Springer-Verlag. One of the driving forces behind the emerging interest in highly interactive environments is to make computers not only genuine user-friendly but also essentially invisible to the user.

Intelligence Environments refer to physical environments where information and communication technologies and sensor systems retreat as they get embedded into physical objects, infrastructures, and the surroundings in which we live, travel, and work. The principal aim is to permit computers to participate in activities that were never previously involved and allow people to interact with computers via gesture, voice, movement, and context.

This drives us to the next step of understanding the basic concept of intelligent environments. Intelligent Environments (IE) assume an inexorably imperative part in numerous aspects of our lives, including education, healthcare and the domestic environment. The term alludes to physical spaces fusing pervasive figuring innovation used to accomplish particular objectives for the user, the environment or both.

How has the zone of Intelligent Environments (IE) created? What are its center qualities and how does it contrast from different regions? By "Environment" we allude here to any space in our environment. Although some individuals may likewise consider virtual situations here, we generally allude to Physical spaces, in all its assorted qualities: House, building, road, a field, a region in the sea or space, and so forth. Our utilization of "intelligent" connected to Environments generally alludes to Artificial Intelligence, as characterized in. An Intelligent Environment is one in which the activities of various arranged controllers and sensors (controlling diverse parts of a situation) is coordinated without anyone else's input programming pre-emptive procedures (e.g., intelligent software programmes) so as to make a wholly interactive usefulness that improves inhabitants experience.

1.2 Related concepts and basic principles

There are plenty of related areas which have encouraged the improvement of Intelligent Environments. Many of these ranges cover however they likewise have huge contrasts. We will attempt to clear up how they identify with each other.

Pervasive/ubiquitous computing: examines the procurement of circulated computational administrations which are setting mindful and go with the user consistently over different situations. Universal registering is all the more extensively connected with Human-Computer Interaction while Pervasive figuring is a more grounded accentuation on gadgets, their systems administration and the handling of the information they deliver.

Smart environments: a domain advanced with sensors, some of them with capacity to store and process information locally. See, for instance, for a more complete depiction

Ambient intelligence: refers to the intelligent software that backs individuals in their day by day lives by helping them sensibly.

Intelligent environments: expands on all the past ideas and goes for making frameworks which coordinate a Smart Environment with “Ambient Intelligence” and is situated in the pervasive/omnipresent accessibility of administrations.

To help portraying what we translate by Intelligent Environments, we list underneath some key standards we trust each Intelligent Environment should seek to have: (i) to be sensible to perceive a circumstance where it can offer assistance.(ii) to be sensible to perceive when it is

permitted to offer assistance, (iii) to convey help as indicated by the requirements and inclinations of those which are making a difference, (iv) to achieve its objectives without requesting from the user's technical knowledge to profit by its assistance, (v) to prioritize safety of the user to organize wellbeing of the user at all times, (vi) to have autonomous behavior, (vii) to have the capability to work without compelling changes on the look and feel of environment or on the normal conduct of the occupants, and (viii) to stick to the rule that the user is in command and the computer complies, and not vice versa.

1.3 What are smart urban environments?

In a slight contrast to what the idea of intelligent environments suggest, smart urban environments aim to involve people in the process of aiding help and in solution finding. The city's processing cloud breaks down the data and changes the city in response to the information it has got from sensors. People use the social interface and then disseminate the information cleverly. Inhabitants can likewise change the city experience, customizing it to themselves by entering their inclinations in interactive interface applications. For instance, in case someone is feeling unwell, they could take their blood pressure at home, and the results will automatically be added to your wellbeing record, which is put away in digital mode in the city's cloud. When blood pressure is at a hazardous level, your specialist is consequently paged but the intelligent interface, and soon, the help shows up on the telepresence screen at the patient's residence and speedy consultation is given.

An environment gets to be "smart" when all parts of its infrastructure and government organizations are digitally weaved and optimized in terms of utility of data. The city's insightful base is fueled by three key innovations that share environment and citizen data continually: sensors, the cloud, and smart interfaces. And "Smart Urban Environment" is proposed to offer not just that but more. As per the example given above, "smart urban environments" strive to involve the public and bring about collaboration between different sectors to bring about a collective solution to problems that are faced by the public themselves in day to day life and to facilitate this movement with the help of rich, advanced technology.

The spaces where they can be deployed are several. There are closed spaces with moderately all well-defined limits and others which do not have very defined limits which we can call open spaces. Each of them can be generally characterized by the region (physical space) that the sensors can sense. These situations are typically rich, complex, eccentric, perhaps creating considerable "loud" information, unstructured and sometimes very dynamic (i.e., they change ceaselessly or at least often).The rest of this paper clarifies how individuals working in this domain apply all the learning increased through many years of advances in various fields of Computer Science to permit a framework to comprehend as most ideal as a situation and give valuable decision-making leadership to individuals that interact with that environment

1.4 Research Hypothesis and Structure

The starting point of the research is **To show that contrary to what huge literature says, the "small smart urban environments" cannot depend only on connecting people with digital devices.** In order to outline and examine the points mentioned earlier and the concepts explained, the paper aims to give a clear inference and suggestions based on the previous cases and methods used to employ aid and seed intelligence in environments. This is explained and studied extensively in the literature review where the psychology behind the reaction towards a situation, personality influence on the psychology towards reaction in an event is studied. To better comprehend the ways for employing persuasive technology, huge literature shows how a small urban environment is connected digitally and how the technology is seeded invisibly in the environment. It explains ways and means of optimum usage for an easier interface between unseen data that is poured with the help of technology to people. But it fails to explain or talk about how the users are involved or the part of stakeholders and their collaboration in finding and emanating the aid.

The hypothesis of the research is that **new technologies especially digital technologies could be exploited as levels and facilitators of social innovation. Of real socio-cultural and economic problems people face every day.** After studies from previous experiment and literature and their cumulative idea, the paper aims to explain that technology alone cannot make an environment smart. It could act as a facilitator to provide smart solutions which are found and conceived by the users. There exists many problem people face every day in different fields like education, health care, social, economic, environmental and the list goes on. But the existing cases and literature suggest that technology is used to make the occupants' actions and movements smoother. Is that all there to the usage? What if the environmental intelligence and the social networks come together to provide solutions to problems? It is a huge underlying opportunity which has to be explored and to be experimented upon. The present study aims to propose just that: To use technology as tools and facilitators for a problem solving network managed and decided by the people.

The next section of the paper explains various instances where various possible ways technology was treated as tools for solution finding. The cities in the future are foreseen with the help of studying these previous instances where people used technology to collaborate in crisis times to help each other without any external forced trigger. People themselves used technology as a useful instrument where they were in need instead of using it merely for entertainment, knowledge and communication. This explains that **new modern technologies alone cannot define a "smart urban environment," and new technologies could be treated as levels, amplifiers and as tools for developing socially smart environments.**

Finally, the last section of the paper discusses the various ways and methods to use this emanating opportunity in the area of intelligent/ persuasive technology. It also cites the various instances where it could be exploited to bring about a positive change in a small urban environment. And further, the challenges and the faults in completely digitalizing and putting dependency on digitalized city are discussed and it leads to the conclusion that the people who use the technology are what make the digital environment smart and not the digital technology in the environment.

2. LITERATURE REVIEW

The study on literature for this paper discusses and cites a wide range of related subjects from what makes an environment smart in a very basic view point, the psychology behind why smart environments can make an impact on the human minds for it to be persuasive. Further studying on the aspects of social behavior and its cognition where it goes on to explain the psychology behind the person situation interaction and behavioral changes with situationism. A study on how people change and shape their environments in addition to how it changes them has also been discussed. After careful study on human mind behavior the literature study goes on to establish concrete reasons as to why the use of persuasive technology is much needed. Further the study goes in detail about the existing smart city cases in Europe for a deeper understanding of what has already been done and how this has changed the urban scenario for the better or worse. By studying these previous cases it gives a lead on this research for how and how not the technology can be used. Not only that but also gives us an understanding and helps to look ahead on the existing and possible limitations, the unexplored possibilities that technology can facilitate.

2.1 Nobody is stupid

The thought originates from the question what makes the environment smart? Is it when the people are relatively dumber than the environment or when they are not capable of handling the situation they are put in? This brings us to the basics that every human has developed the ability to discern and react instinctively to the surroundings and the forces around it.

2.2 The Person-Situation Interaction

The intellectual perspective on social collaboration starts with the assumption - that people are intelligent creatures. Our conduct is not incidentally a matter of reflex, taxis, intuition, and conditioned reaction. Or maybe, it happens because of the importance of the simulus, and reflects dynamic intellectual procedures of seeing, learning, recollecting, thinking, and linguistic communication. (John F. Kihlstrom,University of California, Berkeley)

The Doctrine of Traits

The traditional psychology of personality treated behavior as an effect of personal attributes such as traits, attitudes, emotions, motives, and values. Typically, personality psychologists value these behavioral dispositions by means of a questionnaire (or similar instrument), and then correlate this predictor variable with some criterion behavior in some specific situation. In such research, the effects of the environment are generally construed as "noise." The canonical method of traditional personality psychology thus exemplifies the Doctrine of Traits, which may be stated as follows:

Social behavior varies as a function of internal behavioral dispositions that render it coherent, stable, consistent, and predictable.

In fact, Gordon Allport (1937, p. 295) defined a personality trait as: "a generalized and focalized neuropsychic system... with the capacity to render many stimuli functionally equivalent, and to initiate and guide consistent (equivalent) forms of adaptive and expressive behavior." For him, there was a comparison between personality traits and physical traits. Just as physical characteristics are stable features of appearance and body, personality traits are also stable characteristics of behavior. Although social psychologists might prefer a "biosocial" view of traits merely as linguistic categories for the classification of social behaviors, Allport himself preferred a "biophysical" view of traits. For him, personality traits were real in precisely the same way that physical traits were real, and were subject to measurement in precisely the same way that physical attributes were. Since traits are acquired through experience, they are not necessarily genetic. However, traits are somehow represented in the nervous system. These personal characteristics, once established, then mediate between the surroundings and behavior. Traits "render situations functionally equivalent", in that they dispose the person to display similar sorts of behaviors in them, and they "initiate and guide consistent (equivalent) forms of... behavior", in that trait-relevant behaviors all exemplify some disposition, such as friendliness or aggressiveness. (John F. Kihlstrom,University of California, Berkeley)

2.3 How Do People Shape Their Environments?

While evolutionary psychology focuses on the selection of behavior *by* the environment, selection *of* the environment occurs as well. People make choices each, and by virtue of some of those choices they enter one environment as opposed to another. As a result, the match between the person and the environment is nonrandom. Individuals tend to choose environments that are in agreement with their own personalities, supporting and promoting their own choices and propensities (Emmons, Diener, & Larsen, 1986). If gender-role socialization is the ideal example of evocation, the ideal example of selection may be one's choice of mate: people tend to marry people who are like themselves (Buss & Barnes, 1986); and, in furtherance of this tendency, contemporary dating websites tend to match potential partners on the basis of similarity in traits and attitudes). On the other hand, behavior therapists recommend that one strategy for fostering personality *change* may be to choose to place oneself in a new environment that will support a new set of preferences and tendencies. Of course, sometimes the environment is selected *for* the person, as in arranged marriages, or personnel decisions (Arthur, Bell, Villado, & Doverspike, 2006); but at least in the latter case people typically choose the professions for which they will be considered, and can refuse a job that does not seem to "fit" them. In any case, whether ordinary or extraordinary, each such choice moves the person out of one environment and into another, pre-empting alternatives -- with the result that the individual's behaviors will be constrained by an environment that is, to at least some extent, one of his or her own making.

Some accounts of the person-environment fit seem to relegate the person to a relatively passive role: a person with trait *X* will be happy in environment *Y* but unhappy in environment *Z*. From a cognitive point of view, however, such choices reflect active judgments and decisions on the part of the person(s) doing the selection (Hastie & Dawes, 2001). That the cognitive processes may be better explained as judgment heuristics rather than the algorithms of normative rationality (Gigerenzer, Todd, & the ABC Research Group, 1999; Kahneman, Slovic, & Tversky,

1982) does not gainsay the basic point that the person is trying to figure out, under conditions of uncertainty, which available alternative to select. At the same time, it does not matter if the selection is made on intuitive grounds, where the person cannot articulate the basis for his or her choice, or if the basis for the choice is emotional rather than "rational" (e.g., Haidt, 2001, 2002). Intuitions also play a very positive role in analyses of cognitive processes (Wallas, 1921; see also Dorfman, Shames, & Kihlstrom, 1996; Kihlstrom, Shames, & Dorfman, 1996). There may be certain situations where reason fails us, and we must rely on our emotional responses instead; but even in this case, emotion is information for cognition (Niedenthal & Showers, 1991).

2.4 The Doctrine of Situationism

Traditional social psychology, by contrast, treats behavior as a function of differences in the physical and (especially) social environment. In their research, social psychologists typically employ some aspect of the social environment, such as the presence or behavior of other people, and then examine the ramification of this independent variable on some behavioral dependent variable. In this type of research, the effects of differences in individual personality are generally construed as "noise". This view is captured by what might be called the Doctrine of Situationism.

Social behavior differs as a function of features of the external environment, particularly the social situation, that elicit behavior directly, or that communicate social expectations, demands, and incentives. As examples of the doctrine of situationism, the classic definition of social psychology offered by G. Allport (1954, p. 5) can be first considered:

"With few exceptions, social psychologists regard their discipline as an attempt to understand and explain how the thought, feeling, and behavior of individuals are influenced by the actual, imagined, or implied presence of other human beings. [S]ocial psychology wishes to know how any given member of a society is affected by all the social stimuli that surround him."

Ross and Nisbett (1991, p. 9) claimed that "the social context creates potent forces producing or constraining behavior," and identified "the power of the situation" as one of the three legs on which social psychology rested. Similarly, Lieberman (2005), introducing social psychology to neuroscientists, stated that

If a social psychologist was to be marooned on a deserted island and could only take one principle of social psychology with him, it would without any doubt be the "power of the situation." Mostly, classic studies in the early days of social psychology demonstrated that situations can exert a powerful force over the individuals' actions.

Situationism has its clear origins in stimulus-response behaviorism (Zimbardo, 1999). For example, Skinner's assertion can be considered::

"The free inner man who is held responsible for the behavior of the external biological organism is only a prescientific substitute for the kinds of causes which are discovered in the course of a scientific analysis. These entire alternative causes lie outside the individual." (Skinner, 1953, p. 447).

More recently, Bargh and Chartrand (1999, p. 462) identified the mechanism for situational influence in the idea of automaticity:

"[M]ost of a person's everyday life is determined not by their conscious intentions and deliberate choices but by mental processes that are put into motion by features of the environment and that operate outside of conscious awareness and guidance."

2.5 Personality and Social Cognition

Social interactions are decided by what the individual participants perceive, think, and remember—what they pay attention to; how they classify and organize the objects and events they confront; their fund of declarative knowledge about themselves, their interaction partners, and the social world in general; their procedural repertoire of skills and rules for regulating various aspects of social intercourse. The social world lies outside the individual, but the cognitive structures and processes by which the person achieves his or her understanding that social world, and navigates through it, lie inside. These social-cognitive structures and processes, are no less a part of personality than the traits and states of traditional personality theory. And, because cognition is crucial to the interaction of the person and the situation, and to understanding the individual's behavior in any particular situation, they are probably the greater part of it. As such, social cognition is as critical to understanding personality as it is to cognitive and social psychology. (John F. Kihlstrom, University of California, Berkeley)

2.6 Why the use of persuasive technology?

People's ability to make suggestions can be powerfully influenced by the environment in which they find themselves, and you can use environmental triggers, and 'triggers' can, of course, include visuals to seed suggestions which are later taken up by the person seeing and present in a particular environment.

The main idea here is that hypnotic suggestibility happens all the time. And it is often the case that the source of a 'suggestion' is actually not a hypnotist, as such but the environment itself. For instance, research has demonstrated that a subtle background aroma of cleaning liquid in the air influences people to be perceptibly cleaner and tidier than they would otherwise be.

Psychological experiments on simple social behavior: A fascinating piece of research reported in the journal Science in October 2008 used hot and cold cups of coffee. Students were directed to hold a cup of coffee for a few seconds before browsing through an information pack about a hypothetical person and then assessing this person's 'character'. Students who had kept a hot cup of coffee in their hands were significantly more likely to describe the hypothetic individual as 'warm and friendly' than students who had held an iced coffee. As the immediate environment of their hands had seeded their unconscious minds, their responses were largely in accord with the environmental 'suggestion, although they all read the very same information about the imaginary individual.

Again students who were exposed to environmental triggers which seeded the pattern for 'old' and 'frail', such as sitting in an office with a professor surrounded by pictures of very old people and with words like gray, infirm, weak, old, slow, tired both being used by the professor and subliminally scattered on posters and leaflets, tended to walk out of the office at a much slower rate than when they arrived. Students unconsciously exposed to patterns of youth, vitality, energy and strength will walk out of the office more quickly than when they arrived.

People would behave more competitively if there was a briefcase in sight - or even if there was a picture of a briefcase in a picture on the wall. And this happens even when people have no conscious memory of having seen the briefcase afterwards. Again, people are more cooperative when they glimpse words like dependable and support - all without being aware of the change, or what prompted it. Environmental triggers seed behavior and response in people to greater extent than we realize. But a vital point to remember here is that visuals form a very important part of our environment.

And why are we all so susceptible to environmental suggestion? Well, we need to be! Keeping us safe is a major part of the role of the unconscious mind. It needs to be able to do this very speedily in case we need to make quick decisions. So it does something called 'thin slicing'. In other words, it will take one small slice of reality and generalize it, and from that it will determine what behavior to adopt. Of course, appearances may be deceptive, so developing the ability not to do this on occasion gives us the power to get beyond the limitations of this mechanism.

Hence, it is true to say we respond much more powerfully to our environment than we realize. The very visuals one uses, along with other aspects of one's communication, help to create an environment for others. This is the reason for seeding to be very powerful.

Now there are many ways to subtly and indirectly seed suggestions in ways which appeal to the unconscious part of the brain - which is, after all, the part that actually gets us feeling better or feeling like behaving more constructively. One can use hypnotic presumptions to subtly imply a certain outcome without demanding it, for instance, or tell metaphorical stories which have seeded visuals and patterns within them to help effectively seed the environment for someone. So, it's clear that our environment has a profound impact on our psychology and will even influence how quickly we heal.

In summary

- Humans are highly inclined to environmental triggers and these triggers can powerfully seed responses in us.
- Sight shapes environment as strongly as smell, taste, touch and language.
- Suggestions can become much more powerful if seeded with universal patterns that people can relate to easily.

2.7 Study on previous European cases

2.7.1 Amsterdam

The Amsterdam Smart City Initiative which began in 2009 currently includes 79 projects local residents and government and business houses collaboratively developed. These projects run on an interconnected platform through wireless devices to enhance the city's real time decision making abilities. The City of Amsterdam (**City**) claims that the purpose of the projects is to reduce traffic, save energy and improve public safety. To develop efforts from local residents, the City runs the Amsterdam Smart City Challenge annually, accepting proposals for applications and developments that fit within the City's framework (source, Amsterdam Smart City. "Amsterdam Smart City - Projects").

An example of a resident developed app is Mobypark, which allows owners of parking spaces to rent them out to people for a fee. The data generated from this app can then be used by the City to determine parking demand and traffic flows in Amsterdam. A number of homes have also been provided with smart energy meters, with incentives provided to those that actively reduce energy consumption. Other initiatives include flexible street lighting (smart lighting) which permits local authorities to control the brightness of street lights, and smart traffic management where traffic is monitored in real time by the City and information about current travel time on certain roads is broadcast to allow motorists to determine the best routes to take (source, Amsterdam Smart City. "Amsterdam Smart City- The smart home". Amsterdam Smart City. "Amsterdam Smart City ~ Flexible street lighting").

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Fig 2.1 & 2.2 Illustrations representing smart city Amsterdam [source : article, big data smart city march 2016, Amsterdam smart city website]

2.7.2 Barcelona

Barcelona has established a number of projects that can be considered 'smart city' applications within its "CityOS" strategy.For example, sensor technology has been implemented in the irrigation system in Parc del Centre de Poblenou, where real time data is transmitted to gardening crews about the level of water required for the plants. Barcelona has also designed a new bus network based on data analysis of the most common traffic flows in Barcelona, utilizing primarily vertical, horizontal and diagonal routes with a number of interchanges. Integration of

multiple smart city technologies can be seen through the implementation of smart traffic lights as buses run on routes designed to optimize the number of green lights (source – Ibarcelona website link : http://ibarcelona.bcn.cat/en).

In addition, where an emergency is reported in Barcelona, the approximate route of the emergency vehicle is entered into the traffic light system, setting all the lights to green as the vehicle approaches through a mix of GPS and traffic management software, allowing emergency services to reach the incident without delay. A new bus network was implemented in Barcelona due to smart city data analytics. Barcelona implemented sensor technology in the irrigation system in Parc del Centre de Poblenou, which monitors irrigation patterns for gardening crews in real time. Emergency vehicle routes are also entered into the traffic light system, setting all the lights to green as the vehicles moves towards their destinations without delay.

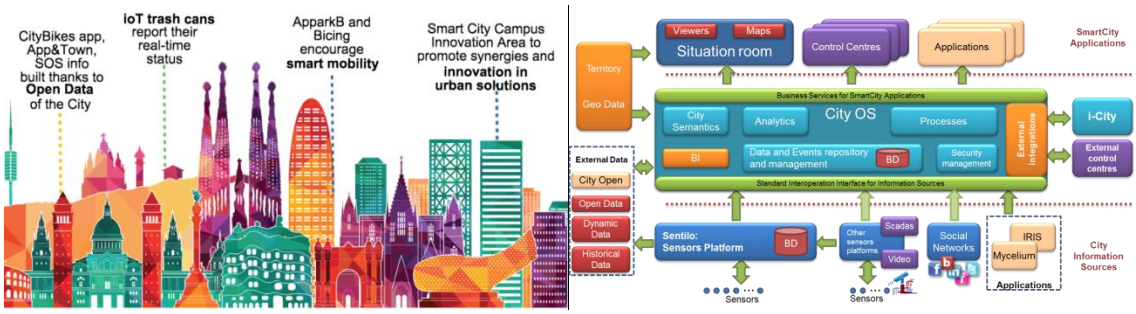

Fig 3.1 & 3.2 , Illustrations showing Barcelona OS [source : smart cities project, the website]

2.8 Inference from studies

The point of literature review which says that the cities will adopt another idea of smart urban spaces with the sole use of only technology and also taking these cases like Amsterdam and Barcelona one thing is evident. It is that by just using new technologies, does it allow a city to become smarter and to solve people's problems? The answer is no.

Barcelona and Amsterdam as landmarks in very developed environments and financial status were able to tweak their urban space. What is the inference of technology usage in urban environment of affluent countries like Amsterdam and Barcelona? The most important result is that new technologies alone are not enough. We cannot say or conclude that with just providing digital technology, camera, controls and sensors everywhere, we can say that my city is instantly smart. It is the people who use the technology effectively make the city or the urban environment smart.

Is digital progress an enemy of culture? Will technology give an end to cities as we know them or give them a new future? Process of urban growth and change is at constant movement. Cities cannot be static. Cities are living things. For a city to be viable environment for creativity it has to change and evolve.

The sensorized city is an output producing machine. What are the ways by which we can streamline this cascade of data and interpret this more subtle message and content? How can we collect a great amount of collective intelligent feedback from various groups of people such as the public sector or employees of a company who can sense the beat of their city? The

sensorized city has its pros and cons as well. What is the darker side of the sensorized smart cities? How do we deal with overload of data and its psychological impact due to its intangible properties? Will we devise schemes and methods to protect and keep away from data pollution?

What is the ideal info graphic in this highly visual era and what are the new ways of communicating and interpreting the data? Creative or smart cities as being a promise for better cities are conceived by our yearning for deeper connection and purpose. It does not happen naturally with our present lifestyle. It has to be fostered to become a part of our common sense. In order to make this feasible public intent, revised policy and regulations, incentive providing regimes and civic generosity is much needed.

What makes a city work? Proximity and human contact and the ability to see each other which in the city is not theoretical concept, but it affect us profoundly and it stimulates us. The greatest challenge and purpose of a city is to facilitate encounters and meeting between different classes and groups. It is a place which promotes tolerance and connectivity.

3. METHODOLOGY

The methodology this research has adapted is to delve into analyzing and getting insights from the previous cases of India. There exist very little statistical and theoretical data on real time studies on smart environments. The data on the working, performance, limitation when put to use are still nonexistent when it comes to such avant garde topic like the proposal of a smart urban environment. Since there is little to no existing subject for real time case studies and very little fields of technologically enriched spaces to do a real time survey and get statistical data, this research has adopted a method to carefully study the previous cases on the location of interest (India) and analyze the forces that drives and restrains the use of technology on times of various needs and demands.

The method of studying these cases has been done by force field analysis of each of the cases where the problem is introduced and the happenings are narrated. Firstly the methodology begins to explain the workings of force field analysis and the existing insights on the field of study, India. Then it begins to explain and justify why India is a potential field of reflection for smart urban environments. Moving on, in every case firstly the approach that has been used to tackle the problem has been discussed after which observations and inference for the problems and the approach of each case has been keenly studied. This has been done for two major cases (i.e.) Example 1: Crisis Management, Chennai floods and Example 2: Freedom 251. These two are very different cases from each other. The first case serves as a module of what has previously been done while the need for timely help during a crisis arises and the second case is a module to explain why smart urban environments can be a huge transformation and profiting tool in India.

The other cases of reflection (a) Jammu and Kashmir floods of 2014 and (b) Porte ouverte, Paris–The open door has been analyzed in a brief way using the same methodology as the first two cases to show various instances when technology helped and limited in when put to test on different situations. Then the paper explains how these cases were dealt with and the specific methods used in the instances while in demand. It further discusses the people's cognitive reaction on using technology as a medium to facilitate aid in these cases. The discussion on challenges and limitations faced while using technology during these extreme conditions are discussed. Later the methodology is concluded on listing the fault in the system when people use technology to their aid when it was not one of the planned crisis protocols for a city. And it further explains to conclude on how the presence of smart urban environments can drastically change existing scenario and almost completely diminish the fault in the system in our field of reflection, India.

Since it is not possible to study these cases as and when they happen, it has only been feasible to carefully collect data from various possible sources and stich them together to study on our field of reflection. In order to study these cases, various statistical and theoretical data has been largely acquired from news articles, maps, statistical reports and survey done on the cases during their dynamic existence. Investigation system of the post impact data, evaluative survey on the cases have also been acquired from the above listed sources, World Wide Web and also from interaction with the subjected people post crisis.

3.1 Field of Reflection: India, a Force Field Analysis

Force Field Analysis for this study is done by listing, discussing, and evaluating the various forces for and against a proposed change. When there is a situation in demand like here for example : crisis management or when a change is planned, this Force Field Analysis helps you look at the big picture by analyzing all of the forces impacting the change and weighing the pros and cons. By knowing the pros and cons, strategies are developed to reduce the impact of the opposing forces and strengthen the supporting forces. Forces that help you achieve the change through technology are called "driving forces." Forces that work against the change with the help of technology and are delaying or restricting are called "restraining forces."

Fig 4.1, World map Showing location of India [source: mapsofworld.com]

Force Field Analysis that is used to develop an action plan and to implement a change. Specifically, it was studied how technology helped (i) to determine if a proposed change can get needed support, (ii) to identify obstacles to successful solutions, (iii) to suggest actions to reduce the strength of the obstacles, (iv) to decide whether or not to move forward with the decision or change, and (v) to think about how you can strengthen the forces that support the change and weaken the forces opposing it, so that the change is more successful.

Fig 4.2, Map showing the states taken under case of study in red [source: mapsofworld.com, edited by author]

3.1.1 Why India is a potential field of study?

How could one mobilize available technologies, much disseminated technologies accessible technologies in fostering the abilities and capabilities of people in finding solutions in urban space to their problem for themselves? It is also a matter of participation, motivation of collective learning, collective action. How to satisfy the most important human needs in an urban space when people face problems like segregation, exclusion, poverty, discrimination and do not feel like a part of this society?

If we want to be smart, for instance, we have technologies that can bring together the individual capabilities of creativity, motivation of collaborations of participation by connecting people by helping them. For example, through digital platforms people can exchange ideas collaborative spaces and things like virtual collaborative spaces, but at the end, people live in a physical space. They don't live in virtual spaces.

The case of India:

Not to generalize or stereo type a country like India but as much as India is one of the fastest growing powers and has a huge tendency to prosper in various fields, India has many problems,

such as poverty, segregation, exclusion, and discrimination. Despite being well educated and having access to the right ways, India is still facing many of these stereotypical problems because of the large diversity of the country in various sectors. Indians have and are very good at using technologies. How can one think of a process through which mobilizing new technologies and their mastering could help solving the economic, social, cultural, environmental and existential problems? Using innovative technology can solve so many social problems which exist in a very secular country like India. India is already well-versed in use and understanding of technology and it appeals to almost all ages and all kinds of societies across the country irrespective of the financial differences.

Technology is a proposed solution finding tool to bring about unity in times of need and self-sustainability in times crisis in social groups. For people to find a way to mobilize this ability in order to build together, to foster together, to sustain together, the collaboration on collective solutions to reach all kinds of people. The problems of understanding each other and living with each other in the same space, in spite of the diversity can be handled with the use of technology. India has a difficult caste system and social divisions. However, there can be ways of overcoming such barriers with the help of use of new technology.

3.1.2 Previous Cases of force field

3.1.2.1 Example 1: Crisis Management, Chennai floods

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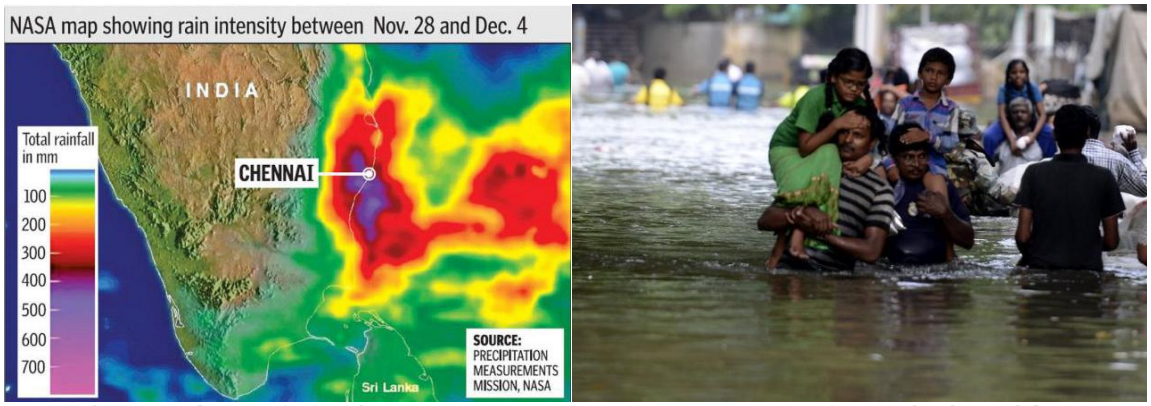
a. Introduction

During the month of November 2015, Chennai recorded a whopping 1218.6 mm of rain – three times its monthly rainfall. The normal rainfall figures for November stand at 407.4 mm. On the first day of December itself, Chennai recorded 374 mm. Had the government acted then, perhaps this area of the city would not have faced such severe flooding. The **2015 South Indian floods** resulted from heavy rainfall generated by the annual northeast monsoon in November–December 2015. (source : "347 dead in rain-related incidents since Oct 1 in TN". Article, The Hindu. 10 December 2015).They affected the Coromandel Coast region of the South Indian states of Tamil Nadu and Andhra Pradesh, and the Union territory of Pondicherry, with Tamil Nadu and the city of Chennai particularly hard-hit. More than 500 people were killed and over 18 lakh (1.8 million) people were displaced. With estimates of damages and losses ranging from nearly ₹200 billion (US$3 billion) to over ₹1 trillion (US$15 billion), the floods were the costliest to have occurred in 2015, and were among the costliest natural disasters of the year. (Source : "#ChennaiFloods: Social media users slam news media for poor flood coverage". Article, OPIndia. 2 December 2015).



Extreme downpours [source : fig 5.1 -The NASA, precipitation measurements mission. Fig 5.2 – article, The Hindu]

Consequences

Supplies of basic necessities, including milk, water and vegetables, were affected due to logistical difficulties. During the December floods in Chennai and the adjoining areas, milk packets sold for ₹100 (US$1.50), five times more than their usual cost. Water bottles and cans were sold at prices between ₹100 (US$1.50) to ₹150 (US$2.20). Vegetables were sold at least ₹10 (15¢ US) to ₹20 (30¢ US) over and above their normal average cost at the wholesale level.

Apart from basic necessities, fuel supplies and travel were greatly affected, especially in Chennai. Numerous accounts of price-gouging were reported; airfares to and from for most parts of South India peaked to almost 10 times over their normal price. A round trip fare from Mumbai or New Delhi to Bangalore, Karnataka (the nearest accessible city to Chennai, Tamilnadu) was sold by airlines like Jet Airways at rates of almost ₹1 lakh (US$1,500), a trip which would have ordinarily cost between ₹10,000 (US$150) to ₹20,000 (US$300). Apart from airfares in South India, airfares also increased for other connections within the country, due to disruptions in rail services. (Source : "Now Chennai struggles to lay its dead to rest". Article, The Indian Express. Janardhanan, Arun 10 December 2015).

In Chennai, over 1.5 lakh (150,000) street vendors sustained losses of over ₹300 crore (US$45 million).The persistent rainfall and flooding forced several major automakers in the region, including Ford, Renault, Nissan and Daimler AG, to temporarily halt production. Industry analysts estimated total industrial losses as a result of the floods to be in the range of ₹10,000 to ₹15,000 crore (US$1.52 billion to US$2.27 billion). The manufacturing belts resumed operations by 8 December, despite ongoing damage assessments; Some employees were forced to continue working from their homes. Many major information technology companies including Infosys and Tata Consultancy Services closed their offices and had their employees work from their homes, or transferred operations to other locations in cities including Pune and Bengaluru.

Prices of vegetables and fruit significantly increased as over 50% of supplies were affected after numerous Lorries were stranded. The Indian Oil Corporation was forced to close its large Manali refinery in Chennai because of the floods. The Chennai real estate market sustained an estimated loss of nearly ₹30,000 crore (US$4.5 billion), while over 20,000 small and medium industrial units across Tamil Nadu reported total losses of over ₹14,000 crore (US$2.1 billion).

Insurers in India estimated they would receive claims totalling over ₹1,000 crore (US$150 million) for losses to property, cargo and inventory, mostly from auto

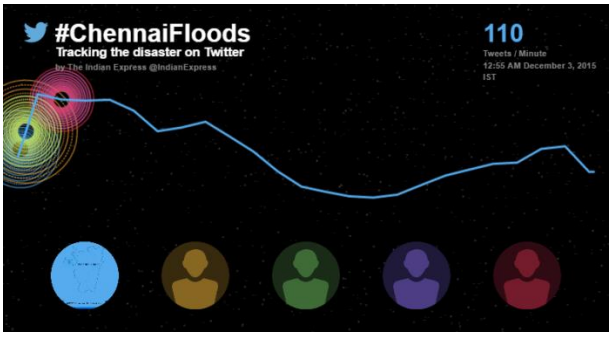
companies. Several Indian IT giants like Tata Consultancy Services and Wipro also informed their stake holders about an expected material impact on its third-quarter earnings due to the floods and then to the low volume revenue during Christmas and New Year holidays in the west. Car makers were also hugely affected due to shut down of plants, thus leading to lower production volume.

b. Approach: Help pours in via social media

National media outlets did not respond promptly to the flooding in Chennai and across South India, resulting in public criticism on Twitter, citizen-journalism and curated news sources for help. Following numerous public allegations against media outlets for poor coverage, and a huge outpouring of support across social media networks the mainstream media provided increased news coverage of the situation.

On 2 December, Prime Minister Narendra Modi discussed the ongoing flood situation and said the ministers were "trying to coordinate with various agencies on relief operations," and that he had alerted the Civil Aviation Ministry to send food to the relief camps. Despite criticism of the Tamil Nadu government's mishandling of the crisis, many notable personalities and other people helped those affected by floods. In Chennai, people across the city offered aid, shelter and food through social media channels like Twitter, Whatsapp, and Facebook. Social media sites were also used extensively to relay information about flooded areas, rescue agencies and food and relief centers. Chennai residents set up a temporary website to crowd source information about people needing help and about those who were ready to help. The local Celebrities actively participated in the relief process by using social media to coordinate aid and gather information. Rashtriya Swayamsevak Sangh members distributed food and relief materials in various rain-hit areas of Chennai, districts of Cuddalore and Kancheepuram. (Source : "Chennai floods: Once again, social media is helping Indians while the government flounders". Article, OPIndia. 2 December 2015).

Skype announced that it would offer free international calls to landlines and mobiles in Tamil Nadu for "the next few days," starting 3 December 2015. Facebook activated its "safety check" feature to allow Chennai residents to let friends know they were safe while Google posted a link on its homepage called "Resources for the Chennai Floods" providing details about relief camps and updates on the situation in the city. It also enabled its Crisis Response tool. Several Twitter hashtags including #ChennaiFloods, #ChennaiRains and #PrayForChennai were among the top trending hashtags across Twitter in India. Telecom major Airtel announced loan credit of ₹30 (45¢ US) and free benefits of calls and 50 MB of data. Other telecom operators including Vodafone, Aircel, and Reliance Communications also offered free benefits to customers. Indian real estate portal Commonfloor.com created links on its company website for people who need shelter or want to offer shelter. Mobile healthcare startup DocsApp, provided free consultation with specialist doctors via mobile. (Source :"When Chennai was logged out and how". Article, Deccan Chronicle. 3 December2015).



[Source: fig 6.1 - article, The Indian Express. Fig 6.2 - article, worldpress]

People helped create online spreadsheets documenting possible shelters and a crowd-sourced map on November 27 and 28 to document inundated neighborhoods and streets in Chennai. Outside India, many members of the Indian and Tamil diaspora sent non-perishable food, clothes, bedding and relief funds from countries including Malaysia, Singapore, the UAE, Mexico and the United States. Tamil and Indian communities across the United States organized dozens of relief and fundraising drives in over 50 cities, raising roughly ₹65 crore (US$10 million)) in donations by the second week of December.

Many NGOs sent tonnes of food, bedding, clothing and relief materials. Companies including Ola Cabs, Paytm, Practo and Zomato also aided in the relief efforts. Nestle, Coca Cola, Pepsi Co, ITC, MTR, Britannia and Parle contributed thousands of instant meals, boxes of biscuits and 1-litre water bottles, along with tonnes of milk products and coffee; other major corporations, including Hyundai and Hindustan Unilever, donated vehicles and hundreds of thousands of food and medicine packets and actively aided with rescue efforts across the state. Hyundai India donated ₹2 crore (US$297,200)) to the Tamil Nadu Chief Minister's Relief fund; U.S. information technology multinational Cognizant made a direct donation of ₹65 crore (US$10 million)) to the relief fund and various Chennai-based NGOs, while contributing a further ₹195 crore(US$29 million)) towards the long-term recovery efforts of staff and business partners.

Fig 7.1, Illustration showing Social collaboration of various private companies through social media [source : The times of India]

c. Observations

There has been a force in Chennai more powerful than the rains pounding the city. While bridges collapsed, floodgates opened and people were confined to their homes, citizens came together on social media – Twitter and Facebook – to coordinate efforts to send or seek help with accommodation, food and rescue relief. The people behind the joint effort at Chennairains.org, a Google spreadsheet listing helpline numbers, aid offers and requests, rescue requests, volunteer details and accommodation details has been, and is still being, widely shared so that people can fill in details or provide necessary information to volunteers.

This kind of response from the people during the time of crisis was unexpected because there was not a previous instance where the people have used social media as a very constructive, problem solving tool and to collaborate different companies and organizations to meet the aids and requests. This process of problem solving was weaved by people themselves when they were put in a critical situation. The government and the organizations failing to help the occupants of Chennai have triggered an out roar of demand and self-help from the occupants via social media. A regular person in Chennai using Facebook on a normal day would most probably post about having coffee with friend or share a video that he/she is interested in. But when the situation was demanding, people turned to use the social media for more than just what it is used on a given normal day. The volunteers have been working all night and people from other cities and countries pitched in and took turns to stay awake. Soon, Twitter India shared the link. Some volunteers kept track of certain hashtags including #chennairains, #chennaivolunteer, #chennairescue and #chennairainshelp.

This being inferred, it is not only the individuals' effort that makes this advanced system work but also the joint effort of the public/private companies, the welfare organizations and community help centers. For providing different kinds of aids like food by Zomato, transport help from Uber, joint effort of the people for helping those who don't have a place to stay because of the situation, the blogging communities input on the varying weather status in different areas of the city and so on. Here we see that the collaboration with not only individuals and groups of people using social media but also the companies and organizations come together to offer favorable solution to the problems that are put front by the people in a very unexpected and helpless situation. This shows how technology was used as a facilitator to provide and find fast solutions to the problems faced by the inhabitants then and there where time was a limitation of concern.

3.1.2.2 Example 2: Freedom 251

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a. Introduction

Indian buyers have kept up their quest for even cheaper products and their eternal search for the cheapest phone seems to have found an answer, in Ringing Bells latest product, Freedom 251 the claim to fame for this 4 inched device is, it's apparent, value for money. The **Freedom 251** is a smartphone that was initially offered for sale in India at the promotional price of ₹251 (the equivalent of $3.67 as of 18 February 2016). (Source :"Freedom 251: India's cheapest Android

smartphone launched at Rs 251" . Article, The Indian Express, 18 February 2016).It is being sold by Ringing Bells Private Limited and is marketed as the world's cheapest smartphone. This is shows the budget oriented smartphone market in India and how this low cost and high volume market, and how this is supposed to sculpt the future of the industry in a question.

this phone has managed to generate all the hype that is needed for marketing, and after a keen observation of the company's revenue model, brings out some pertinent questions. So let us address the elephant in the room, how can a smartphone be made in just Rs 251, let alone marketed and sold with a bunch of in-box accessories. Before we begin to talk about this issue, one thing is absolutely clear. In the economic and technical state that the world is in right now, it is physically impossible to make a phone and price it at a very cheap rate of Rs 251, without incurring huge losses. the question arises, who is the loss on and how do they strategize to tackle this? The first thing that pops in our mind is the Indian government. After all, government subsidizing the cost of products is nothing new; and this smartphone seems to be meant for people in rural areas who cannot afford smartphones at the conventional price point of 4000-6000 INR. However, there seems to be no such indication in press reports from the company that, the Freedom 251 has been governmentally subsidized.

Next factors that come to mind are the Indian telecom providers. Buying phones under contract is a pretty common occurrence in countries like the US, but it hasn't been prevalent in India, as yet. This is primarily because a vast majority of the Indian mobile user uses prepaid connections instead of postpaid connections and are hence, not tethered to a monthly bill. They have the approach of subsidizing a phone to increases network proliferation and as a result, increasing their business might have been a strategic master stroke, none of the Indian telecoms look up to the task for such a giant risk.

b. Approach: Digital India movement

Freedom 251 offers a dual sim handset with 3G enabled on both the sims. Included with that, a few selective apps will be bundled with the retail version of the smartphone such as Women Safety, Swachh Bharat, Fisherman, Farmer, Medical, WhatsApp, Facebook and YouTube. These apps are made available and used by the low income group. Freedom 251 intends to make technology accessible for all sectors of people and have them connected. While the first few apps seem to be a nod to the schemes of the Modi Government, the inclusion of popular messaging and social networking platforms, are a clear indication of the Digital India movement. This popular digital India movement has been largely promoted by the Indian government and also welcomed by the people.

Expecting greatness out of a tiny, Noida based startup, seems like child's folly, but we will reserve our criticism for their product and instead, choose to applaud the vision and the courage to undertake such a mammoth project. To connect such a large diverse group of people and bring about a new digital revolution. No matter how hard Ringing Bells may fall, and fall they will; one can be overjoyed by the fact that the scenario of Indian smartphones and startup is producing such inspiring projects and the idea behind why this sells is the hook to the new digital revolution.

c. Observations

We observe that freedom 251 is not a sustainable business model in current smartphone scenario. It might be a marketing ploy. if it is, it is going to backfire in a big way. Analyzing, the

big disconnect here is inability to understand the diverse set of end users and their needs which is more inclined towards "value for money" instead of "cheap" or just low price. We have seen some of this in previous cases like Mozilla firefox ,which has costed a fortune of their time, money and brand value be like Mozilla's firefox strategy for smartphones.

It is true that a massive shift in India is happening from feature phones to smartphones but that shift brings with itself a level of expectation from the people - expectation of consuming content, expectation of watching videos and listening to music for longer time, staying connected and hence need for better hardware features. To accommodate these features, Industry has reached a certain level of price point which is currently $50-$60 but packing something similar in $4 is something which is not possible as of now. The thirst for staying connected and aware is very evident and this has been used as the catch for marketing.

In the coming times freedom 251 It might prove out to be a dis-service to the smartphone segment rather than bringing people on smartphone platform, as there is a high chance that target users shift back to feature phones after a horrible first time smartphone experience. Despite our cynical take on the entire situation, one thing cannot be denied. If the Freedom 251 project does manage to take off, then it will be a monumental moment for India. The impact of this one phone could change all our predictions and assumptions and India could make rapid strides to close in the gap between China as the largest consumer base for smartphones. Not only has that, but also bridges the gap of quick accessibility and connectivity to information between the high and low income groups. We have strung together just a few scenarios that will get a jab in the arm if the Freedom 251 manages to deliver on its promises.

Leaving aside the large marketing and promotion of the most affordable, cheapest smart phone available on the market, the intent and the reason what makes this click is very thought provoking. This is a result of the existing need for technology in a large country like India to have various social and economic sectors of people connected. The problems of understanding each other and living with each other in the same space in a country like India. The existing caste system, Gender discrimination, and social divisions pose a challenging situation. However, it is not impossible to overcome such barriers. It might take time but it will surely evolve. It might take copious amount of time but we can take a step towards that kind of positive evolution.

3.1.2.3 Other Notable Examples

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a. **Jammu and Kashmir floods of 2014**

Jammu and Kashmir floods are a peculiar case of study of what happens when there is no power or connectivity. When unprecedented floods hit the state of Jammu and Kashmir, all lines of communication ceased to exist. The only surviving medium to connect and inform, was the social media. #KashmirFloods hit twitter within hours of the water entering Srinagar. Irrespective of how it started initially as a series of chaotic twitter messages soon turned into a platform which helped not only individuals but also rescue agencies, a call for NGOs and relief organizations in managing this disaster.

The case of Srinagar- the nerve centre - submerged and no reports of the existing situation, worried friends and family soon began shooting tweets on the worldwide web using social networking sites like Facebook and Twitter. It soon took form which led to positive organizing and several dedicated pages began to take root on these sites. To further optimize the potential of this tool, the Indian Army began using this medium to put out images and information regarding rescue operations and evacuated citizens on its 'ADGPI- Indian Army' page.(source : article, NYtimes)

Later, J&K government established jkfloodrelief.org, which brought together volunteers who began scanning relevant social media websites identifying SOS calls and directing them to rescue teams. This was not just individual effort, but a collaborative one where even employees from Facebook and Twitter were put on the task of smoothening the rescue efforts. Social media filled the information vacuum by enabling family members to identify their kin during the period that the phone lines were down. More so ever its successful implementation in streamlining the flow of information brought out the value of this tool of social media and the need for it to be incorporated in disaster and crisis management.

While we can see the obvious impact of positive gains in the immense use of social media for rescue and relief operations, there was also another narrative which found voice on social media sites across the Internet. Thousands of residents stranded for days on end vented out their frustrations in the platforms available. Stories of poor rescue operations, of bias in rescue against Kashmiri residents and trumped up rescues by the security forces only for media attention, began to fall under the light. This which was initially captured by television journalists began gaining momentum on social media sites. As phone connectivity was restored, and access returned to locals, there were lopsided narratives emerging online.

Here we see the importance of the usage of social media as a tool even when the power grids are off and the inhabitants of the place in crisis are off the network. This shows us the influence of not only timely connectivity but also the influence of the input given by third party people who are not going through crisis. They could raise their voices towards help in the place of their kith and kin when they were in a situation nada. Technology was used as a tool where the voice traveled from the crisis traveled to their loved ones and back. This kind of usage of technology during off grid situation really makes us wonder about the possibilities we would have if we could use this tool for problem solving not only during crisis but also in our everyday lives.

b. Porte ouverte, Paris – The open door

During the November of 2015, Paris attacks were a series of coordinated terrorist attacks occurred in the city of Paris and its northern suburb, Saint-Denis. On the 13th of November 2015, beginning at 21:20 , three suicide bombers struck near the State de France in Saint-Denis, followed by suicide bombings and mass shootings at cafés, restaurants and a music venue in central Paris. The attackers killed 130 people, including 89 at the Bataclan theatre, where the terrorists took hostages before engaging in a stand-off with police. Another 368 people were injured,80–99 seriously. Seven of the attackers also died, while the authorities continued to search for accomplices. The attacks were said to be the most deadliest on France since World War II.

When Paris was under attack, amidst of all the fear, there was a glimmer of hope, kindness and solidarity with other fellow beings. Parisians have used social media as a lifesaving safety tool by helping tourists to find shelter from the ongoing attacks, to get phone numbers of embassies and much more. The most prominent hash tag used is #PorteOuverte, which means "open door" in English-speaking Parisians are using it to offer their homes to people who were - or are – either forced to move or stranded in the city as a consequence of the lockdown imposed by the authorities. This was the first time hashtag was used since the attacks began. When being tweeted, The tweet also asks for users to geo-locate their tweets, this helped people to be able to easily find the people in need and get to shelter as soon as possible (source : article, NYtimes).

As the Paris attacks slowly died down and the city went into lockdown, people of the world turned to social media for help and information. Parisians were offering their homes to strangers and looking for people who were missing. what does #PorteOuverte mean for risk managers? Here we have more than 645 million registered users on Twitter. According to eMarketer, two-thirds of companies use Twitter to communicate. With its scope, it only makes sense that this social media platform serve as a lifeline for information-sharing foe people under stress during crisis situations.

The use of Porte Ouverte was well applauded for its efforts to provide help – to an extent that use of the hashtag extended well beyond Paris to people around the world tweeting their excitement and support for it. The movement was great concept, but there's a catch, to every good thing there also exists a down side, the real danger with social media sensations like Porte Ouverte is that their risks often don't seem to gain public awareness until they become a situation of reality. In this case of Porte Ouverte, most of these risks weren't realized, but trusting the hospitality of strangers must always be approached with an awareness of potential risks.

3.2 How it was done

Effort to map inundated roads in Chennai along with information on vulnerable and water logged points and flood relief camps was put together like this: 5, 476 roads were flooded. Chennai Rains, an independent weather blogging community, put out regular updates on the situation of rains. Uber Chennai offered free rides all day and included trucks to help with carrying necessary supplies such as medicines and food, it said on its blog.

Individuals helped both online and offline. Social media has been the savior through all this. Even before heading out and helping, people had to check social media to ensure that the rescue was going to the right places, which required most help. **Work online mainly included circulating the right information and connecting demand with supply.**

Preparation of a comprehensive and proactive crisis plan is essential for a city before anything takes place. When sending people to "safe" locations during crisis situations in major cities, the system could easily become complacent. Taking the example of Paris , it is one of the largest cities in the world, seeing millions of visitors each year. For all good intents and purposes, it is generally viewed as a safe location by the inhabitants and tourists. The Paris attacks emphasize that even in seemingly secure destinations. In today's world, disasters are probable to strike

anytime and anywhere. It is, therefore, imperative for risk managers to prepare for a variety of outcomes for when the city is under crisis. And this is when the collaboration of proper use of technology and intelligent environments comes to play.

Since every city is unique, it stands to reason that there should be unique emergency protocols designed for every urban area to alter to context specific needs. There does not exist a catch-all plan to prevent or reduce disasters, and there are a number of steps and resources that make proactive preparation possible for the cities.

3.3 The challenges

Psychology, cognitive barriers for using this kind of technologies, issues of privacy are important. The idea of privacy could be important if one controller could have an eye on what people do in it. But if people are ready to share among themselves, there is no problem.

The fact that instead of just sending an SMS or posting a video or tweet to say something trivial, we could promote talks and thoughts on saying "I have an idea about such (some) kind of problems." Using these devices to collaborate and create useful solutions which most of the time does not cost anything. They must not only facilitate but also motivate.

Information available on the ground are at loss and are not easily updated when disaster strikes and in the absence of any ground information, social narratives found space in national spectrum and out dated data are a serious problem which can lead to mishaps. while the positive narrative on social media gained greater attention and success, the alternate narrative resulted in downplaying the relief and rehabilitation by state and central government. With the play of many genuine accounts of stranded citizens with no access to relief or rescue, people also finds exaggerated stories and untrue propaganda in messages and tweets, by several actors in the state, for vested interests and personal self-marketing.

The contrary part of it is that, This counter narrative has other negative fallout. With a lack of consistent story on ground, the corporate sector of the country holds back. While the government pools in the resources it can give from internal as well as external agencies, little to no help is seen coming from the private sector. The play of private sectors making collaboration with social startups and communities brings about a huge change in the crisis scenario when in crisis. Normally, this sector would have participated in a large way for rehabilitation of the flood affected victims. But why the participation of private sectors was not motivated is a question to ponder on and the ways of motivating them is an area to strategize on.

Timely Communication should be at the forefront of any proactive crisis managing strategy. Details, such as ensuring employees know who their emergency point of contact will be, are key to helping eliminate confusion during and immediately after a disaster. The panic that results during a disaster can be diminished when system providing know where to go for help. It is very important to know and establish digital communication protocols for worst-case scenarios. When it is necessary for providing systems to utilize a solution protocol such as Porte Ouverte that poses some measure of risk, they should be aware of the steps their givers and recipients want to take to best ensure their safety.

3.4 The fault in the system

The biggest problem has been outdated information. But their work is not restricted to the internet alone, their admins have also been available on the ground, gathering food and distributing it. Not many have access to the Internet all the time. IN fact, that is the biggest problem.

In situation like Chennai floods and porte ouverte where people were offered homes to stay in there exists not only the possibility that those offering their homes as “safe locations” could have negative intentions. in case like porte ouverte attackers could also find new targets using the hashtag. Social media sites – and especially in exreamly open platforms like Twitter – are public forums that anyone can access and expose people to all kinds of cybercrimes, this fact must be kept in mind when panning for risk management after crisis.

While the Chennai floods, Jammu and Kashmir floods and porte ouverte movement was a great concept, there existed risks associated with it that could make business travelers, and by extension their organizations, vulnerable. The best way to tackle these risks is to actively educate people on these issues and possible mishaps for them to be prepared before they get the help that they need from a third party. Sometimes the safest option for an strangled individual is a potentially insecure one which puts them in a vulnerable position, like accepting the hospitality of a stranger. To take this kind of vulnerabilities is to educate the people on the risks that they are going to undertake and make them aware enough to protect themselves during these protocols.

It is very important that these digital protocols make sure to communicate to employees early and often through a drill of communications and training. In the end, the objective should be to protect the people in need whilst also finding the solution by providing the right resources and improving their decision making when things are at their lowest ebb. Overall, while the influence of social media on crisis management was an admirable one. The individuals must consider this approach as an emergency measure only, till a digital protocol which not only includes peoples input but also filters the input with sensorial information is planned.

3.5 Inferences from the insights on cases discussed

From what has been studied and analyzed, correlating both the literature and the methodological studies show that technology can be a huge game changer. But the question that arises is how can technology be used in smart urban environments to provide solutions? This is discussed elaborately in the following chapter. And the curious thoughts on how can technology be something beyond just problem solving? Is it possible to design and use technology in such a way as to facilitate real human interaction and social collaboration in physical spaces? This is something that comes to our minds after the study. These questions and thoughts are discussed and pondered upon in the following chapter.

4. FINDINGS AND DISCUSSIONS

The findings and discussion part of the research streamlines the thoughts and ideas on the previous literature and case studies which has been made earlier, through discussion with my supervisor, professors and by connecting the dots by comprehending and connecting the literature that has been studied during the process. Firstly the findings about what makes technology work? What is social media without people behind it? Has been discusses based on cognitive analysis done through the study and methodology. Then the paper discusses on how smart urban environments could provide a solution to all the above faced problems and limitations. Discussions on the means of how smart urban environment could make various possibilities boom adds meaning to why smart urban environment is so needed for the city's future. The discussion proceeds to talk about using technology as a community empowerment tool. It ponders over how and what is it that technology can do to provide solution and not only that but to facilitate and motivate public/community empowerment, collaboration and real public meetings. The need for a working model of a smart urban environment, what drives and what restrains it is discussed. Finally a suggestion of a working model is woven taking the very particular and common Indian case of traffic congestion in all big cities. And the considerations and the ways on which it should be formed to be a facilitator are discussed.

4.1 But what is technology without people?

Choice of an individual affects our culture and society resulting in a chain reaction. Every Independent choice made within a society affects or has effect on everyone within it. Finding a way to positively influence every individual choice with the help of our environments to achieve a larger change on society as a whole and thereby causing the chain to react on a further bigger level like an area which will affect a city.

People use and rely more on digital ways to communicate from their houses and the excellent cities were designed to facilitate real life meeting. There is a fundamental human dimension of real contact that technology cannot facilitate for which real cities were design to do.

But what is social media without people behind it?

The youth boys run the Chennai Memes Facebook page, known usually for their hilarious trolls, who donned a different hat during crisis. Since the rains started, the boys have been updating statuses to share information about stranded residents, rescue operations, resource requirement and news updates. They helped many people find shelter or contact their loved ones and also managed to get resources and volunteers for NGOs and other good Samaritans who are mobilizing help.

With phone connectivity as a big problem in the state and city, the Internet is a big boon for those looking and offering help. Using Facebook posts and tweets call out for help. The people say "The internet is our lifeline now." People rationalize that sending out a tweet elicits multiple responses and say that collective reasoning and thought is more helpful in such situations. The need of the hour is the people who own vehicles that can maneuver their way through difficult

terrain. But for the people who are unable to leave their homes and are still keen on helping, the web will be just be an info hub.

4.2 How can Smart Urban Environments Provide a solution to this problem?

The challenge now is to try and get things organized. The biggest problem is assessing who needs immediate attention to prioritize. What can be done when communication lines are down and power outages are rampant? That is where the infrastructure plays a role.It can be by providing Smart urban infrastructure with sensors and technology for the people to streamline information into social platforms for effective management social problems.

By using technology as a facilitator for solving various problems by arraying and managing the information that the public do not have control over. The idea of a smart digital environment is to first think of physical spaces and not virtual. People live in physical spaces and they have all have an inbuilt intelligence towards their environment developed. The decision making and choices of people may vary depending on the community or the urban space they live in. and every individual can find the best possible solution for them. They are not only able find a solution but also deploy a certain amount of creativity in methods, implementation of it.

The area which needs the thought process is how do we bring these collective ideas, solutions, these pieces of creativity together? And what are the ways, methods for organizing the clustering of these pieces of information, intelligence and creativity. Smart urban environments is the one where the processors, sensors and the devices that allow or facilitate grouping the combination of these pieces of intelligence of creativity. This is exactly where new digital technology and networking technology can help.

So, this being said, we can all see how technology is a facilitator or a device that can help activate the seamlessly sewing pieces of intelligence and information that the people are able to develop. This is where we can apply the method of cross learning, where people can learn from one another and solutions are developed through the interaction from one another. There exchange of information and interaction is facilitated by the new technologies. This also means that the technology in an environment is used as a motivator to meet and exchange physically too. These are also supported the devices which allow remote connection among people in a smart urban space.

4.3 Community empowerment strategies: using Technology

Learning to understand social, political and economic disparities and to act against their elements of reality Empowerment is defined as process of mobilization and change ‘that improve under-privileged individuals’ and social groups and ability to create and handle mental, material, social, cultural and symbolic relevant resources. Mobilization and process of capacity building in social groups and local communities includes creating social relations of trust and reciprocity with use of technology between local residents and local well fare

professionals. (source : Frank Moulaert, Diana MacCallum, Abid Mehmood and Abdelillah Hamdouch , The International Handbook On Social Innovation, Collective action, social learning and transdiscipinary research, University of Tours, France, 2013). ***Technology is a facilitator and catalyst for society to see themselves as active agents and innovators for positive social change in local community life.***

Digital Emergency protocol with and a well-equipped and planned crisis response team is a great way to develop in-depth problem solving specific to the context of the urban area of interest. unique needs in a safe, low-stress environment before an emergency occurs or before a problem agglomerates to something that cannot be contained. To think that even if we have such fore planning in the recent times, the need to refresh and constantly stream in new information to introduce new tool or a facilitator like the cases seen above is a very crucial and need step. These exercises should be fore thought, planned out and practiced, not only so they can be used for additional training, but also so they can serve as a risk management and for solution finding procedures. Through this process, the system can then identify bottlenecks and make amendments to anything that could potentially cause delays or communication gaps during a real emergency situation. And also to streamline and filter the copious amounts of new data that flows through and outdated data that floats around the web.

A smart urban environment is a socially innovative environment which enables collective social learning. The missing pieces of this protocol are that the new technology can feed al the social and cross learning innovation. This kind of social innovative way of addressing a problem is the key to smarter urban environments. People face problems with having proper transport system, breathing pure air, drinking pure water, access to health, housing issues, environmental concerns, labor market and education. People of a country like India do not even have access to public transport of certain good quality. Say, if a person were to go out for a meeting in india, he would prefer to take is own private means of transport to get to his destination than taking the public transport. This is due to the bad quality, congestion, unreliability in timings of the pubic transports. In such cases what do the less affluent do? Smart Urban Environments must facilitate not only the economically affluent but also the ordinary. With many real problems faced daily in the country, Smart Urban Environments must be socially creative as to allow the real problems and the real human needs. In order to do this *Smart Urban Environments must provide to facilitate real human interaction where the intelligence, emotions are exchanged, in a place where diverse groups of people are cohabiting the space.*

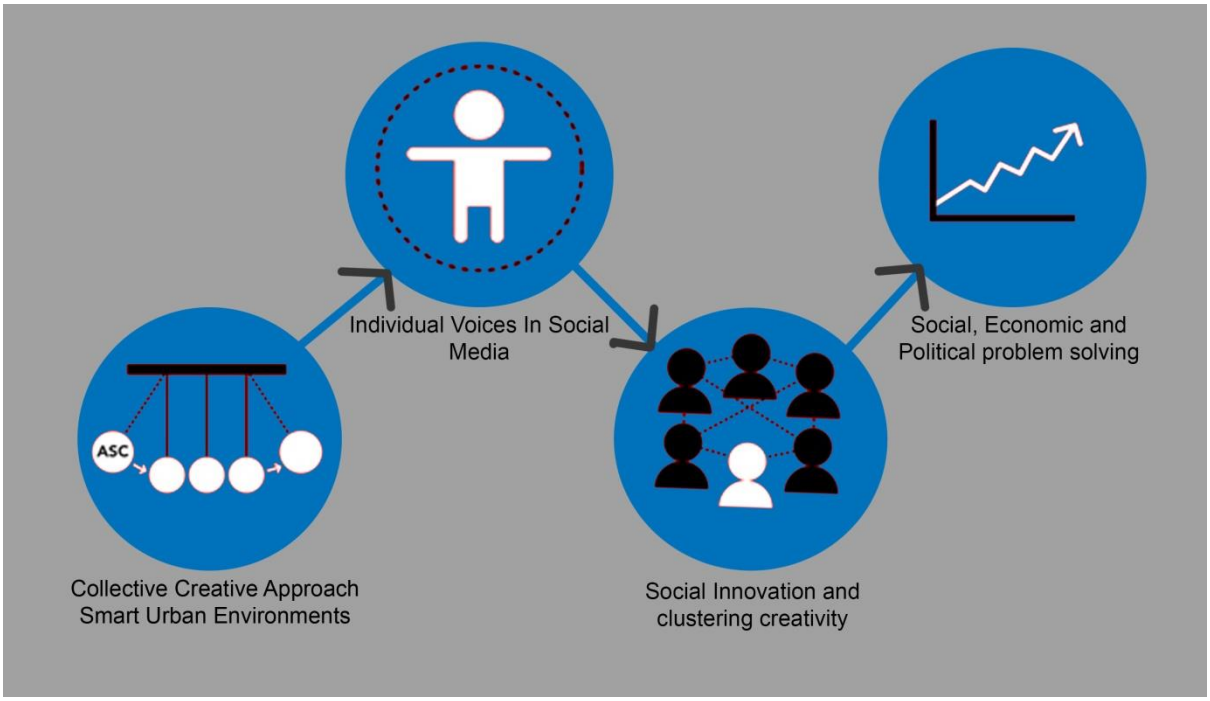

Fig 8.1, Illustration showing community empowerment strategies using technology [source: illustrated by the author]

4.4 Suggestion of a working model

Applying the digital approach to a country like India is very interesting. Most of the Indians are very well versed in the use of technology and are aware of the workings and the potential possibilities of outcomes through it. Irrespective of say, low income group to high income group, everyone has the access to the internet and they use it for constant communication and sharing trivial things. Even the below poverty class of people are well informed with the technology because of their access to media and television. The average education rate in India is constantly on a raise and this does not seem to still stop the gender discrimination. And these are only few of the problems listed here from a vast pool of underlying discrepancies. In such a country where everything is rapid in case of development, agglomeration, growth of issues, it can only be solved when the public, private and the political sectors join hands to bring about a positive change for the various problems faced in different categories of existing problems that people face every day that are left untouched by the government or the public sectors.

The issues expressed above could be brought about to change by addressing the collective and the individual problems that common people face. The solution starts when we confront the reality that people have ideas. But there is a need for these ideas to be carefully combined, streamlined, filtered with facts and finally formulized. Through this kind of collective leaning and action one can bring about a huge revolution in the social, economic as well as the political context of the particular environment by bringing together these pieces of creativity and innovation.

This takes us back to what we have discussed earlier that people have a sense of life, they know what they need and nobody is mute to the instinctual behavior that they have developed with ages of time. This shows what they are capable of and so they have to foster these capabilities to find a solution to their needs for themselves. And as urban planners we are obliged to provide

the people of a classes and sectors with a collaborative solution finding platform. And what can facilitate this kind of problem solving strategy is when smart urban environments come to play.

So, how do we use these fantastic new technologies in order to reveal and foster the peoples abilities in creating and developing solutions for various problems like social, cultural, urban, environmental, housing, medical problems? the answer is when the sensorized city and the social platforms combine together to streamline different kinds of data to the appropriate databases and when the public, private sectors join this system as well. By collaborating and putting in joint efforts we can not only help people to find solution to their problems but also tackle the challenges and faults which were faced in the previous instances.

Example: A suggestion for the problem of traffic congestion in any given big city, India.

Most common and never ending problem in India is traffic in Indian cities due to overcrowding and bottle necks in some areas of big cities. Map analysis can be made, and can be set to work by creating the crowd sourced map of areas based on time. For example, when we saw reports coming in about the flooding and we did not have a clear picture of what was happening in areas worst affected and so on. There was no granular idea on geographical conditions.

The tool can be designed with various technological enhancements embedded in physical environments like the roads and congested places, so that they can stream this time bound information to a processor which filters and streamlines the data. Not only that, but is also filtering the outdated information laying around the web. This is then dissipated as information on social platforms and the people are left to make the decision for them based on the factual inputs fed by the technology. Before designing the tool, there exist few step and things that must be thought over. They are as follows,

Define the change you want to see: Write down the goal or vision of a future desired state. Or you might prefer to understand the present status quo or equilibrium.

Brainstorm or Mind Map the Driving Forces (using persuasive technology): the driving forces are very context specific. So the solution protocol for one city in India might not work in another. The tool must be favorable to change. Record these on a force field diagram.

Brainstorm or Mind Map the Restraining Forces: it is very important to study the forces that are working against the tool or that could possibly bring hanger or a weak link, those that are unfavorable to or oppose change. Record these on the force field diagram.

Evaluate the Driving and Restraining forces: Do this by rating each force, from 1 (weak) to 5 (strong), and total each side. Or you can leave the numbers out completely and focus holistically on the impact each has.

Review the forces: Decide which of the forces have some flexibility for change or which can be influenced.

Strategies: Create a strategy very specific to the context, to strengthen the driving forces using persuasive technology to motivate people or weaken the restraining forces, or both. Evaluation

related to rating each force how can you raise the scores of the Driving Forces or lower the scores of the Restraining Forces, or bot.? Is a point to be though over.

Priorities action steps: What action steps can you take that will achieve the greatest impact? Identify the resources you will need and decide how to implement the action steps. Also to be sure of the order of actions, this is very important in any digital process.

The aim is to build a simple tool. Where timely inputs are given from the sensors and the satellite and then they are filtered and streamlined to social platforms for people to know ahead the status of a particular place, or to redirect in times of emergency. We already have some platforms that can help us like AA non-proprietary, open model (software) using OpenStreetMap project where Chennai has already been mapped fairly well. Using this method has previously helped during the floods. Elevation models from ISRO quickly did an analysis of low lying areas to see the darker areas on the map and also used data from the UN which included analysis of satellite images of stagnated water. The same model can be applied to control traffic problems, to deliberate strategies for strengthening citizen's involvement and positive affiliations to the local area, and to use empowerment strategies in deprived urban areas.

4.5 Inference on finding and discussion

We have discussed the ways and means by using technology in physical environments to bring about a change we desire and as to why it is necessary. The idea of electrifying individual/collaborative ideas and disseminating them through the digital world which is almost like an electronic cloak over the world which is made of minds spanning everywhere is the key we don't know we have. Where this cloak is cosmos in which thoughts travel at the speed of light and evolves in a networked capacity. And smart urban environments can be a facilitator, guide for people to realize and use this key that we already have at our disposal. This is where we the people build tools and the tools in return build us, smart urban environment aims to make Digital communities coming together, sharing ideas, producing content and pushing to become and be the powerful change that they need for themselves. Smart urban environments can create a nonphysical and physical force field to facilitate digital/real life collaborations which can help us to move forward collectively. We can say that even though we have seen some faults in the system while using technology and there could be a lot more faults that could be foreseen while using and depending on technology, it can be strongly said that smart urban environments has the capacity and means to provide solution for those underlying faults and filter the crudeness that comes with using technology.

5. CONCLUSION

The impact of every individual's voice which finds resonance on social media holds an immense potential for building as well as altering perceptions of the mass as well as to shape the future. In previous problem solving and natural disasters recorded in the state, we do see the kind of impact that has now been generated across the country by the social media. In previous times before the cases of study explained here the use of social media was mentally restricted by the people, This was perhaps due to the fact that social media at that time had not matured and there was limited space for a few individuals to be able to reach millions instantly with negative exaggerating stories downplaying efforts for rescue and rehabilitation.

When every new disaster strikes, affecting communities across the world, there is immediate response and exchange of information on the web in these recent times. Be it the different cases like earthquake that hit China in 2008, Hurricane Sandy in America in 2012, or the Kashmir floods in 2014, social media is the new, quick response platform.

The use of digital environment and social media as tools in disaster management needs to be carefully strategized and planned in order to ensure that there is already machinery in place for two key measures. (i) to build a database for those facing the problem or affected and ensure that there is accurate information available of the distressed, and (ii) to fore think, plan and build a true structure which can change context specifically to enable greater support towards collaborative problem solving, rehabilitation and help build the morale of those affected as well as the citizens of the country. In case of a calamity where the telecom network is wiped out and media is absent, an smart urban environments which is in synchronization with social media can serve as an effective alternative for communication, ensuring greater success in coordinating answers, bringing about unity, rescue and peace enforcing efforts. However, the power of such a tool should not be forgotten and used only for times of helpless ness but also in day to day problem solving in various sectors like social, political, economic, education, housing, medical and issues of discrimination needs.

We have inferred from this research that technology alone has a lot of holes in it and cannot serve as tool just by itself. It needs social innovation and streamlined inputting and arraying of data. And the technology is not smart enough to find a solution for the problems people face every day. New technologies alone cannot define a smart urban environment. *New technologies could serve as levels and as amplifiers as tools for developing socially smart environments.*

With public sector at one end and the private sector at another they are incompetent in providing to the needs of the people just by themselves. Maybe the economically affluent get their way through but technology as a facilitator can bridge this gap between the existing demand from the low income group and supply by the public and private sector. And how can this be made a reality is my bringing about social, private and public sectorial collaboration and partnerships in finding a suitable solution to an underlying problem. Now, we can say that *New technologies especially digital technologies could be used as levels and as facilitators of social innovation.* The kind of innovation which provides solution for real social cultural and economic problems people face.

This paper concludes that technology can be strategized in ways in which individual and collective intelligence can be deployed by better connecting people which can lead to great social innovations. New digital technology, embedded systems, network technologies and social networks can be used as powerful tools to amplify and act as a catalyst for what people can do for themselves. And ***a smart urban environment has the capacity to invent solutions, capacity to mobilize, not only that but also empower people and communities.***

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ABSTRACT

Use of Interactive Technology in urban planning is relatively an innovative idea when it comes to implementation in finding usage in social collaboration. The use of intelligent systems in public spaces for different domains like energy conservation, education, healthcare and the domestic environment is quite common in western countries. The present study investigates the idea of using interactive and persuasive technology as aids and catalyst to facilitate social interaction and collaboration, to find solution for themselves to different social problems that people face every day.

There exists little data on documentation, process and outcomes of use of interactive and persuasive technologies and their usage for urban planning. Living in a space with embedded systems and communication devices, where sensors are embedded into physical object and computation is seamlessly used to enhance an ordinary function or activity. The argument and the findings of this paper is that the practice of technology on physical space which does not involve or require human input and collaboration does not necessarily make the environment intelligent or based on the examples of usage of technology on previous cases in India as a field of reflection. The results of this research and the proposed ideas might lead to opening up better understanding and provision for the use of interactive technology in an urban environment.

Keywords
Smart Urban Environments, technology, Social collaboration, Problem solving, Intelligent environments

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