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Resilient and Responsible Smart Cities

Proceedings of Future Smart Cities (FSC) 2nd Edition & Resilient and Responsible Architecture and Urbanism (RRAU) 2nd Edition, Xiamen University, Sepang, Malaysia, 2019

ISBN: 978/977-85525-3-9

Preface

Developing existing infrastructure and improving the quality of life has been in demand, as well as, saving energy and trying to make it efficient without having to use all the natural resources, that's why the need for sustainable smart cities to be developed is extremely important, this is immensely helpful when it comes to having a self-efficient city that self- charges. Future smart cities can be the solution to stop pollution and put an end to waste production, as it aims to decrease it, as almost zero-waste is produced. In addition to smart cities, resilience has been extremely crucial for architectural designing and planning of adaptive cities to have a sustainable life. As architecture is responsible for making any city more flexible and resilient to any change in climate or natural disaster that hits. Resilience is the core of architecture as it is important for planning cities responsibly through problem diagnosis by providing building safety assessments. The design process needs carful thought into building a strong resilient city.

An enormous number of research papers of high quality has been gathered to enlighten readers and give them the newest ideas and developments being made from professional international academics who are sharing their knowledge by writing and co-authoring a chapter or more. This book is a collection of diligently selected papers submitted to IEREK'S international conferences on Future Smart Cities and Resilient and Responsible Architecture and Urbanism. The chapters of this book provide extensive research full of different fields, such as smart framework and transportation, digital applications, smart energy adaptation, resiliency challenges and sustainability. This aims to shorten the gap and put theory to practice in planning and development of future smart cities. Moreover, it also addresses prime issues and difficulties that face architects and designers, by providing innovative approaches and solutions to resolve these issues.

This book is a useful resource for academics, researches and practitioners who are looking to excel in research, as it provides several direct proceedings to how resilience and responsible architecture can be integrated and can contribute to urbanism, and how future smart cities can achieve a better life quality if planned with the highest and newest technology. Furthermore, this book contains several case studies that are taken from different countries and cities all over the world and can be used as a handbook for other researchers for innovative approaches and new ideas.

Acknowledgements

IEREK would like to express its appreciation to all members of the staff and scientific committee for their tremendous efforts and contribution to the growth of this institution and for making our joint conferences on Future Smart Cities and Resilient and Responsible Architecture and Urbanism a success. IEREK would like to thank the conference chairperson, Professor Xiao Han, the head of ICT department Xiamen University Malaysia, who had a hand in making this conference what it is today by providing scientific and logistical support as well as making the university facilities and resources available for our every need. IEREK takes pride in being an institution that amasses a highly qualified and competent team who restlessly worked for months to make this conference what it is today in hopes of creating a well-rounded society. Last but not least, we cannot neglect the prominent role undertaken by our Editors who made it their duty to help this institution in spreading knowledge to the masses.

WORD BY THE CONFERENCE CHAIRPERSON

It is with great pleasure and pride that I introduce to you the proceedings of the Second Edition of the International conferences on *Future Smart Cities* and *Resilient and Responsible Architecture & Urbanism* held in Xiamen University Malaysia of Selangor, Malaysia from 5 – 7 November 2019. This conference is the result of a joint effort between the Xiamen University Malaysia and, our partners and the main organizer, IEREK –International Experts for Research Enrichment and Knowledge Exchange. In this book, the concept of smart cities is defined, reimagined and thoroughly explored. It goes on to showcase emerging scientific and technological trends and applications in the field to solve problems, provide direction for future planning practices and identify key-issues and future opportunities. This book encompasses an exploration of zero energy buildings, resilient infrastructure and efficient resources and urban areas as a way of better managing resources in the urban environment and improving the quality of our daily life.

The main goal of this conference is to facilitate an exchange of ideas and knowledge between experts and policy-makers in hopes of making a change. Thus, I hope the research and topics of discussion debated in this book become a starting point of a new paradigm that uses Smart Cities to cope with sustainability and resiliency objectives in urban environments.

Finally, I would like to take this opportunity to thank all authors for their informative contributions to this conference as well as the scientific committee and organizing committee for their efforts and dedication to making this conference what it is today.

Professor Xiao Han
Head of Information & Communication Technology Department
Xiamen University Malaysia

Word from the Chairman of the Board of IEREK

It is a delight and pleasure to launch the 2nd edition of the international conference ‘‘Future smart cities’’

“resilient and responsible architecture and urbanism”.

The international institute of IEREK started presenting its activities regarding the scientific research field as well as organizing conferences and publishing full papers through various respected scientific magazines. All that achieved through Building international relationships with prestigious universities and institutions worldwide is one of the main goals that IEREK seeks to fulfill in order to spread knowledge and enhance research in its homeland, Egypt, and everywhere in the world through collaborating with trustworthy partners who share the same goals. Including distinguished professors and researchers from a wide variety of international universities, IEREK hopes to establish a solid infrastructure in the world of research to present successful conferences that gives a chance to scholars in the field to discuss and negotiate creative solutions tackling global problems and challenges regarding the most trending topics nowadays concerning architecture and urban development as well as various aspects. This event will discuss a very significant and important topics ranging from sustainable urban development along with the demand to develop infrastructure, improve the quality of life, achieve efficiency & saving, comes the need to develop smart and sustainable cities that is adaptive and suitable for users making a city more flexible and resilient. My goal for this event is to tackle and add to the world valuable knowledge and researches concerning these universal topics. I also hope that the attending audience of undergraduate and postgraduate students would benefit from this event. I look forward to meeting you all and thank you for your participation and collaboration with IEREK.

Mourad S. Amer

Architect, B5c, DSc, MSc, PhD

IEREK CEO

Table of Contents

Part VI: Smart Energy Adaptation and Resiliency Challenges

Introduction

In an increasingly computerized world, challenges of sustainable urban development have been among topics of discussion. With an increasing demand to develop existing structures, improve the quality of life and achieve energy efficiency and saving, a need to develop smarter and sustainable cities has risen. Similarly, a smart city is often the result of smart planning with resilience incorporated as one of its main aims. The topic of resilience in Architecture is aimed at designing and planning adaptive cities to sustain a suitable life for its users with an improved quality of life. Nowadays, urban areas are incorporating technology to minimize traffic, congestion and enhance movement efficiency.

With climate change, global warming, rapid technology advances and unprecedented challenges resulting from urbanization and posing as some of the biggest threats to the planet, this book provides an overview of current and newly emerging strategies aimed at tipping the scales of climate change, urban sprawl and inadequate infrastructure. It presents research from different geographical contexts such as Africa, Australia, Asia, South America, and Europe and introduces different approaches to fill the existing gap between adaptation planning and implementation.

Authors of this book undertake a study case approach to explore cities' capacities to cope with the many challenges threatening contemporary cities and their development. By exploring the different approaches and techniques that pave the way for climate sensitive urban development and smarter cities such as big data systems and Geographic Information Systems, this conference finds potential in informal areas and highlights their hidden characteristics and potentialities in relation to theories of sustainable urbanism. Nonetheless, this book does not overlook the Role of community engagement, making and management in contributing to resilience for the community and built environment.

Part I
Smart Cities: The Development of Integrated Frameworks

Citizen Pothole Electronic Report as A Step to Use Bigdata in Planning Smart Cities in Malang City, INDONESIA

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Keywords

potholes, sharing, bigdata, text mining, geovisualization

Abstract

Spatial planning ought to be founded on comprehension of the possibilities and impediments of the indigenous habitat and the financial advancement exercises specifically zones, just as the present requests and the protection of the earth later on (Hall, 2002). A complex societal framework need sharing among resident and elites to keep up their living congruity with social and natural changes. Exchange in spatial planning can be characterized as a political procedure to accomplish social agreement between various interests by giving the open chances to discourse with elites, for example, city councils and local government delegates, urban planners and the community itself (McLoughlin, 1969; Chadwick, 1978; Meadowcroft, 1999).

This study will explore the urban planning prototype model through citizen pothole electronic report answering the challenges of implementing smart cities through the creation of a dialogue between citizen and government through big data, text mining, and geovisualization in Malang city, Indonesia. The results of this study are that digital trends using big data, text mining, and geovisualization are welcomed by citizens and government representatives and provide direction and recommendations in an effort to formulate urban policies with legalization through regulations to implement digital dialogue between citizens and governments towards the ubiquitous spatial planning in Malang city.

Introduction

Internet penetration is so rapid in Indonesia raises hopes that information technology can empower individuals who have been far from the center of economics and politics (Yudono, 2017), in the context of this research specific to spatial planning activities. At present, almost all urban communities are connected to the internet (Shirky, 2008). Sharing aspects of people's lives is increasingly connected in digital space, both for social interaction, public services, finance, and education (Bott *et al.* 2014) . The character of low-cost digital space and being able to shorten distance, space and time gives access to individuals who have an interest in space (ODI, 2015).

In the current digital era, where Smart city is a hype for the agenda in cities and districts, innovation and utilization of technology related to urban management are key in efforts to create harmonization of society, government, businessmen and nature (Kunzmann, 1999). The innovation referred to in this study is an effort to integrate various forms of digital communication to create informative and communicative city planning and management between urban stakeholders through text mining, bigdata and geovisualization studies. For this reason, this study will explore the integration of the three digital communication methods in the new planning model prototype of Malang City, Indonesia.

Conclusion

Digital space has broken down the fragmentation of community bureaucracy with the government and so on in the spatial planning process through the movement of sharing information both on personal matters and urban general issues. Before entering the digital era, planners need a multi-year process to map urban problems and organize for the better. Entering the smart cities era, the use of digital technology has created an effective and efficient civilization in spatial planning agenda, programs and actions. However, even though the use of digital technology has made a positive contribution from the perspective of urban planning, it cannot be denied that there is a negative side to the practice. Up to today, the existence of digital technology in identifying linguistic contexts is still limited. The use of text mining correctly is still limited to English, not in other languages. All in all, this paper may contribute to examining how bigdata, text processing and visualization can

be integrated in spatial planning context.

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A Smart city Agra :Smart Developments of Cultural Tourism and Heritage Sites

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Keywords

Smart city,urban planning,Cultural tourism,Heritage site,Agra;

Abstract

This Paper aims to analyse the linkages between local cultural tourism with Heritage sites and come up with possible outcomes to enhance tourism experience. Government of India had announced Smart city mission in 2016 where 100 smart cities were identified based on the given smart city proposals. The city of love was one such selected city and thus also known as Smart City Agra

Agra was selected after second round under Retrofitting Development: Planning in an existing built-up area to make it more efficient and Pan-city Development which covers application of selected Smart Solutions to the existing citywide infrastructure and promoting them to be World Heritage sites. In order to find the possible interlinkage between local cultural arts, heritage sites and smart mechanisms, this paper approaches/proposes different types of heritage walks which cover historically lesser known monuments along with Taj mahal and other local arts and artists. It will help develop tourism industries economic growth by direct linkages with cities market. This research covers two heritages walk, around 2km radius of Taj Mahal which shall address beautification and some civil work improvements. Micro-skill development centers are proposed to enhance the skills of workers/ local artisans by training them in sculpting, in-lay work, flower art and zardozi which will help improve livelihood of local residents. Such proposals will help to establish a sustainable livelihood project that promotes traditional skills. Results show that Smart Sustainable Planning plays a vital role in "Smartization" and future smart city processes as it can help to achieve various Sustainable Development Goals. Results also show possible suggestions for municipalities and new researches on Smart Developments of Cultural Tourism and Heritage Sites.

Introduction

Agra is the city of the inimitable Taj Mahal. It is as loved by Indians as it is by foreigners who throng here in large numbers to admire its beauty. Along with Delhi and Jaipur, Agra forms the Golden Triangle of tourism in India. Situated in Uttar Pradesh, Agra is synonymous with the Taj Mahal however there's lot more to the city than this world-famous monument. Right from the epic Mahabharata to the Mughal Dynasty, Agra has been monumental and has played a significant role in shaping India's history.

Agra is well known by its history and large heritage places and buildings.Heritage places and culture represent the character of the place and its communities, as well as they work as landmarks characterized by their historical and cultural values and their uniqueness. Heritage destruction and degradation, resulting in the loss of valuable and irreplaceable structures and architectonic features have caught the attention of authorities and specialists, which are already doing every effort to implement rehabilitation and conservation projects to protect them and to strengthen their role in the community, highlighting the history, traditions and roots of the place and their people.

Government of India had announced Smart city mission in 2016 where 100 smart cities were identified based on the given smart city proposals. The city of love was one such selected city and thus also known as Smart City Agra.In Agra Smart city proposal there are total 2250 acre area covered under Area based development concept and other ICT solutions will cover whole pan city area.This ABD (Area Based Development) area comes near tajmahal which is also called as Tajganj area.This whole area covers astonishing hertiage monuments and

cultural tourism which attracts Indians and foriegners as tourist destination. Agra has two UNESCO World Heritage sites which is Agra fort and Taj Mahal however Taj Mahal features in the 50 most popular tourist destinations in the world.

Apart from these two major world famous monuments there are few lesser known monuments which falls within 2kms radius from Taj Mahal. Having such an immense tourism potential, it hardly has the required standards of infrastructure to support the footfalls it has. Hence the following section studies the area encompassed within 2km from Taj Mahal and suggests required measures to be incorporated to make Agra a smart tourism destination by linking local cultural Beautification around heritage monuments form a very important segment of the tourist sector in the country and to develop the local cultural art it is very necessary to enhance the local cultural art which gives benefits to cultural tourism and their economic growth. Micro-skill development centers are proposed to enhance the skills of workers/ local artisans by training them in sculpting, in-lay work, flower art and zardozi which will help improve livelihood of local residents.This helps to World Suistanable Development Goals to achive the target by 2030.The map of Agra shows boundry of ABD area around Tajmahal.

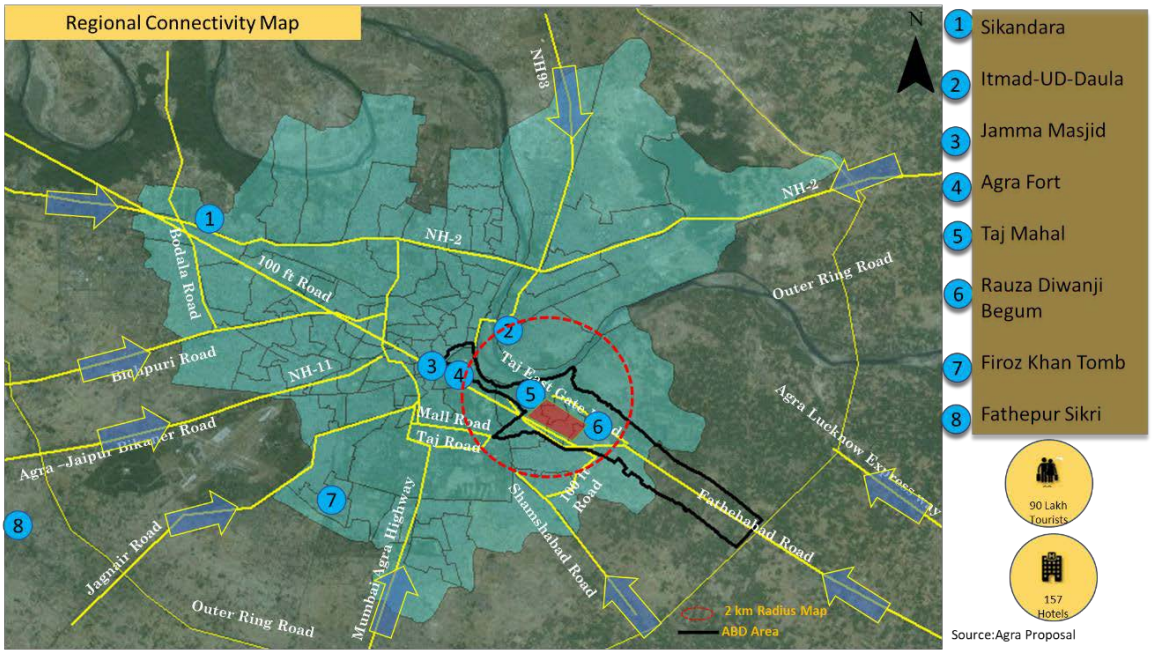

Figure 1:ABD Area and regional Connectivity map

Results and Conclusion:

- This project is already implemented at ground level in Agra,some of the civil works going on and already micro skill centers working very actively; workers and SHG(Self Helping Group) groups are actively participate ,communicate and work for their economica growth.
- A key tool for urban revival: Heritage Walk - as the name suggests, behaves as an effective tool whereby the inner areas of the city shall be explored in terms of the architectural heritage, cultural heritage and the craft heritage.
- The walk carries with it another kind of advantage - the changes it can bring about in the land use pattern of the area, by conversion of a part of the heritage building into a cafeteria or into a paying guest accommodation, whereby the tourists can get the actual feel of the cultural heritage by staying within the precincts of it. This can allow a total change in the economy of the area wherein the tourists can stay in and spend at these inner areas.
- The exploring and exposing of the inner areas of the Agra City requires an initiative from the Municipal Corporation of the city and smart city SPV which needs to provide some basic infrastructure - in terms of proper paving, cleaning up of the streets, provision of street lights, signage, public amenities under Smart city Mission.

- To development of community by economically it is very important to create and build the environment that will affect to overall development of area with their skills for that training is required for local vendors so that they can do business accordingly because of this initiative foreign tourist can easily buy the materials and explore the heritage experience.
- Micro skill development center will provide the training to local skill workers as per new technology and connect with the market. Entrepreneurship development plan for micro skill workers so that they can earn money directly from the buyers.In that way cultural tourism sector will grow more and have very active responsibility of all the stakeholders.
- This research will help to local community economic growth and municipal corporation for the smart dvelopment of cutural tourism and linkages between local cultural tourism with Heritage sites and come up with possible outcomes to enhance tourism experience.
- As future recommendations and future work, this study can lead to a more deeply research, in order to achieve more interesting results by calculating Indexing score and devlope municipal perfomavnce index for the local cultural tourism and heritage sites. This research can also link with Suistanable Development Goals,Majorly this types of study directly relate Goal 8:Decent work and economic growth.World Heritage places as well as a way to analyse the possible heritage management strategies and funding for other Indian smart cities already recognised by GOI as Smart City Mission.

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Are the New Towns really smart?

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Keywords

New Tonws ; representation, environmental sustainability

Abstract

In the 21st century lot of New Towns projects have been announced, due to the increase of the world population and its relocation in urban centers. This phenomenon has made possible to conceive new approaches to urban planning, many of them related to smarter and eco-sustainable strategies. Today the list of brand new towns is wide. We can consider them as examples - more or less concrete – of the current state of the art on these issues. So how do these "Cities of the Future " are alike? Which are the main features that characterize those cities? And which differentiate them from to the cities of the past?

The paper wants to speculate on these questions by dealing in the first part with the phenomenon of New Towns, focusing above all on those that claim to be "Smart Cities". In the second part we will analyze in depth a case study that embraces both the concepts of *New Towns* and *Smart Cities*: *Masdar City* in the United Arab Emirates; in this part we will examine in detail the design strategies of the project. In the conclusions, we will reason about the ways the paradigms linked to environmental sustainability and to the smart technological innovation are applied to New Towns.

Introduction

It can be a difficult and controversial operation to give an exhaustive definition of what a New Town can be as evidenced by the different positions and visions taken by the scholars in this field. For Ervin Galantay New Towns are " planned communities consciously created in response to clearly stated objectives " (Galantay, 1975); for Pierre Merlin and Françoise Choay a New Town is "a planned city whose creation was decided by administrative means" (Merlin, Choay, 1988); in Piero Pierotti's words, "A city problem exists when the creation of a new settlement has the exclusive or predominant purpose of establishing a new urban organism, conceived in its specific constructive and functional articulations" (Pierotti, 1972); and finally, Bernardo Secchi writes, "Probably at the origin of every city there is an act of foundation, most often unaware of its own destiny" (Secchi, 2008). The creation of a city as an act of will presupposes the existence of an authority or organization sufficiently effective to protect the site, to introduce resources for its development, to exercise control until the city reaches vital dimensions. The New Towns also have an identifiable date of birth, which may be the day of the designation of their site or the day of a formal foundation act that establishes the legal existence of the new community. The "idea" of the city is formalized in a project drawn up before the site is modified by the arrival of the first new residents. A design response that responds to very well-defined temporal needs leads to bringing together many of the new cities regardless of the historical moment to which they are linked and in this regard a definition that well summarizes this aspect is the one proposed by Rachel Keeton: "New Towns are cities or towns that are designed from scratch and built in a short period of time. They are designed by professionals according to a Master Plan on a site where there was no city before. This distuinguishes in New Town from a "normal" city that gradually grows and evolves over time. Also, New Towns are the result of a political (top-down) decision. The building of a new city 'from scratch' is a heroic enterprise that challenges the architect or planner to find the ideal shape for the urban planning according to the state of the art planning ideas. A New Town is always a reflection of one moment in time and the ambitions of that moment"(Keeton, 2014).

Historically, New Towns were built on the basis of a unitary project and often for political decisions such as, for example, occurred for the cities of New Delhi and the new British cities of the 20th century. Contemporary New Towns tend to have fluid boundaries, extremely variable dimensions and varying degrees of autonomy. The demands of contemporary living, as well as global settlement strategies, lead to a redefinition of the reasons that drive governments to establish new cities. In the twentieth century, up until the seventies, the reasons that led to the need to build New Cities programs lay in progressive social development models, such as Garden City by Hebenezer Howard or in functionalist models, such as La Ville Radieuse of Le Corbusier, utopias but also replicable city models. More often there were strategic needs such as creating new cities dedicated to trade (Jubail,

Saudi Arabia); city for scientific and technological research (Irvine in the USA, Novokuznetsk in USSR); colonization, for example of African countries by some European nations (Eritrea, Zaire, Morocco, Ethiopia); a need to give a capital to new states or redefine political geographies within the same countries (Brasilia in Brazil, New Dehli in India); new cities dedicated to controlling urban and demographic growth (Great Britain, Sweden, France, United States). The new contemporary cities gather much of these functional specificities, often hybridizing them..

Conclusions

In the course of the paper we saw how the population increase has led to the birth of new towns to satisfy the growing demand for space in our cities. Most of these projects strive to make the most of the potential offered by contemporary technological innovations in order to achieve better performance. The spread of digital technology, thanks to its increasingly low cost, has allowed us to accumulate a quantity of data from the city that was unthinkable up until a few decades ago. This allows us to acquire an ever greater knowledge of the territories in which we live. So now we are in the phase of imagining how to exploit this potential to improve the quality of life of citizens, increase the competitiveness of cities and optimize the use of resources and energy. Masdar City is just one of the examples of "new town" where all this is being attempted. Although its concrete development has not brought the expected results, we can look to Masdar City as a case study that with its objectives and its strategies adds an extra piece to the construction of the smart city of the future; an experiment that served to push the boundaries of research on these issues further and to which we can refer to draw principles and ideas on which to continue working.

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Urban Megaprojects: Disorderly, Disruptive, Contentious Endeavours

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Keywords

Disruptive megaprojects, contentious megaprojects, Bilbao, Istanbul, Hong Kong

Abstract

This paper discusses contentious aspects in the planning and development of megaprojects in three cities around the world: Bilbao, Istanbul and Hong Kong. Our purpose is to lay out the variety of controversies, difficulties, obstacles, negative impacts and civic opposition associated to the construction of urban projects in the three cities. We will show that the nature and the shaping of projects owes to the socio-economic, developmental, institutional and geographic context where they emerge. However, we will also see that urban megaprojects, regardless of context, constitute *disorderly, disruptive and contentious endeavours* and have an intrinsic potential (often realized) to elicit substantial controversy and criticism that fundamentally questions the parameters of the projects as envisioned and publicly presented by their promoters. As a result, it is possible to highlight – as will be done in the conclusion to this paper -- some suggestions for future research and policy practice aiming at urban sustainability that can be applied to the planning, design, management, implementation and development of megaprojects worldwide.

Introduction

For the past few decades, scholars have tried to make sense of an “urban moment” of increasing global attention to the relevance of cities for the evolution and development of nations. The unstoppable population growth in the cities of the planet has only intensified this interest in the urban realm. Cities are today analyzed as lenses through which we can observe and study the main socio-economic phenomena tied to globalization, which marks the evolution of humankind in the beginnings of the 21st century. Further, cities are no longer understood exclusively as individual and discontinuous places, but rather as nodes in networks and flows of transnational capital, matter (goods and services), energy, information and people. Strategically positioning cities in the global network has become a major strategy of economic development for urban elites.

In order to increase their global visibility, many cities have undertaken in the past two decades strategies of revitalization and re-development that in many cases include the construction of emblematic megaprojects, often iconic buildings from an architectural point of view. The expectation was that such iconic buildings and structures would internationalize the city, put it "on the map", attract global investments, visitors and tourists, and thus contribute to solve the perennial problem of improving the welfare and prosperity of urbanites. The city of Bilbao, Spain, is a legendary example (one that is more successful than others) of this focus on urban development via construction of spectacular architecture in times of globalization.

We are heirs to the globalized city, in which it is not possible to conceive anything but the regeneration of areas adjacent to rivers and bays, the recovery of zones previously dedicated to storage and manufacturing, the construction of new transportation infrastructures or the extension of existing ones, as well as the renewal of historical centers. However, the Manhattanization of the world – and the urban political economy that sustains it – also presents difficulties and can create several structural obstacles with direct consequences for the design and implementation of megaprojects in globalizing cities and regions.

Conclusions

This paper has presented and discussed evidence in three cities (Bilbao, Istanbul and Hong Kong) showing that megaprojects are disorderly, disruptive and contentious enterprises triggering important economic, socio-political and environmental challenges that are often hard to resolve for the benefit of urban communities. The list is long: cost overruns, negative environmental impacts, gentrification risks, drawbacks of top-down cultural engineering, neglect of local cultural identities, an uncertain economic success, population displacements, the spoiling of cities´visual and structural uniqueness, rise of congestion and overpopulation, political gridlock,

threats for ecosystems, environmental risks of many kinds, etc.

In view of all of these drawbacks, it seems reasonable to think that better investment opportunities exist for cities, but very often these opportunities are not priorized given the hegemonic neoliberal urban discourse that focus on growth, international visibility and competition in the global arena.

Under the "green capitalism" label, recent megaprojects are presented as "sustainable." However, it remains unclear under what conditions these allegedly sustainable megaprojects can foster widespread growth and shared prosperity. Will they simply symbolize, once again, the grandiose vision of political and economic leaders in their attempta at nation-building to effectively compete on the global board? Will those megaprojects yield economic benefits to the cities that host them and not only to the promoters who build them? We do not know yet, although there is growing evidence that the benefits could be very limited (as is increasingly the case with Olympic mega-events).

Growing skepticism about spectacular and large-scale urban development, as well as the multiple impacts of the Great Recession of 2008, have triggered a rethinking of urban revitalization strategies in the West, and new paradigms, such as "smart cities," have come to the forefront of the discussions. Advocates of the "smart city" idea, who rightly stress the importance of digitalization and technology for a better management of urban areas, seem to overlook the fact that it is the governance models, not just the tools, that need to be improved.

What is truly fundamental for urbanites is to ensure that their leaders (and themselves as creators and re-creators of the places they inhabit) work to organize sustainable urban ecosystems from an ecological, environmental and socio-economic perspective. The good form and efficiency of the city are not enough to guarantee a good urban life. Improving macro-economic magnitudes is not enough if there is no effort at achieving higher levels of social welfare. Urban visibility (megaprojects) and urban connectivity (smart cities) strategies, by themselves, present as many risks as benefits for urban populations.

Jane Jacobs rightly reminded us almost half a century ago that cities are organized complexity that can not be addressed as a conventional problem of hierarchies and visual or mechanical order planned exclusively by leaders and experts (her diatribes with Robert Moses, the great modernizer of New York, are legendary). Jacobs understood cities as a complex problem of interrelated factors in an organic whole, and recommended urban planners and architects to show respect for the intrinsic order of the city and discard the demiurgic, spectacular and traumatic interventions that they often put into practice.

Today, the science of complexity applied to urbanism is proposing some postulates based on scientific evidence and the multidisciplinary study of cities that echoes the thought of Jacobs. The first is that cities have the capacity to promote creative and dynamic growth and at the same time reduce the destruction of resources. It has long been known that the city is more efficient than other types of human settlements from the point of view of energy, consumption of resources and emission of greenhouse gases. The reason is that urban ecologies are organized through exchange networks organized in spatial proximity whose synergies have positive and multiple effects. In other words, cities are complex, dynamic and variable human clusters that can favor efficiency, competitiveness and ecology.

Likewise, we know that networks and proximity flows and casual encounters in defined spatial environments foster multiplier effects and thus explain the impact of creativity on the economic strength of cities. We are not advocating for the presence of a creative class that allegedly serves as as the engine for urban prosperity, but rather for valuing and promoting the configuration of the ecological character of the city as a place for the exchange of knowledge, information, experiences and affections. This area of exchange needs public or semi-public spaces, and hence the crucial importance of preserving squares, sidewalks, parks, terraces, cafés and other meeting places where economic rationality does not prevail. Online connections can supplement, but not replace, this primary network of face-to-face human exchange.

Like any network, cities benefit geometrically from the number of existing connections. If the economic disparity between urbanites condemns certain citizens and neighborhoods to socio-spatial segregation, the prosperity of the city as a whole will be compromised. For reasons of social welfare, economic prosperity, and, increasingly, for reasons of survival of the planet and our species, it is essential to advance in the planning of integrated cities on a human scale that respect the close and multiple interaction of their neighborhoods. This constant process of human interaction -- the intrinsic order of the city -- allows urbanites to shape their own identity by appropriating their environment and endowing it with meaning, a fundamental factor that contributes to individual and collective well-being, and indirectly also to prosperity.

Cities need to ensure that the above ideas, which flesh out the urban order as organized complexity, become the driving force behind megaproject planning and implementation. When urban ecologies are organized through exchange networks organized in spatial proximity, when urban planning values and promotes the configuration of the ecological character of the city as a place for the exchange of knowledge, information, experiences and

affections, and when planning aims at advancing integrated cities on a human scale that respect the close and multiple interaction of their neighborhoods, then megaprojects could possibly work for the welfare of the community; at a minimum, they would turn from disorderly, disruptive and contentious endeavours into feeble artifacts.

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Governing Sustainability in Urban Ecosystems: Arguments for a Transdisciplinary Framework

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Keywords

rapid urbanization, ecology, sustainability, anthropocene, megaprojects, green capitalism, strategical urban planning, transdisciplinarity

Abstract

This paper points towards the need of transdisciplinary frameworks for understanding the nature and challenges of urban sustainability. It questions the conventional approaches to "planetary urbanization," particularly their neglect to articulate the current process of rapid urban growth within the framework of new climate regimes and the ecological crisis. From this angle, it is irrelevant whether we focus on the idea of "city" or "the urban" in order to grasp contemporary socio-economic developments. Put differently, "planetary urbanization" is one of the fundamentally constitutive elements of the Anthropocene era. Planetary urbanization is a problematic concept, and one that does not allow us to seriously analyze and assess the ecological threat and begin to craft proposals for a better understanding of sustainable development practices. After suggesting that the idea of "ecology" is fundamentally opposed to the idea of "nature," we propose a concept of sustainability that is relevant for urban contexts and for an overall situation of planetary urbanization defined within the Anthropocene. Accordingly, an urban context will be defined as sustainable if it is planned and governed to account for the capacity, fitness, resilience, diversity and balance of its ecosystem. We take the view of sustainability as an organic process including environment, economy and community: form and efficiency (environmental factors in design, architecture, engineering and construction) as well as policy (urban plans and practices that explicitly aim at maintaining and improving the social and economic well-being of citizens). We need to step away from any conception of "the natural" as Nature. What is natural is what is sustainable, both urban and non-urban.

Introduction: Planetary Urbanization?

Danish architect Bjarke Ingels recently declared: "I had to overcome the centrism that means identifying the city only with the beautiful streets that surround the historic center. The city, and the urban, is much more" (2018). This is an apparently simple idea, easily intelligible and which surely many inexpert observers would agree with -- the city, and the urban, is much more than a historic center. I focus on this apparent simplicity because it contains two concepts - the city and the urban - whose meaning and interpretation are far from obvious. Groups of planners and urbanists in the forefront of research have been debating about the primacy of one concept over the other in the last years. Has the reality of "the city" been subsumed in "the urban", as the French philosopher Henri Lefebvre argued in the 1970s? (Lefebvre, 1970; 1989). And, if so, should we stop focusing on the study of "the city" and focusinstead on the study of "the urban"? What would this mean in practice?

Brenner & Schmid (2011, passim) have provided a rich description of the massive urban changes underway. The concepts of "urban agglomerations," "city-regions," "urban regions," "metropolitan regions" and "global cities-regions" refer to a particular qualitatively specific, spatially delimited territory. Such territory is demarcable and different from "non-urban" spaces. However, there is growing evidence of the difficulty of spatially demarcating the urban from the non-urban.

Conclusions: Strategy, Holism and Transdisciplinarity

A major effort to stop the effects of climate change and support environmental sustainability has been developed around the world at the urban and regional levels around the concept and practice of the "sustainable city" and its associated planning practices. Planning schools around the world have included "sustainability" as one of their essential interests and today it is difficult to find professionals and academics who are not concerned with sustainable cities and the impact of climate change and global warming on the practices of urban planning. Urban systems have the potential to be more sustainable than suburban or rural communities. Therefore, it could be said that urbanization shows a potential to facilitate the management, and perhaps control, of climate change.

The difficult challenges to achieve it come, not from the cities, but from the incentive structures of the capitalist system.
The notion of “strategic urban planning” has become paramount in efforts to address sustainability challenges in urban environments. This notion involves a holistic approach to problem-solving in the area of sustainability that implies placing the idea of complexity at the forefront of analysis and action. Complex thought, education and knowledge, in Edgar Morin´s understanding, take into account contextual, global and multidimensional factors to desvise strategy conducive to more fruitful action.

“Pertinent, knowledge must confront complexity. Complexus means that which is woven together. In fact there is complexity whenever the various elements (economic, political, sociological, psychological, emotional, mythological …) that compose a whole are inseparable, and there is inter-retroactive, interactive, interdependent tissue between the subject of knowledge and its context, the parts and the whole, the whole and the parts, the parts amongst themselves. Complexity is therefore the bond between unity and multiplicity. Developments proper to our planetary era confront us more frequently, ineluctably with the challenge of complexity” (Morin, 1999, 15).

Complex knowledge also factors in the centrality of the knowing subject in analytical endeavors, the uncertainty of the knowledge enterprise itself and the incompleteness and undecidable nature of *homo complexus´*s human action. Through complex knowledge, the holistic quality of urban planning neturally leads to a transdisciplinary conception of theory-building and practice development.
Thus, a possibly fruitful way to apply this notion of strategic urban planning would be to propose a transdisciplinary paradigm to address urban challenges. Strategy by itself is insufficient if it is based on traditional approaches to knowledge generation. A global and transdisciplinary strategy of sustainable development is required. The concepts in individual disciplines are not necessarily univocal. The global problems of sustainable development consist not only in some of the environmental problems (generally known as climate change and loss of biodiversity), but also in socio-economic issues, whatever exactly "sustainability" and its possible and multiple interpretations, involves politics, resources and power. Most current attempts to solve sustainable development are not conducive to sustainable development; they are mostly contradictory, inconsistent and inefficient. This contrasts with the nature of the behavior of sustainable development systems, which is non-linear and holistic.
"Green reformism" is based on a paradox, because it simultaneously adopts neoliberal capitalism and rejects economic growth. Although "green reformism" has developed an integral form of natural resource management, it has a poorly defined vision and well-being of human development. The current consideration of sustainable development in literature and the media is basically reductionist and involves mainly a binary thought. The problem is that reductionism, binary logic and disciplinary approaches are beliefs that must be overcome.
A transdisciplinary way of thinking is in order. Such a way of thinking would cross traditional disciplines and would modify the classical notion of science. A new vision fostering sustainable principles requires a rethinking of human values, and a reconsideration of the integration among the flow of perception, experience and consciousness. It is impossible to imagine a single solution to the problem of sustainability, but many complex, interrelated and evolving solutions. To avoid current destructive human behavior, we need to develop a new collective perception of human relations towards the valorization of a new set of attitudes and behaviors or towards a different prioritization of the set of current values. Holistic and unified knowledge can deal with complex global problems of sustainable development. Progress has been made in this regard and continues to be made, within the United Nations and in other forums and institutions. If, in addition, a rethinking of the priorities and structures of economic incentives is achieved, then we can say that there may be a space for hope.

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The dilution of Peri-Urban socio-cultural identity: An insight into policies and strategies in Malaysia and the European Commission

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Keywords

characteristics;dilution;identity;peri-urban;policy;strategy

Abstract

The peri-urban area or zones happen all over the globe as urban areas are rapidly expanding and over the coming decades, the urbanization process will continue to grow exponentially. The peri-urban area, naturally being transitional and ambiguity in its character, has put this area in obscurity. The dynamic changes in the social and cultural aspect reflect peri-urban area identity. Being neither urban nor completely rural, peri-urban areas show the common characteristic of equivocalness, despite their diversity in terms of definition, formation, and measure. Implicit in the construct was the concept that urban and rural area were defined by very definite land-use patterns and unambiguous socio-cultural, and that the boundaries between this location and spaces were discernible and clearly defined. Thus, this article seeks to achieve these objectives; (i) examining the peri-urban definitions, policy, and strategies implemented by Malaysia and Europe, and (ii) to highlight the importance of establishing more appropriate strategies for this particular area. This qualitative study, with content analysis, provides a comprehensive review on reviving the socio-cultural identity of the dynamic peri-urban. The finding shows that with good and appropriate planning, as well as strategies, can benefit the peri-urban sustainability. These features and their interactions have led them to become known as significant peri-urban regions or interfaces and to become significant research on their own. On account of the unique identity, and the interactions between these peri-urban and the metropolitan cities, they came to be known as important zones or interfaces (PUI) and have become major research foci in their own right. The contribution of this paper is to alert the local government, especially the policymaker on the importance of the Peri-Urban Socio-Cultural identity in controlling the encroachment of development.

Introduction

Today, more than half of the world's population lives in the metropolitan area, while the urban area continues to develop and invade the peri-urban to accommodate more people. The rapid growth of cities in most countries expanding beyond their incorporation boundaries transformed the land use from rural to urban(Geneletti, La, Spyra, & Cortinovis, 2017; Ravetz, Fertner, & Nielsen, 2013). This situation developed an area in between urban and rural knows as peri-urban area. Metropolitan areas and cities have faced issues related to urban sprawl and urbanization for decades, particularly on their fringes(Amirinejad, Donehue, & Baker, 2018). Thus, peri-urban happens all over the globe due to the urban expansion and urban sprawl process. As urban systems continue to develop globally, urban peripheries are increasing in numbers and typologies, making the planning a sustainable development challenge (Geneletti et al., 2017). In recent decades, the globalization and urbanization processes that have caused a rapid change in our environment have placed the concept of identity on the agenda of planners and designers (Kaymaz, 2013). Globalization and urbanization are, of course, two significant phenomena affecting our economic, social, cultural, and environment. These peri-urban areas usually have social, political, and economic structures that are predominantly informal(Amirinejad et al., 2018).

Consequently, the area's natural and cultural landscape resources will remain under pressure. Peri-urban growth leads to some fundamental issues, such as sprawl, poor land-use planning, improper infrastructure, people's relocation, low levels of economic activity, land acquisition, slum housing, psychological problems, social and environmental issues(Geneletti et al., 2017; Wandl & Magoni, 2017; Winarso, Hudalah, & Firman, 2015). In

addition to environmental sustainability problems, urban development and the deteriorating natural and cultural assets, concerns about peri-urban landscapes ' image and identity ' are addressed. For peripheral urban, threats and challenges are directly linked to their heterogeneous mosaic of physical settings (with different land uses and population), their dynamic social and cultural structures, and various types of governance that encompass several institutional system at distinct administrative levels(Friedmann, 2016; Simon, Duncan, & Donald, 2003).

European metropolitan regions have extended by 78% on average since the mid-1950s, while their population has increased by only 33% (Nilsson et al., 2014). Urban areas are still growing even in regions where the population is decreasing, notably in Italy, Portugal, Spain and in eastern Germany. Leipzig-Halle is an instance of a region facing both the problems of a urban sprawl encroachment and shrinking city (Piorr, Ravetz, & Tosics, 2011). In developed countries, the trends of urbanization and urban-rural migration happen in most of the countries. In search of better possibilities for jobs, education, medical, social and fundamental facilities and enhanced livelihoods, people move from rural to urban regions. In specific, young and qualified individuals leave rural regions for urban centers, leaving elderly individuals, females and kids behind and causing a so-called brain drain(UN Habitat, 2017). These trends can lead to the increase of social and economic disparities or even a political splitting between urban and rural areas and the “transitional area” between it. As a result, in many countries, urban sprawl results in a high rate of poverty in rural areas, slums or peri-urban areas. In the transnational Alpine region, six European nations (Italy, Germany, Austria, Switzerland, France and Slovenia) recognized that urban areas and nearby rural regions experience landscape degradation, water and soil shortages, biodiversity loss, territorial fragmentation, rural-urban migration, severe resource utilization, economic issues and life quality(UN Habitat, 2017).

The peri-urbanization process in developing countries is also increasing as a specific type of urbanization, which is characterized by rapid and fragmented development. In search of better possibilities for jobs, education, medical, social and fundamental facilities and enhanced livelihoods, a large number of individuals move from rural to urban regions(Mpofu, Darkoh, & Gwebu, 2018; Winarso et al., 2015). Migration is also the consequence of disasters, both natural and man-made, and insecurity; it entails difficulties and possibilities for those who leave, but it also has a profound impact on rural groups, particularly females, elderly and young kids who have left behind and have to fulfill ends. Young individuals under 35 are a large percentage of those moving to towns. Emerging developments also show cyclical migration between their workplaces and rural housing by urban employees, catalyzed by contemporary transportation, communication and social networks(Sharifi, Chiba, Okamoto, Yokoyama, & Murayama, 2014). This brings some advantages with regard to financial capital, socio-cultural exchanges and knowledge transfer, but it also introduces new difficulties and hazards. Consequently, both push and pull factors need to be considered in relation to urbanization and migration patterns (UN Habitat, 2017).

The population in East Asia’s peri-urban areas is expected to increase by approximately 200 million people over the next twenty five years, representing 40 percent of metropolitan population growth in the region(Kontgis et al., 2014). For the next two decades, it is predicted that the problem of demographic growth will occur outside the city of Bangkok extended urban area(the Metropolitan Administration area of Bangkok), while 70 percent is the equivalent indicator for the Jakarta extended urban area. In the meantime, the peri-urban predictions in China are less developed. However, peri-urbanization is anticipated to account for at least 40% of future urban population development in service-oriented expanded urban areas (Webster, 2002). While in India, the lack of institutional structure contributes to weak infrastructure for adequate governance and peri-urban region growth. Because of their proximity to the city, peri-urban areas are particularly prone to damage the environment, which degrades their land and water resources. These regions face serious challenges and dynamism in land use transformation planning and execution(Roopawala & Bhatt, 2017). Some of the peri-urban regions turn into a solid and liquid waste or spillover dumping ground from the town. In addition, the fringe's productive agricultural land is somehow being transformed to urban uses as urbanization rises. Peri-urban happen mostly at all states in Malaysia, especially at the National Conurbation area which consists of the metropolitan city, Kuala Lumpur and a major part of Selangor. The term "peri-urbanization" is still not commonly used in Malaysia. However, it does not mean that it is not an important topic since it refers to what has been happening at the fringes of towns and cities(Rostam, Choy, Sakawi, Mohd Nor, & Muhammad, 2011). In these new landscapes, unique cultural identities continue to develop. The emergence of these conflict, issues and problems are due to the lack of adequate guidelines and surveillance systems where the development conflicts continue and unorganized peri-urban growth occurs.

Conclusion

The fact that half of the people of the world live in a landscape that can be called "urban" is usually agreed. This does not imply, however, that half of the globe lives in towns. This doesn't imply, however, that half the world lives in towns. Urban citizens are trying, while at the same time looking for accessible and attractive residentials,

to ensure better quality of life through excellent infrastructure, improved security and safety, a cleaner atmosphere, nearby open space and decent access to (urban) places of work. The absence of a clear local government system results in many peri-urban issues. The peri-urban region is an area that is part or independent of a neighboring town. Unplanned, unregulated rapid development is very prevalent in the periphery of the town or peri-urban region. Development along transportation corridors outside the boundaries of a big city's master plan is a natural failure, occurring in periurban regions. Those urban landscapes vary in their density, spatial configuration and land use from ' urban cores, ' from cities and towns in larger areas of the globe, particularly in developed countries and quickly developing nations(Meeus & Gulinck, 2008a). The strong identity of urban-rural peri societies, associated with an iconic landscape, can also attract new populations in search of "a character" and "roots" regions. As living settings, cultural landscape, but also as a source of heritage and identity, is crucial. Urban transformations lead to erode these social and cultural values.It is crucial to discover methods to contain, regulate and direct development in peri-urban regions at both national and local level. Definition confusion results in poor design and execution of policies and incorrect assessment of policies/program. Consequently, there is an urgent need to eliminate confusion in governance rules and jurisdiction of organizations (Saxena, 2015). Elijah Agunbiade, Rajabifard, & Bennett (2012) states that on the assumption that decision-makers, particularly physical planners at all levels of authority (national, state, metropolitan and local), need to know the scale and dynamism of urban growth and what needs to be done to cope with it appropriately. In general, by reviving the image and identity of the peri-urban area through the sustainable socio-cultural landscape can bring back the local character of a place and create clear boundaries for a peripheral urban area by characterizing the complexity of peri-urban character that affects by urban and rural identity. Therefore, there is a need to understand the importance of the socio-cultural landscape at peri-urban area to revive its unique identity.

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INTEGRATING RESILIENCE THROUGH ADAPTABILITY AND TRANSFORMABILITY: Ecologically Responsive Design Approach in Case of South-Western Coastal Region of Bangladesh

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Keywords

Transformative Resilience; Adaptability; Climate change; Ecological Resilience;

Abstract

The diverse and dynamic coastal area of Bangladesh is currently facing incontrovertible climate change problem which leads to constant flooding, rising sea-level, coastal erosion, subsidence, and salinity. Shyamnagar Upazila, Satkhira, most Aila affected area in 2009, is one of the vulnerable Upazila of the south-western coastal region (Roy. S. 2017) of Bangladesh in face of climate change. This paper is based on field observation, software simulation and design thinking to create an ecologically responsive resilient community which represents the adaptive capacity to adjust with the unforeseen challenges of climate change allowing the present growth rate. It also represents the inter-scalar relationship between smaller to a larger scale of development by allowing transformative change among the settlement formation in case of Shyamnagar, a south-western Upazila of Bangladesh. With a vision of introducing ecological resilience to make a vulnerable indigenous community in face of climate change, the design process is based on highlighting the wind flow, cyclonic storm flow, water flow within and around the site. The expected result of this research will provide a vision for a vulnerable community to be self resilient over the years by modifying the settlement pattern.

Introduction

Researchers (Aktar et al. 2019, Lamari, M. et al. 2016) in the field of resilience research study have found that, due to unique geographical location and geo-morphological condition, Bangladesh has become one of the most vulnerable countries of the world in particular to sea-level rise. The interface between the two different regions, south of Bengal Bay and north of Himalayas lies between Bangladesh. In addition to creating a life-giving monsoon, this distinctive area of Bangladesh also generates devastating natural catastrophes to which climate change and the rising sea-level are being added. Except for the northwest and southeast areas, the nation has a very small and flat topography. In different research papers, it is evident that approximately one-third population of Bangladesh is under climate change risk because of having small and almost flat topography. The country has three separate coastal regions — namely, central, western, and eastern coastal areas (Fig. 1, Islam et al., 1999). Bangladesh lies on an active delta zone titles the “Ganges Delta”, where the three major rivers are the Ganges, Brahmaputra, and Meghna (Masood et al. 2015) known as the tidal plain of Ganges and it is crossed by endless streams and creeks with very low topographies. The occurrence of water -introduced disasters is a frequent occurrence due to its unique geographical location. Furthermore, after analysis, Masood et al. 2015 stated in his paper that, Bangladesh I going to face more intensified hydrological cycle which will impact overall basin areas and leads to frequent flooding and inundation. The country’s southwest region is covered by the world's biggest mangrove (Islam et al 2018). The mangrove forests act as a deterrent to the furiosity and storm surges of the tropical cyclone.

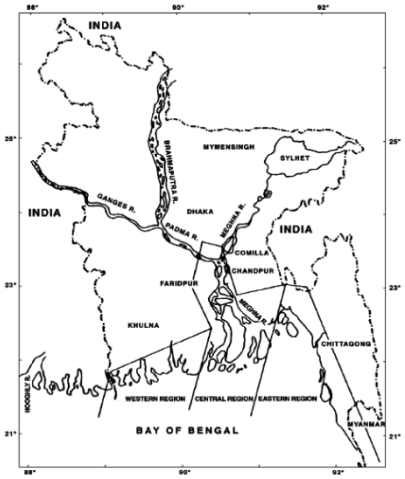

Figure 1 Map of Bangladesh showing coastal area and the major river system (Islam et al., 1999)

According to Whitehead et al, 2015, Ganges-Brahmaputra-Meghna is one of the world's biggest river basins serving over 650 million inhabitants and this river system is regarded to be one big trans-boundary river basin, even though this system's three rivers have separate features and flow for most of their lengths through very different geographic areas. They join the downstream Ganges-Brahmaputra-Meghna delta before flowing into Bengal Bay. In their studies, they observed that the 2050s and 2090s indicate a substantial rise in monsoon flows in future environments, with increased flood potential by introducing INCA-N to the Ganges deltaic River Systems to simulate flow and water quality along the rivers under a range of future climate circumstances.

In view of these, the paper focuses on the effect of the cyclonic storm as well as the decreasing rate of mangrove and sea-level rise in the case of Shyamnagar Upazilla, an Upazila from Bangladesh's south-west region. The paper also describes some feasible adaptation processes that may be undertaken in Bangladesh through a transformative resilience method to face the challenge of climate change in the near future.

Conclusion

It is obvious that there will be a tension between maintaining resilience of the desired current state in the face of some known and unknown shocks and stresses and thereby building a transformable system is needed to foster the flexibility to the unforeseen challenges. However, the characteristics of the adaptive and transformative settlement are likely to overlap. With relation to such characteristics of the system, ith is expected that the transformative resilience of a human settlement will emphasize the diversity, strength and human capital of a community across the multiscale dimensions. But transformation does not occur in a vacant place. Drawing resilience from multiple scales and using every shock and stress as an opportunity and combining the indigenous knowledge and technology it is possible to navigate the special-ecological transformation from one state to another state of the landscape.

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3D spatial development of historic urban landscape to promote a historic spatial data system

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Keywords

Urban Modeling; Historic Streetscape; Historical Spatial Data; Online-Spatial Multimedia; Kayutangan Street

Abstract

Spatial experience in historical street corridors is essential to encourage a continuously satisfying experience of a historical aesthetic leading to a better quality of the historic urban landscape, which is significant for making precious memory of the city's history. 3D spatial formation along the historic street corridor fosters the generation of historical memory of the urban space. Both tangible and intangible aspect that is attached to the spatial configuration of the historic street corridors has significant meaning that forms the integrity of the valuable historical urban space. The study is located in Kayutangan street as one of the historical street corridors in Malang City, East Java, Indonesia. The study aims to develop the historical spatial data system of the Kayutangan corridor to construct an online digital spatial database and can enforce as a policy decision reference by the government in managing the urban development in historical areas, especially in the Kayutangan street corridor. The development of this 3D spatial of historic urban landscape uses the combination of 3D modeling software, 3D visualization software, and 3D spatial multimedia application authoring platforms that produce three spatial data types covering 3D spatial-passive observation data, 3D spatial-active observation data, and 3D spatial-interactive simulation data. As a result, this study produces 3D spatial multimedia contained the 3D spatial of historical data of Kayutangan streetscape, which performs as a historical spatial data system to reference the smart development of cultural tourism and heritage cities in Malang.

Introduction

The aesthetic experience is commonly defined as the experience of a human being to the environment that gives a sense of pleasure, desire, life value, and meaning. Cultural context and locality in which the human being is born to build specific characteristics that will provide identifiers for every human experience. Awareness and aesthetic taste will be dependent on human memory traces in the aesthetic experience. According to Leder *et al*. (2004), aesthetic processing relies on some implicit memory effects, and the results of this do not have to become conscious in order to affect aesthetic processing.

On the other hand, historic streetscape as one of the valuable parts of urban spaces becomes a space medium which is responsive to the heritage values existing in human beings with the perception values generated by the formation of urban space. Well-designed historic streetscapes contribute to the visual quality and livability of the communities. Historic streetscapes make a significant contribution to the urban character and overall legibility of settlements since they are the primary way in which we travel through and experience different areas. The historic streetscapes must create a suitable environment for people to visit and gather in order to be the center of urban image.

In line with the development of science and technology in the field of good governance and with the 2011 UNESCO consensus that recommends the member countries and relevant local authorities to identify and take essential steps to implement the Historic Urban Landscape approach, so one of the critical consensus that needs to be examined is the importance of building appropriate partnerships and local management frameworks in identifying buildings and conserved landscapes, and developing conservation control mechanisms to coordinate various activities between different actors, both public and private. Furthermore, the development of a multimedia spatial system is very much needed and will refer to the rules of developing digital platforms for the management of urban heritage (Digital Platform for Urban Heritage Management). Therefore, to support the development of the spatial multimedia system, spatial data containing three crucial information, namely historical layer data, present situation data, and future planning data, is required.

Malang is one of the historic cities in Indonesia with many beautiful urban landscapes, which were built during the Dutch colonial period. One of the city's beautiful historical landscapes in Malang is the Kayutangan Street

corridor. This study aims to construct the development of the 3D historical spatial data system for the Kayutangan Street corridor in Malang, Indonesia.

Conclusion

In summary, the outcome of this paper is the online historical spatial data system development of the 3D historic urban landscape for the community. This study emphasized the four essential stages of 3D historic spatial data that consisted of the production of 3D historic street corridor modeling, the processing of 3D modeling data that collaborate with the 3D visualization software and 3D object-oriented programming (OOP) language, the production of 3D spatial data types, and the development of 3D spatial multimedia of historic spatial data types consisted of predefined 3D visualization and 3D interactive visualization. The process of data acquisition of a historic building and also overall historic landscape component required drone equipment (also known as Unoccupied Aerial Vehicle (UAV)) to enhance the accuracy and precision of 3D spatial data. The use of 3D drone mapping and UAV photogrammetry for large scale buildings and areas requires a lot of photo data recording process and a burdensome 3D mapping process. Therefore, the use of a 3D mapping method is divided per field object on photogrammetry software to lighten the 3D mapping process and to improve the accuracy of the results.

This study also emphasizes the strategy of developing a historic 3D spatial data system that presents three types of data visualization that capable support the interactivity level of spatial data delivery covering 3D spatial-passive observation data, 3D spatial-active observation data, and 3D spatial-interactive simulation data. Therefore, it recommends employing a collaboration of four software applications to produce the development of 3D spatial data of historic urban landscape, i.e., 3D modeling software, 3D visualization software, photogrammetry software, and 3D spatial multimedia application authoring platforms.

For further research, the strategy of using a combination of close-range photogrammetry methods with grid and circular mission methods in historic buildings needs to be tested in various cases to produce a more effective and better 3D mapping, especially in areas of buildings that lack sufficient space for drone mapping. On the other hand, the low cost and effective technique to produce 3D mapping data of a single building or small area can be recommended using a combination of close-range photogrammetry methods and 3D montage techniques. Hence, the development of the historical spatial data system is still a prototype application and required an advanced development and application enhancements as well as online delivery system testing.

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Environmentally Sensitive Geometries

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Keywords

Geometry, Energy,Efficiency, Envelope, Environment

Abstract

Cities, and the buildings that make them, are undergoing an evolution, in some instances unwittingly, in response to increased societal demands but also in relation to a growing awareness and sensitivity to our environment. Currently the focus of sustainable practices centers around material sourcing, new means of energy generation and advanced materials to enhance thermal comfort. The inherent role geometry plays in contributing to sustainable practices is often overlooked in today's general discourse of the subject.

The defining geometry or form of an architectural project can have a profound effect upon the amount of energy consumption of a building. This is true not only for the amount of energy consumed in the construction process, known as embodied energy, but the amount of energy required for its operation. When geometry is considered in this aspect the form of buildings will change driven in response to minimize the consumption of energy. Two attributes of energy efficient geometries are found in weight reduction, or the so-called tonnage of a building, and the reduction of its surface area. Both of these reduce embodied energy while the latter also impacts operational energy. As these attributes are applied in greater measure building forms will shift away from a dominant orthogonal geometry which characterizes our built environment today. The form of the city will take on a much different shape.

The Mexico City New International Airport, a joint venture between Foster Partners and Fernando Romero Enterprise, is a project principled upon energy efficient geometries and offers the perfect case study in which to illustrate these principles. The paper will provide an in-depth review of the project focusing on the geometries, their generating ideas and their benefits for the reduction of energy. It can also provide a hint of methods employed and considerations made for the future development of our built environment. z

Introduction:

When pursuing sustainable strategies with the aim of reducing energy consumption and embodied carbon, it is seldom that the geometric form of a building comes under review. However, building form plays an instrumental role that has a direct and reciprocal impact on the efficient use of energy and embodied carbon. The form of buildings we have inherited, and that which populate our cities today, were driven by industry, production and construction, none of which include sustainable goals. In the era that ushered in the methods and techniques that gave rise to these buildings, there was an abundance of energy and global warming had yet made its debut. Even today, except in a few rare cases, these methodologies go unquestioned, or further yet challenged, but stand as an a priori condition in which to build buildings. The crises we find ourselves in today requires an urgent reevaluation of the practices that have led to our current circumstance including the role building form plays in the expenditure of energy. The Mexico City New International Airport, a joint venture between Foster Partners and Fernando Romero Enterprise, is a project that confronts building form and its impact on the environment. It reconsiders the generation of form not as the result of industrial procedures or formal manipulations but as a means of lessening detrimental environmental impact through the reduction of energy consumption and embodied carbon and therefore providing an excellent vehicle for study.

Conclusion

In summary, the Mexico City New International Airport presents a new paradigm in the relation of architecture to its environment. Substantial reductions in energy consumption can be realized in challenging a priori forms borne from orthogonal geometries embedded in the manufacturing process. This, coupled with form active, highly efficient structures, further reduces weight and material and the associated embodied energies of each. The formal

approach in defining the mesh also discards the shackles of a straitjacket geometry that is unforgiving to local conditions. Instead this geometric strategy enables the ability of the form to adapt to localized conditions. As always architecture is an art, it is not strictly scientific. There is always an art in balancing quantitative facts with qualitative conditions. Architecture, first and foremost inspires the human condition but at the same time must be vigilantly conscious of the costs for its realization. Perhaps the most interesting aspect of the Mexico City New International Airport is that it provides a malleable enclosure within a comprehensive logic that allows the freedom for nuanced behavior while respecting the responsibility of energy conscious forms.

We have new tools at our disposal and a variety of manufacturing techniques that are quickly evolving. We also have the capacity to analyze big data, related to various phenomena, hitherto unavailable before. By the year 2030, three and a half times the existing building stock of the United States, including infrastructure, will be built worldwide, primarily in Asia (Architecture 2030, UN Habitat, *State of the World's Cities 2010/2011*; McKinsey Global Institute). In light of these conditions, in which we now find ourselves, a paradigm shift is required; The Nuevo Aeropuerto Internacional de la Ciudad de Mexico points in this new direction.

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3D based visualization tool to analyze the influential topics via hashtags on Instagram platform

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Keywords

Information visualization, Instagram,interactive 3D visualization, social media, topic analysis ;

Abstract

This paper intends to develop an interactive, comprehensive information visualization platform of Instagram hashtag analysis. Instagram hashtags has developed themselves into all different kinds of group or communities for users to share hobbies and find similar friends. In order to analyze topic influence and user interest trend from Instagram, which contains billions of end-users and has worldwide influence, hashtag analysis is necessary to gather such information and compare the proportion of people involving in each tags and rank them to visualize.

The visualization is developed in 3D space and consists of time-varying data flow of tags, together with tag comparison analysis, as well as event researches. In the rest of the paper, we mainly discuss the design idea and the development process of the system. An example of the system design work will be shown in the discussion, which involves 4 popular hashtags discussed on Instagram and are shown on the system, displayed as an 3D histogram, together with another comparison histogram to compare different tags, as well as an event view in the back.

Introduction

Instagram is one of the most influential social media in the world. Various types of contents such as texts, images and short videos are uploaded on this platform. Users can upload their photos, or videos with description, and give each post corresponding hashtags. It can easily achieve people's reaction from one certain event or topic through posts under hashtag. It's really important to analysis people's reaction of different topics especially in such a huge social media platform, using information visualization method to show the clout of one topic by amount of posts though the timeline.

In Instagram, a hashtag under the topic actually show different perspective of this topic. Therefore, when calculating the clout of one topic, all the posts which are under hashtags related to this subject will be considered in the visualization model. To some extent, these hashtags will show the reason why clout of this topics suddenly increased. For example, when analyzing the clout of football, the hashtag #worldcup will be considered. In world cup period, the clout of football must have a significant increase because of the clout of the world cup. Therefore, these relative hashtags of certain topic of each should be also included in the visualization system. Each topic must have a peak clout, in somehow these peak values reflects the influence of the topics, which should also be considered in the visualization model.

This paper will be based on this data introduces system for visualizing clout of topics via hashtags in Instagram, explain the detailed of system design. Then some example cases applying that visualization system will be presented in the paper, to directly show how the visualization systems visualizing these data.

Conclusion

Above all, the visualization method proposed in this study is mainly used for evaluating the levels of heat (discussion amount) of topics and related information. There may be still some weaknesses that the visualization has, anyway, these approaches will be improved in the future work.

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A Conceptual Framework of Infrastructural Layers of Smart Cities

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Keywords

smart city; infrastructure; sociotechnical system

Abstract

As urban population density grows, the challenges of sustainability demand that more accurate and more effective methods be utilized for reduction of energy consumption, traffic congestion, CO2 emissions, etc. In facing these challenges, governments have to use new technologies and approaches to find comprehensive solutions. In smart cities, which are seen as sociotechnical systems, various systems seek to overcome environmental complexities and develop their limits and boundaries. Therefore, the function of these systems is reducing complications and for so doing, they need to constantly appropriate and adapt themselves to environmental complexities. In this process, the data layer is a catalyzer which links the infrastructure layer to the service layer in order to technically improve the performance of infrastructures, develop new services and socially engage various players including consumers, production companies, operators and governments. The complexity of multifunction infrastructures which are able to render multiple services is growing. Therefore, making sure that these infrastructures remain affordable, accessible, suitably priced and widely accepted inevitably creates new management challenges that demand development of an accurate framework for smart cities. The complexity of infrastructures in smart cities shapes newly-formed systems on the one hand and alters demand patterns on the other. In such system, a complex technical network becomes intertwined with a complex social network and this requires identification of variables and their relationship in a rational algorithm. Despite numerous qualitative analyses of available documents, an accurate and transparent framework that can explain the relationship between the physical and social complexity of infrastructures in smart cities is still lacking.

Introduction

The city is a place where people live and work together. The infrastructures, the urban infrastructures enable such collective living and working. And this is typically done in a systemic fashion. The infrastructures enable the way that people work, the way that people live, the way that people decide. You can easily imagine how the infrastructures are built that effects social life. Is it easy to reach the city center or not? Is the traffic flowing, is it not flowing? Is water available? All this effects the quality of life, of social life and of economic life of a city. But also the other way around the economic and social and political life determines how the infrastructures are maintained, built, invested in, and developed (Abramson & Lawrence, 2001). So typically the city is such a complex socio-technical system that decides upon the infrastructure which in turn decide upon the social life of a city. Now, at the same time, one can look a little bit more in detail. To look at the infrastructures themselves as a socio-technical system. And so we have infrastructures, such typical infrastructures, such as transport, housing, buildings, energy, water and other things you can add. And the way these infrastructures are laid out effect the way that the social and political and economic life of a city is happening. Inversely, the decisions made at these levels will effect where housing is going to be, whether transport is developed here or there whether energy is renewable or not renewable whether water is cleaned or not cleaned. So one can really look at urban infrastructure systems as a socio-technical system in itself as part of a larger urban system (Alawadhi et al., 2012). Now this systemic view of cities clearly has implications on the management and the governance of cities. The most important concept here is the concept of feedback loops. So all these elements of the system, of course, interact with each other and create feedback. The social dimensions interact with the technical

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dimensions. The technical dimensions interact with the economic dimensions and all this creates feedback loops. This makes cities very, very complex and the outcomes of what happens in the city is never attributable to one single cause. All these elements are related to each other. And of course, all these things are also path dependent. So decisions that have been made at some point in the past deploy their effects later in the future. What happens today, may be caused by an array of complex interactions and feedback loops that come from the past.

The massive crowding of residents has led to chaos, which has not only brought down the balance of cities, but also made it impossible to achieve sustainability with current methods of city administration and development. So the old institutions, the old ways of governance and governance are in conflict with the complex and rapidly changing world (Bria, 2012). As a result, urban planners around the world are working to integrate all aspects of urban development into models for developing 21st Century cities to meet today's new demands and expectations. In other words, the necessity and requirements of these dams have driven many cities around the world to find smarter ways to manage them. One of the fundamental foundations of smart city is access to real-time information on citizens' actions and choices. Real-time access to smart city information makes it possible to identify and identify normative and behavioral patterns (both at the city level and at the individual level) that are valuable (Chourabi, 2012). This makes it impossible to observe the invisible (in order to understand what is going on) and the behavior of a city over different periods of time, to influence them and to model. Many countries around the world are now turning to virtual world approaches and solutions to maximize the potential of their urban life to solve city problems that cannot be solved by classical approaches. One of the new concepts to address the current challenges of cities in the field of urban planning is the development of smart city which has attracted much attention in recent years. The smart city is at the heart of the Millennium Development, which means opening up new concepts in urban planning that combine real-world and virtual capabilities to solve urban problems. The enormous data generated in the urban space, along with the advances in information and communication technology, provide unprecedented opportunities to meet the enormous challenges that cities are facing (Yusof, & Loon, 2012). In spite of the fact that the concept of smart city has become a very popular subject of research in all fields of science, and despite the widespread use of the term and its widespread efforts to explain it, there is a clear and general consensus among academics about there is no concept, meaning and what features, elements or components it encompasses (due to different perspectives on different areas of knowledge). Studies show that scholars in various fields of science have suggested a variety of terms and used a range of conceptual types instead of intelligent attributes. While some have emphasized the technology dimension and others believe that adopting technology in the smart city is not the end, they have highlighted the development of human and social capital and physical infrastructure. But what is true is that the creation of the smart city as the reality of the 21st century is not opposed to the global integration of cities (Poor-Ahmad et al., 2018). In this research the existing literature on smart city infrastructures will be first reviewed and then the most related justifications about infrastructural layers will be introduced. The main of this paper is to develop a conceptual model on behalf of infrastructural layers of smart cities.

Conclusion

Building a smart city requires integrated actions at different levels of municipality and social context. Smart City is a holistic concept that aims to tackle contemporary challenges and take advantage of recent opportunities offered by ICT advances and urbanization. Despite the extensive literature on the concept of smart city, there is not yet a clear understanding and general consensus on this subject, and scholars have proposed a variety of content. While some have considered smart technology as the only or at least the most important component of smart city, others have proposed definitions that go beyond technology and believe that technology adoption is not the end. Technologies can be used in cities to empower citizens by adapting these technologies to their needs rather than adapting their lives to technology requirements. An examination of the vast array of literature shows that the meaning of a smart city is multifaceted. The results of the analysis of Smart City definitions and concepts suggest that there are three key issues: Infrastructure is central to the concept of smart city. Technology is an enabling factor for the smart city, but it's not necessarily the most critical. The combination, interconnection and integration of systems and infrastructures are essential to making a city smart. The core systems are not discrete, and have become a complex multidimensional network of diverse interconnected systems in a synergistic manner that delivers better and optimal performance.

While there have been significant advancements in the Smart Cities technology solutions (such as IoT), there are still limitations in current technology and data analytics processes to support the data capture, integration and exploitation required within the proposed framework. Furthermore, the understanding of the interaction with these technologies both at the individual level and the collective level is not well understood and could limit the implementation of the framework. Often fractured national government of local policies do not provide the needed transparency and leadership required. Furthermore, the establish bureaucracy in city services will be reluctant to expose their services processes and associated data to the other city services and the broader city management. A political, city services culture, technical and social transformation is required to support the

development and implementation of the proposed framework. Privacy and concerns of impact on democratic governments within a Smart Cities framework need to be addressed as it becomes a growing concern for cities and society as a whole. This includes both technology concern such IT safeguards of personnel data and governance concerns around the separation of power between governments, technology provides and the citizens. These concerns must be addressed for successful implementation of a Smart Cities framework. Future research should focus on exploring the scalability of the proposed framework to incorporate the alignment to the broader regulation and government objectives and strategies, this will support line of- sight from government policy to citizen's requirements and the performance of infrastructure assets. 'Is it possible to imagine infrastructure systems that can meet the needs of twice today's population with half today's resources while providing twice the livability? We focus on how infrastructures evolve and how the behavior of infrastructures emerges over time. In doing so, we look at infrastructures from both a technical and a social perspective. We are delighted that you have signed up for this course. From a technical perspective, technological advances can for instance bring improved operation of infrastructures or enable new services to be developed. From a social perspective we analyze the many actors involved: consumers, producing companies, operators, governments, and so on.

Furthermore we look at these actors and infrastructures on a local, regional, national and a transnational level and analyze the diverging interests that occur between actors at different levels. In this weblecture we will explain what you will learn during this course. Infrastructures provide critical services such as the transportation of people and goods, the provision of energy, water and sanitation, and telecommunication and information services. We say critical services, because these infrastructure systems form the very backbone of our society. They create the conditions for livability and economic development. For many people around the world access to high quality infrastructure services is not a given. They are daily struggling to collect water and firewood. While there is moral imperative to ensure reliable and affordable infrastructure services for all, the world population is still growing, and natural resources are becoming increasingly strained, adding to the challenge. And, last but not least, the challenge is aggravated by the increasing complexity of today's infrastructure systems. The complexity of infrastructures results in emergent system behavior. That is behavior that we cannot predict from our understanding of the system components. Many causes are at play in causing this complexity. Ageing of infrastructure components is one of them. Technological innovation is another cause of increasing complexity. In many infrastructure systems we see many innovations at the same time, occurring at various speeds, at various places, and at various levels. Furthermore, we see changing demand patterns, for example due to population growth in urban areas and increasing welfare giving people access to a wide range of infrastructure services. Another example of how the complexity of infrastructures is increasing is multi-functionality, which is a term we use for infrastructures, which provide a range of services. At the same time, infrastructures are becoming more and more interconnected and interdependent across infrastructure sectors. Securing the availability, accessibility, affordability and acceptability of infrastructures will therefore lead to new governance challenges. Furthermore, due to the diverse nature of cities, the dynamic and changing aspect of citizen requirements should be investigated and inform changes in government functions. Finally, investigating the commercial business requirements might differ from individual citizen requirements and provide new insight into the relationship between business, city services and the infrastructure assets. Figure 3, shows proposed smart city infrastructure conceptual model.

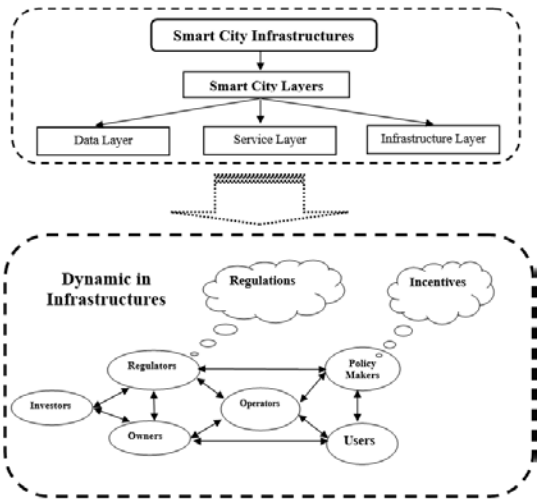

Figure 3. A Conceptual Framework of Infrastructural Layers of Smart Cities (Author, 2019).

The key point is that cities must respond to the changing terrain in which they operate and what should be considered intelligent depending on the context of the different contexts (textual and contextual) (such as political system, geographical location, and technology diffusion). In fact, smart solutions simply cannot be copied and need to be valued for different contexts, in fact there is no path to becoming smart and different cities have adopted different approaches. This is a reflection of their special circumstances: cities cannot easily copy good practices, but they must To develop unions that fit their situation because there are no two cities with the same situation, but urban managers should not aim to solve all the problems of the city, but instead have to build an urban system capacity to confront and confront. With a wide range of issues and problems, the smart city model as a model of urban development in different parts of a country can be considered in parallel. The field of intelligence has followed (Poor-Ahmad et al., 2018). But all of them aim to improve the quality of life by pursuing different goals in accordance with the conditions and priorities of their city.

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Passive energy saving of residential building envelop in Dhaka, Bangladesh: A research on alternative of brick in frame structure

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Keywords

Passive energy, alternative Building material, thermal conductivity, residential building envelops;

Abstract

A significant amount of energy is consumed by today's residential buildings in developing countries like Bangladesh. In many of these buildings, the energy consumption can be extensively reduced by adopting energy efficiency strategies. Due to environmental concerns and the high cost of energy in recent years there has been a renewed attention in building energy efficiency techniques. The conventional building material used in the construction industry in Bangladesh is the burnt brick which has high embodied energy. It causes significant environmental hazards as it consumes considerable amount of top soil. Hence there is a need to produce environmentally responsive building materials for the construction of new buildings in order to meet the rapid urban growth. As an alternative, natural resources used in conventional building material can be replaced by environment friendly blocks. This paper thus attempts to identify an eco-friendly alternative building material by using sand, cement, expanded polystyrene, aluminum dust, thereby reducing continuous exploitation of these natural resources. The properties of the alternative building wall materials are identified and compared with conventional bricks. Additionally, the thermal conductivity of the proposed block is determined and compared with brick to provide a comfortable building environment for the users.

1. Introduction

The building envelope is the vital physical barrier with the environment. It creates an immense relationship with the environment where the building is located. It allows the necessary environmental properties to enter inside and protects from harmful properties at the same time. Thus, the building envelope has to maintain thermal comfort for the occupants. Givoni stated that, *"Building materials play an important role in buildings from the energy efficiency and thermal comfort points of view"* (Givoni, 1998). Due to their intrinsic properties, different building materials respond differently to climatic conditions. The buildings should amend the natural environment to offer livable and comfortable conditions to the occupants. The envelope plays a particularly important role in fulfilling the task of keeping the indoor environmental conditions at a comfortable level. Olanipekun defines that, *"The thermal properties of building components such as walls, ceiling and floors together determine the energy consumption patterns and comfort conditions in an enclosed space"* (Olanipekun, 2002).

The conventional building material in Bangladesh used for the construction of buildings is the burnt clay brick which devours excess fuel during its manufacturing process and leads to the emission of poisonous gases like carbon monoxide to the atmosphere, contributing to major climate change. The increased embodied and operational energy of the brick leads to high operational costs. It also causes environmental hazards as considerable amount of top soil is consumed which is rich in minerals, thus affecting the natural vegetation. The survival of God's creation depends upon the "Five Elements" and nature has provided them as assets to human beings and is mutually dependent on each other for their sustainability. To attain this sustainability the most important step is to improve energy efficiency in every sector. Due to the continuous exploitation of natural resources, there is an urge to produce environmentally responsive building material for the construction of new buildings to meet the rapid urban growth.

Demand for bricks is increasing in parallel to the rapid growth of real estate and public infrastructure sectors of Bangladesh. According to Bangladesh Brick Manufacturing Owners Association (BBMOA), there are approximately 6,000 brick fields that manufacture bricks of different grades in the country. About 60 per cent of

the produced bricks in the country are consumed by different government departments, such as the Roads and Highways Department, Public Works Department and Local Government Engineering Department annually. The rest is consumed by private sector users specially the private housing development companies. Despite the high demand, brick manufacturing has been dominated so far mainly by the seasonal fixed chimney brick kilns or its closest counterparts in Bangladesh. These technologies are more than 150 years old and inefficient in terms of fuel usage. Also, such technologies are already proscribed in the other parts of the world.
Recognizing the need for producing bricks with smart technologies while minimizing environmental impact and contributing towards economic development, it is now a necessity to establish environmental brick manufacturing facilities in Bangladesh. These technologies are expected to produce high quality bricks using less energy and hence reduce environmental pollution.

To get more insight into how to overcome the problems considering the environment and, this paper will investigate what sustainable alternative materials exist to replace to a certain extent the concrete used in the building industry in Bangladesh of tropical climate zone. Sustainable alternative materials are selected and evaluated to research their suitability as a building material and to see how suitable they are for application in a tropical climate. Since temperature is one of the key weather variables affecting thermal comfort, Thermal performance of the brick and alternative to brick was evaluated on the basis of experiments only.

Conclusion

The building envelope is the fundamental interface between indoors and outdoors and has a significant role in restraining variations in the outdoor weather conditions, providing thermal comfort for occupants of the building. Therefore, this investigative study shows that envelop material plays an important to control indoor temperature. From literature review it is obvious to find out that brick model house would have higher temperature rather than thermal block and aerated concrete. However, from investigation it is very tough to reach any conclusion. Specially there is no opinion of a specific lowest temperature measured model house in this study.

In this situation we can rethink about the materials which were used to study. We should review the production process about the materials. There is a possibility of flaws of proper making process of green building materials like thermal block and aerated concrete. However, getting good thermal comfort, rest of the world is trying to shift on green building materials instead of brick, it's obvious that brick has higher thermal effect rather than green building materials. Besides, a full year investigation will also can affect to get the result.

This study may play an important role in decision making and production processes of building material in respect to green building material particular in Bangladesh. This awareness may increase environmental performance of building and occupants' thermal comfort as well as decrease future energy consumption in long run. Though this study is limited to only three building material further research on other available materials and may enrich the knowledge about thermal property and performance of material.

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Colour Preferrences in Interior Design Environments for Middle Eastern Tourists in Smart Cities

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Keywords

Built Environment Informatics; colour psychology; interior design; colour cultural effects; Middle Eastern tourists; hospitality facilities.

Abstract

The colours in interior design traditionally represent theoretical colour schemes, theories, and meanings that translate into experience, materials, and surfaces. This paper is part of a larger research on colour psychology and meaning based on cultural preferences of Middle Eastern tourists who are visiting Malaysia. The purpose is for guiding the design of an appropriate environment for them in smart cities. This paper reports on the first part of the survey research methodology covering colour preferences of the sample population of 419 respondents. This study had reviewed literature on colour design psychology, colour of interior design, and colour design environment before using a survey research methodology to determine the expected psychological effects of colours in interior design spaces among Middle Eastern tourists who were visiting Malaysia. Images of four interior colour palettes were shown to Middle Eastern tourists at random afterwhich they would complete a questionnaire. The study found the most preferred colour palette for Middle Eastern tourists has low value contrast (4.5/5.4), and medium chroma contrast (10.3/10.1). In comparison with selected cultures, these Middle Eastern colour characteristics are similar to the Americans, while they differ much from English, Japanese and Korean cultures. Besides guiding interior designers from different cultures to design the built environment for other cultures, this study is significant in supporting the development of tourism in smart cities. The results will also help hotel owners and operators in different cultural context for making affordable changes in their hospitality facilities due to influx of seasonal tourism activities. Results of this study are significant to guide interior designers and architects in designing culture-based living environment in smart cities.

Introduction

Colour is a central part of visual knowledge that impacts an inclusive change in human actions, for example, choosing cars, clothes, and interior decorations. Additionally, the physical environment influences the performance and mood of people (Bakker, 2014). Colour plays a role in the environment, but there are doubts about the exact effects on human beings and their behaviour in relation to specific colours (Bakker, 2013). Motamed and Tucker (2019) demonstrated that architects' preferences towards more colourful designs are informed by practice influences; such as contemporary trends and demands, facilitated by new material and representational technologies, for more colourful buildings in our cities.

According to Park and Guerin (2002), colour is a deep-rooted visual property as normal and designed environments. In interior designs, interiors are designed using multiple colour schemes along with elements such as walls, floors, ceilings, window treatments, and furnishings. Also, Motamed and Tucker (2019) found that colour use is influenced by culture and elucidate for the design community greater understanding about the relationship between culture and colour use in architecture. Zennaro has suggested (2017) that to successfully use colour, designers need to: (1) have cultural understanding of design and colour essentials, (2) consideration of all five senses in perception of surrounding, (2) basic knowledge about colour combination and harmony, (3) knowledge about site historical, cultural, and geographical background, (4) know the special characteristic of the place, (5) different strategies from case to case, (6) make continuous iterations between theory, project and realisation.

Furthermore, most studies in colour preference investigated psychophysical characterisations, which is important for marketing applications. Many of these studies, however, did not provide adequate information for the reasons why some people like those colours or even why they have such colour preferences. Several theories have postulated the reasons behind colour preferences (Guilford et al., (1959); Helson et al., 1970). For instance, Humphrey (1976) recommended that the colours of many modern artefacts are virtually complete, although random in nature. In some cases, such as the colour of a shirt or car, it neither creates significant signal value nor creates deep normal colour signals.

Humphrey (1976) stated that colour preferences originate from the signals sent by the colours to human beings. For instance, a flower's colour attracts specific cross-pollinating insects, and at times, they send 'avoid' signals as well. Whereas, Ou et al. (2004) stated that colour preference is created on 'colour-emotions', which can be called "feelings evoked by either colours or colour combinations." Moreover, colour-feelings or emotions can be connected negatively with colour preference, if the colours are favoured to the degree that when viewed, the phenomenon creates positive feelings for the observer (Ou et al., 2004). Additionally, interior designers take into account many features associated with colour to specify an environment's colour palette when addressing a design issue. Practical, attractive and beautiful interiors have colour palettes which represent significant meaning to the end-users' who are attached to special colours (Park and Guerin, 2002). Indeed, some designers have questioned and explored empirically-proven colour guidelines for interior spaces.

On the other hand, the empirical evidence for making informed decisions regarding the application of colour for smart city' living colours is scarce. Hence, this study aims to design an appropriate environment for users in smart cities. It also aims at analysing the psychological effects of colours in interior design for smart cities and finally, developing a colour instrument for designing interior design space towards smart cities. However, this study focuses on colour design psychology, the colour of the interior design, and colour design environment. Under each theme, a review of major works was performed to critically analysed their contributions towards future investigations and aspects that need to be enhanced for the colour psychology. Therefore, there is a need to understand colour preferences and matching them with the respective culture to intelligently match the interior designs towards intended users.

Conclusion

Understanding colour preferences and matching them with the respective culture may pave a new approach to intelligently match the interior designs towards intended users. The study found the most preferred colour palette for Middle Eastern tourists has low value contrast (4.5/5.4), and medium chroma contrast (10.3/10.1). In comparison with selected cultures, these Middle Eastern colour characteristics are similar to the Americans, while they differ much from English, Japanese and Korean cultures. Besides guiding interior designers from different cultures to design the built environment for other cultures, this study is significant in supporting the development of tourism in smart cities. The results will also help hotel owners and operators in different cultural context for making affordable changes in their hospitality facilities due to influx of seasonal tourism activities. Future studies are recommended to extend the Middle Easterns colour preferences for designing smart city living environment for Middle Easterns communities. Additionally, future studies are recommended to include developing a psychological profile for different cultures which could guide interior designers to design facilities for visitors of different cultural backgrounds.

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Towards a Smart Routing Model (MFR Framework) in Smart Cities

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Keywords:

smart cities, fog computing, Big Data, IOT, MOA, ST-CA, MOA-Fogged Routing MFR

ABSTRACT

The massive stream of data generated from traffic sensors in smart cities are huge to be handled by ordinary tools and algorithms, they take to much time for transmission to the cloud for analyzing and back again to the Internet of Things IOT environment, those are serious issues should be taken into consideration. Fog computing is an extension of cloud computing, it helps in solving big data transmission issues. Massive Online Analysis MOA is a software framework used as a mining tool for big data streams. This paper proposed Smart Routing Model that combines an existing framework called ST-CA and a new framework called MOA-Fogged Routing MFR, the MFR framework overcome some issues with ST-CA related Big Data transmission to the cloud that is solved by fog, and Big Data mining issues that is solved by using MOA.

INTRODUCTION

Smart cities are urban cities developed with the help of Internet of Things IOT, it's the next generation city planning that contains multiple kind of data collected from sensors and devices like traffic conditions of roads. The collected Big Data is analyzed using advanced data analyzing technologies in order to achieve smart city services. One of the main expected services from smart cities is traffic management and road traffic safety, which also related development in vehicular technologies. Hence, companies and researchers focused their attention to how to improve road safety in smart cities. This paper presented the following topics: a review on Big Data and its relation to MOA as a Big Data mining tool, and its relation to hybrid cloud computing together with fog computing for efficiency improvement, with related work, proposed framework, and finally conclusion with future work.

CONCLUSION

The main issue that lead to this work was about managing safe traffic in smart cities; the proposed MFR framework used MOA as a Big Data mining tool, and fog computing as nodes connects IOT with cloud computing. However, there was a big issue in applying MFR- framework on real data within short time to be implemented for more tests.

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Localizing the Globalized - How not to Fail in Smart Cities Frameworks

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Keywords

Smart Cities ; Management of Technology; Urban Planning; Information Technology

Abstract

Smart Cities is viewed by a few as a show, by others as a trend, but by many as a necessity. To cope with growing pressures of urbanization and the complications of citizen urban needs, an integrated hi-tech solution is needed. After all, many renowned cities around the world are adopting it; London, Dubai, Cape Town. Is there a set-menu to adopt a smart city approach? Should urbanists seek standards for quality assurance or develop localized approaches? This research is the findings of an 18 month-long in-depth analysis using extensive case studies and detailed interviews with state-of-the-art experts in the making of Smart Cities around the world. The findings were collaborated by local industry specialists to reach a localized model that adapts the Smart City approach to Egypt. The findings challenge many of conventional stereotypes about the concepts and perceptions that impede Smart Cities.

INTRODUCTION

The number of urban centers with a Smart City strategy has almost doubled in the past two years, rising from 87 in 2017 to 153 in 2019 (Zelt, 2019). The trend continues to rise as cities strive to handle more people efficiently. Yet, there is no consensus as to the framework or mdel to adopt. Especially when is comes to the Middle East region, where Gulf and African cities increasingly become metropolis. Different global cases of smart cities were implemented with consideration to a strategy and timeline that follows a smart cities framework. Generally, it is believed that the following four major steps are taken; Step 1: Creating the vision; Step 2: building the roadmap; Step 3: Identifying the KPIs; Step 4: Building governance to transform the city's operation model. It is important – as the case for more Midlle Eastern smart cities continues to grow – to have a critical look on the model and process by which these cities are created and managed.

In this paper, we will compare the approaches adopted by four different mature Smart Cities from around the globe in order to reach a recommendation on the best course of action.

CONCLUSIONS

Based on the results of this study, it is very clear that citizen-centric smart city is highly important to ensure the success of the initiative. The citizen is the beneficiary and should be part of the journey of smart cities. On the other hand, smart cities initiatives will eventually lead to the welfare of the citizens by improving the quality of life. This win-win relationship is important to make a more efficient and successful smart cities implementation.

Despite that, smart cities utilize and make use of latest technologies. Technologies are used as means to achieve city objectives, not as an objective in itself. Smart city objectives should include the improvement of quality of life, management of resources, the economy and sustainability. Cities will have other objectives based on their local needs but mostly they will be stemmed from these main objectives.

Cities in nature are different in terms of size, population, demographics and economic base. Accordingly, there is no "one size fits all" smart city transformation plan. However, the framework to be followed to create a roadmap has specific steps that need to be followed in all cases. Based on the above mentioned differences, it will lead to different results. Although, the methodology itself will be similar.

The collaboration between different stakeholders and the integration of systems and applications with proper governance for data are key elements in any smart city implementation. This ensures the smooth operation of the city and the understanding of roles and responsibilities. The integration of systems and applications allow city management to have 360º views of all aspects of the city and guide relevant stakeholders in different situations. Cities have to change their traditional operational models to a more integrated model. Cities should keep in mind

that process reviews and improvements should be carried out periodically, and training programs and capacity building plans should be continuously developed and executed.

One critical element is the pricing of city services. Since smart cities provide costly services, the prices of these services to the public will be higher than regular services offered in traditional cities and more taxes may be introduced . To avoid huge increases in prices, cities management should consider offering new value-added services that can benefit their citizens. For example, offering parking reservation through mobile application , providing remote security monitoring, or recommending optimal routes for heavy vehicles through the city against reduced tolling fees . These services are difficult to exist in traditional cities, but it may be convenient for the citizens to pay additional fee for the lifestyle benefit. Thus, officials should be exploring opportunities created by better technology to offer convenient value-added services .

After the implementation of smart cities initiatives and during the operation, city management should be always capable to assess and evaluate their performance as said, “What can’t be measured, can’t be improved”. Cities should consider using global indicators to measure their performance compared to other cities globally in order to make sure of their competitiveness against such cities. This does not mean that local indicators should not be used but rather a combination of both that ensures proper unbiased evaluation. Cities should use latest technologies to collect data related to these indicators and measure them nearly in real-time.

Most importantly, on a national context, proper vision, objectives and guidelines should be developed and followed by those cities willing to become smarter. In some cases, some cities are forced to become smart to overcome their challenges and those cities should be carefully selected and well-studied. It is impossible and very costly to run smart cities initiatives across all cities in parallel. Thus, there should be a national study identifying the cities with the highest priority within a proper roadmap to assess the feasibility and the availability of resources to ensure the success of the city. The country should also consider the regulatory and legal framework and proper improvements should be made to enable key stakeholders to work within the new smart city environment.

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Part II
Smart Mobility: Challenges and Solutions

Users' Mode Change Behavior Due to On-Street Parking Pricing: A Case Study for Dhaka

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Keywords

On-street parking; parking pricing; public perception; Dhaka city;

Abstract

Dhaka city is facing intense on-street parking challenges as car ownership is increasing day by day. This situation has led traffic congestion are not only on local roads but also on collector and arterial roads. Parking charge can be a powerful source to solve on-street parking and traffic congestion problems. In this city most of the on-street parking places are charged free, for this reason, the amount of on-street parking is very high in front of shopping malls, education center, office etc. The objective of this paper is to evaluate the on-street parking users' mode choice behavior, if the charge is implemented. For achieving the research objective, total 500 questionnaire survey was conducted on 16 major locations of Dhaka city. Based on the analytical results along with in-depth on-site investigations, it was found that the users' are less enthusiastic about changing their mode if on-street parking charge is applied while they are willing to pay up to 30 BDT as parking charge. Majority of the users find space for parking without any difficulties where their parking duration is less than one hour. Parking charge may divert users to change parking spot rather than changing transport. According to result, Satmosjid, Mirpur and Banani roads are the most unsafe place according to users' perception while Motijheel and Shyamoli are moderately safe place and other 11 locations are the safest place for on-street parking. The most important finding is the fact that almost 86% of the respondent consume. The result of this research can be employed in planning the parking schemes and the design of such type of infrastructures.

Introduction

Now a days emerging cities are exceedingly suffering from traffic jam caused by the increase of personal vehicles day by day on road network. In most of the cases, these emerging cities fail to provide adequate parking facilities to the increased number of vehicles which ultimately results in traffic congestion. Dhaka city have nearly 3,000 roadside shopping centers where majority of them are unable to provide adequate parking facilities (Rahman, 2010). Therefore, addressing traffic congestion issues due to inadequate parking facilities have become a major concern in transportation sector since the mass acceptance of car worldwide. Most of the countries are now emphasizing on traffic management system to cope up with this problem (Manns, 2010). The policy of parking is one of the most powerful systems that policy makers and urban planners can employ to manage traffic in city centers. Governments of most countries around the world are using different parking policies to reduce urban road traffic flow (Verhoef et al., 1996). Many studies have showed that parking measures are positive means of decreasing congestion (McShane & Meyer, 1982).

Transportation system has been developed in cities round the earth to facilitate individuals according to travel needs (Qin et al., 2013). Many central business areas remain congested with traffic due to high flow of traffic towards the business areas. Liu & Meng (2014) encouraged the use of mass transit as a positive way to mitigate the growing jam in city centre (CBD, Central Business District). Several types of public transport are available according to capacity and mobility in different countries. Consequently, public transport (PT) services have been observed by the transportation authority, urban planners or transit operator engineers like a remedy of traffic congestion. Increasing the coverage region of PT and reasonable fare structure has been a useful technique to augment the custom to use public transport (Rosli et al., 2012).

In the past few years, the increasing traffic demand was endeavored to solve by increasing the capacity as a common practice. Nowadays, due to the charges and improvement difficulties for budgets along with

environmental concerns such solutions are not considered anymore. Since, the solution does not depend in development, but rather lie more on efficient utilization of the existing travel demand management and traffic infrastructure. Amomg the traffic demand management techniques parking cost has emmerged as one of the most effective strategies to reduce congestion. Paying parking charge for both on-street or off-street parking illustrates the most equable technique of amending or introducing this policy where no charge is employed for parking.

This study aims to explore users' mode change behavior due to on-street parking pricing. The way implementing parking price will effect users' behavior have been analyzed in this study. Factors associated with parking such as reason of on-street parking, trip purpose, duration of parking, parking safety, convenience of finding a parking space, parking facility usage among users etc. have been examined in the present study.

Conclusions

Dhaka is one of the busiest and fastest growing cities in the world in terms of population and economy. Being a busiest capital city, traffic load is very high in Dhaka city which frequently causes traffic congestion. Due to illegally parked vehicles along the streets, congestion occurs obstructing the flow of traffic. Therefore, as a solution, a parking pricing would help improve the vehicular flow along the streets especially at peak periods and at the same time would introduce revenues for the city. The space occupied by only a small number of cars can cause a great deal of interruption if the parking is done on streets having heavy vehicular as well as pedestrian traffic for an extended period, such as the whole working day. Illegal parking jeopardizes the safety and livability of a street and thus charge may be applied to encourage users to change their mode and thereby to free the road space. This research may be an overview for taking decisions about implementing charge for on-street parking.

The reasons why the car users are not interested to change their mode from car to others is that in Dhaka it is easily accessible and comfortable way to travel, and the users have privacy, feel safe and it saves time. Other reasons may include the lack of satisfactory public transportation and high prices of taxis in Dhaka. Moreover, the poor quality of walking and biking facilities do not encourage travelers to use them. Hence in Dhaka city, if parking users are to pay, comparatively high parking prices should be imposed since respondents mentioned that they won't change their mode of travel if the parking charge is comparatively low. Some drivers may take the chance of paying fine by parking on a prohibited curb space. Drivers may have other easy options amid on-street parking and giving penalties. One can move to a neighboring space having vacant on-street parking or move to an off-street parking having lower prices, and then can walk to reach point of interest. Nonetheless, the simple message is that if cities cost nothing or very small for on-street parking, motorists may park their car on street.

To address the parking issues, the city authorities may consider imposing on-street parking fare as well as develop off-street parking areas in major economic activity centers. This will definitely improve the circumstances of traffic flow and walkability in those areas which will enhance the livability of the city.

Further variations in sample such as increasing the number of variables and increasing thr number survey locations may benefit to achieve more precise result. More comprehensive data collection like house to house survey may be more beneficial for achieving a better conclusion. This findings of this research may be utilized by the policy-makers and transportation planners.

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Choice of Travel Mode for Work Trips: Some Features for Dhaka city

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Keywords

Mode choice; work trips; trip chain ; Dhaka city;

Abstract

Mode choice and trip chaining behavior of developing cities are gradually becoming more complex due to rapid urbanization and economic growth. The travel mode is included private automobile, public transportation, walking, bicycling etc. The choice of mode depends on income level, travel time, working hour per day, trip distance, trip chain of work related days, comfort level of modes and so on. The aim of this research is to analyse the mode choice behaviour of work trips in Dhaka city based on users assessment. A questionnaire survey was carried out at 14 different locations in Dhaka city to 1000 respondents. The questionnaire had seven main parts including demographic and trip chain information, mode of trip, trip distance, travel time, travel cost, route choice, and quality of service. Result shows that majority (38%) of the respondents monthly household travel cost was 3000~5000 Taka. About half of the respondents said that they make simple home to work; work to home (h-w-(-w-)-h) trip chain of work related days. 68% of the respondents reported that they make only one non-work (h-nw-h) trip chain of none work related days. 51% of the respondents stated that they make more than one non-work activity (h-nw-(-nw-)-h) trip chain of non-work related (1 to 5) days within a month. 34% of the respondents mentioned the waiting time travel mode is 5 to 10 minutes and 36% mentioned their travel time was 30 minutes. The respondents use bus or train or paratransit as a main mode of travel and they will not change any mode, although about half (49%) of them think the mode was uncomfortable. 69% users had no household motorized vehicle while half of the respondents said that their workplace has no parking facility. This study may be employed by the urban planner or policy makers of Bangladesh to enhance the users travel experience and to reveal the variables influencing comfort level of mode choice.

1. Intdoduction

Mode choice and trip chaining behavior of developing cities are gradually becoming more complex due to rapid urbanization and economic growth. The choices of suitable mode may be determined by the costs, speed of transport, flexibility, regularity of service, safety and security, nature of commodity, destinations, capacities, frequencies, comfort and other considerations of the modes together with the nature of the carried goods and their destinations. Congestion level and any trip chain can be identified by the mode choice analysis. Mode choice model is one of the fundamental models in decision making o transportation since it plays a significant role in constituting transport guiding principle (Ortúzar and Willumsen 1994). Nowadays mode choice modeling is based on utility maximization. It maximizes the utility function by reducing delay, accidents, congestion and environmental effect. It can also affect positively in maximization in utility by increasing economic condition and comfort.

Dhaka, the capital city of Bangladesh is having the highest growth rate with an intensity of 28,663 people per square kilometerand and having a population of over 18 million in 2016 (world population review, 2018). With this kind of environment, a lot of people would come and go using various kinds of transport. The profile of Dhaka city profile is shown in table 1. The need to study the trip attributes of the people and the mode of transport they are using is very important to determine the travel behavior in the area for proper transport planning and decision making. The percentage of current urbanization level is about 30% and anticipated to increase 50% by year 2050 (STP, 2005).

Travelers mode choice behavior is persuaded by several factors ranging from social to financial factors and also motivated by travel realted attributes like travel time, cost, waiting at station, and contentment of trip and lot more. Better service of public transport can attract further passengers while poor service inivites more personal vehicles as explored by Zhao et al. (2002). Trip attributes influences the choice of a particular mode as described by Racca and Ratledge (2004). Other studies (Strathman and Dueker, 1996 and Ye et al., 2007) showed that trip intricacy has a significant impact on choice o a mode. Household position, proximity nature and other inner-city characteristics demonstrates an eminent role in influencing the preferred commuting mode as elucidated (Pinjari et al., 2007; Frank et al., 2008).

Dhaka urban transport model (DUTM) used three explanatory variables for the mode choice model namely, travel time, travel cost and comfort. Result suggests that comfort had significant impact rathar than journey time and cost implying that the people are more sensitive towards the comfort provided by the mode than the travel time and expense which is unrealistic (Habib, 2002).

A mode choice model for the work trips was established by Aftabuzzaman et al. (2010) for the middle income group of Dhaka city. The primary data source was the house hold interview survey of about 200 people. Only three modes i.e. rickshaw, bus and auto rickshaw were considered in the multinomial logit model development. The research work also presented three policy scenarios in terms of decrease in bus fare, decrease in travel time of bus and the increase in rickshaw fare. All the scenarios resulted in a rise in the modal share of bus and fall in the share of rickshaw and auto rickshaw. Significance of choice of a mode for decision making strategies regarding policies for trip makers is described by Tushara et al. (2013). Attriabutes that affect the choice of housing location is motivated by demographic factors, work place location and some most important activities such as education and shop. Hence to systematize transport and regulate action scheme successfully mode choice investigation is essential as decsribed by Cai et al., 2015. The objective of this research is to analyse the mode choice behaviour of work trips in Dhaka city based on users assessment.

Table 1.The profile of the Dhaka city (world population review, 2018)

Parameters	Dhaka
City area (square km)	306
Metro area (square km)	31051
City population	14400,000
Metro population	19,578,421
City Density (per km^2)	50368
Metro density (per km^2)	631

2. Conclusion

The effectiveness of policies regarding introduction of a new transit system or improvement of the existing one depends on studies of mode choice behavior. These are the critical determinants of the probability of what factors will act behind the shifting of people from one mode to the other and also the probability of the number of people may actually change their travel mode. The objective of this study is to find the some features influencing to choice of travel mode for work trips in Dhaka city, Bangladesh. Most importantly it relates passengers demand about the change of mode and trip chains. The result of this paper is ascertained on different customers' opinions revealing their demands and expectations. With the determination of the mode choice attributes, this research may benefit to make best use of the inadequate resources to enhance the modes. Majority of the respondents said that they make simple home to work; work to home (h-w-(-w-)-h) trip chain in work related days. They use mass transit as their main travel mode. About half of the traveler thinks the mode was uncomfortable. It is imperative to highlight that the attributes have a vital role in the overall mode choice assessment. For these reasons, planners and administrators of public transport need to be more watchful about these attributes while planning measures for enhancing the use of public transport. Several statistical analyses can be developed for proper understanding of mode choice behavior of work trips. Those analyses may help in different transportation planning in future.

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Assessing Spatial Accessibility to Educational Facilities from Public Transit using Distance Measures: A Case of Indian Cities

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Keywords *;*

Accessibility; Public transit; Network;Educational Facilities;Non-Motorized transport

Abstract

Accessibility is recognized as an important element of efficient, high quality and sustainable transport system. High accessibility makes cities physically liveable, socially active and economically viable. Use of non-motorised transport (NMT) to reach public transit (PT) is very important as it improves accessibility and also creates a pollution-free environment. But in developing countries the share of desirable modes - walk, bicycle and PT is declining and the share of undesirable modes i.e. cars and 2-wheelers is growing day by day, which in turn leads to air and noise pollution.Though there is intense planning on public transportation in Indian cities, last mile connectivity still remains a major concern. Connection associated with link educational facilities will help students to their destinations from PT. This paper demonstrates a simple method where it identifies how educational facilities are connected to PT in Indian cities. This study uses Google API'S and other mobile applications for mapping of PT and educational facilities. Near (Euclidean) and network distance measurements are performed using ArcGIS spatial attribute tools. Further, a new accessibility index is formulated for various ranges i.e (0-400) (401-800) of distances particularly suitable for Indian cities. This study includes the usage of built land cover of the city retrieved from Landsat 8 data with a spatial resolution of 30 m. Moreover, this study attempts to compare the reach to educational facilities from PT in five different cities of India using descriptive statistics. The results help in identifying local barriers and network issues that influence accessibility from public transit to educational facilities. This study helps in improving overall accessibility and developing a framework to be included in urban development policies.

1. Introduction

Theories of new urbanism and smart growth usually point at accessibility as one of their most significant principles (Clifton, Ewing, Knaap, & Song, 2008). As per the transportation research board, in the research of transportation, mobility and accessibility have been identified as very crucial components. Therefore, the integration of transportation and land use planning is repeatedly emphasized. Researchers have called for a paradigm shift from auto mobility oriented planning towards accessibility oriented planning (United Nations Human Settlements Programme, 2013). As "accessibility refers to the ability to reach desired goods, services, activities and destinations" (Handy, 2005) , generalized cost in terms of time, money, discomfort and risk is needed to reach a particular activity (Litman, 2016).

In most Indian cities accessibility criteria is neglected while preparing for transportation plans (Murthy, 2011). The present planning emphasises more on mobility planning and motorized transport only. Mobility is major factor within urban areas but mobility-based approach creates sprawls (Chapin, 1964; ISoCaRP, 2005), particularly when it comes to lower-income households who majorly depend on non-motorized transport in their daily life. Even huge investments are being made in terms of capital and infrastructure for mass transit, NMT is often neglected as a significant mobility choice which influences overall accessibility and improves last-mile connectivity (Singal, 2014). This results in a lot of time and money spent on basic travel. Accessibility is a function of both land use pattern and performance of the transportation system. It is an appropriate criteria for evaluating the transport system to different categories of users (Litman, 2016). Transportation planning is

not evaluated periodically like in case of land use planning and hence the transport plan and land use plan become independent exercises. As sustainability is of more concern in the 21st century's urban planning, new integrated planning approaches are needed to deal with urban growth without neglecting the environment, people and economy. National Urban Transport Policy (NUTP) also suggests that for sustainable development, land use and transportation have to be integrated in an efficient manner (Singal, 2014).

Conclusion

The method adopted in this study helps in guiding and initiating localized policies for better spatial access. It integrates public transit network and land use social infrastructure which makes it easy for authorities to implement them on the ground. Spatial analysis of interaction between educational facilities and public transit (Bus stops) was conducted using GIS-based approach for 5 cities in India. Results indicate weak accessibility to reach bus stops. About 60% of educational facilities are not available in 0-400 m network distance. This determines spatial interactions between public transit and educational facilities are very poor in these cities. Therefore, sustainability is hampered and affects the willingness of encouraging pedestrian users. However, close proximity would determine the turnout for people to use public transport services. The difference between near and network distance will not only identify barriers but also their scale and nature; and identification of unserved area by public transport. While developing new infrastructure, planning should be done for high accessibility according to the presence of public transit using spatial analysis techniques adopted in this paper. Similarly improving public transport service infrastructure in unserved areas can be planned. Comparing cities will establish a common framework to identify level of access in each city and issues in those cities. Further application of similar studies will help in comparing cities with benchmark cities globally and will surely pave a new way for improving accessibility in cities.

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Exploration on Urban Regeneration and Design of Characteristic Streets: A Case Study of Chengxian Street

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Keywords

Nanjing; Chengxian Street; urban regeneration; urban design

Abstract

The paper selects Chengxian Street in Nanjing, the ancient capital of six dynasties as an example, which has a long history of more than 600 years and also has experienced several regeneration and reconstruction in the long past. After a long period of development, Chengxian Street has developed into a characteristic street with a variety of traffic, shops, and many different functions along both sides of the street. The paper based on the perspective of urban regeneration and urban design with literature, field survey and other research methods. The paper then mainly analyzes the concepts of regeneration and design, including the classical theories and successful cases. After that, this paper divides the evolution of Chengxian Street into stages and analyzes the characteristics respectively. The research shows that Chengxian Street had undergone five stages since the Ming dynasty: First, the period of prosperity 1381-1853, second, the period of destructive destruction 1853-1864, Third, the period of restoration and reconstruction 1864-1949, Fourth, the period of local regeneration 1949-2010 and now in a period of comprehensive regeneration. The current practice is oriented toward the objectives of organic regeneration. In addition, This paper also focuses on the problems existing in the recent regeneration and reconstruction of Chengxian Street after two comprehensive regeneration, including lack of traffic calming, several pedestrian spaces are not accessible, lack of public communication, poor street landscape, lack of local characteristic and some street scale are unreasonable, etc. Finally, the paper gives further thoughts on regeneration and design of Chengxian Street about the traffic optimization, public communication, street landscape, street characteristics and so on in order to promote the development of characteristic streets.

Introduction

In the 14th year of Hongwu (1381), Zhu Yuanzhang, the first emperor of the Ming dynasty, who believed in the primary importance of education for the government, ordered that imperial college be built to the south of Jilong Hill (today's Jiming Hill). It was the dynasty's highest institution of learning and one of the world's largest institution of higher learning at that time. The street by the imperial college, which was frequented by the students, was called Chengxian (becoming sages) Street because it was believed that the college could turn scholars into sage qualified for civil service.

Chengxian Street is a famous cultural street in Nanjing, the ancient capital of six dynasties in China. It is located in the central city of Nanjing, not far from the Nanjing government, the former capital Presidential Palace, 1912 Bar Street, Xinjiekou CBD, as well as Jiming Temple, Ming Great Wall, Xuanwu Lake and other famous historical attractions.Chengxian Street is a branch road of the city, runs from the north to the south, from Zhujiang Road in the south to Beijing East Road in the north. It is 857 meters long and 11.5 meters wide, with a one-way lane. Historical sites on the street include the site of National Central University (the present Southeast University, including 9 historic buildings in Nanjing), the Ministry of Education (Nanjing cultural relics protection units) of the National Government, the National Central Library (cultural relics protection units in Jiangsu Province) in the former capital period, and the former residence of Yang Tingbao, a great modern architect (Nanjing cultural relics protection units) , etc (refer to Figure 1). Meanwhile, the place name Chengxian Street is also a non-material cultural heritage of Nanjing. Although Chengxian Street has many historical buildings, it still fails to meet the requirements of historical blocks. Therefore, this paper classifies it into characteristic streets and studies it.

Over the past 600 years, Chengxian Street has been destroyed, but the area has been famous for its indoctrination. In addition to the historical buildings mentioned above, there are also a large number of modern shops on both sides of Chengxian Street, and modern buildings with different functions such as courts, banks, offices, hospitals, student dormitories and communities.

In 2010 and 2018, two relatively comprehensive regeneration of Chengxian Street were launched by Nanjing government, and the appearance of the street has been improved to varying degrees. However, there are still many problems in it, such as weak culture, poor design or lack of design, unreasonable street traffic, etc. There have been relevant researches on Chengxian Street in recent years. For example, some scholars studied the history of Chengxian Street (Gaosong et al., 2013), while others studied the street space and creation of the vitality in three streets including Chengxian Street based on the concept of sharing (Huang Qiushi, 2017). However, there are some problems in the existing research, for example, introduction over research or pay more attention to analysis, but ignore the conclusions and the characteristic of Chengxian Street etc. In view of this, this paper based on the recent renovation of Chengxian Street, combined with classical street design theory and traditional street regeneration and design methods, puts forward suggestions for regeneration and design of Chengxian Street in the future, in order to promote the space quality and vitality of Chengxian Street better.

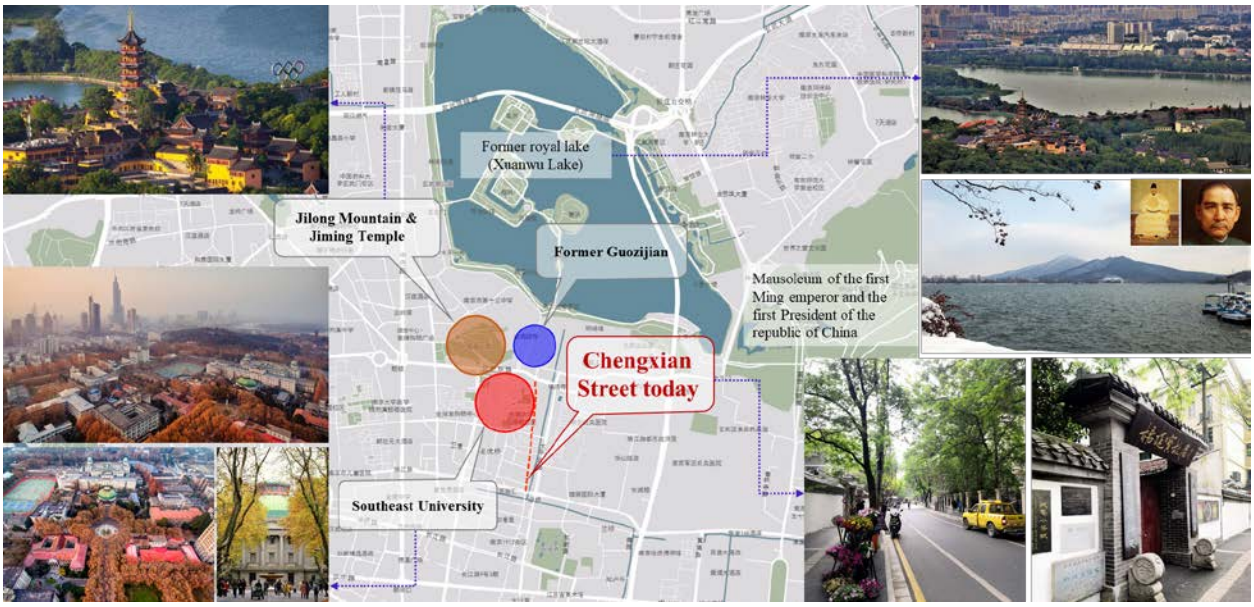

Figure 1 Location of Chengxian Street

Conclusion

In China, Chengxian Street is a microcosm of street development in the future. Through the analysis of Chengxian Street, the street quality can be improved from the aspects of organic regeneration, overall urban design, traffic calming, landscape, culture, communication space, etc. This paper is just a case study in order to strengthen the attention, discussion to street development in China. In addition, many of the suggestions in this paper are in the form of intention figures, so no specific design has been carried out and further research in this field should be strengthened in the future.

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Case Study:
The Impacts of Trucks IoT Monitoring Regulations in Saudi Transportation EcoSystem

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Keywords:

Transportation, IoT applications, smart Tucks, smart transportations, smart cities

Abstract

The government of Saudi Arabia designed its 2030 vision goals, to ensure continues enhancement of the quality of life for all and meet the needs and requirements of their citizens and residents. And they are focusing to provide high-quality services such as water, electricity, public transport, and roads.

And in purpose to reach a thriving economy, Saudi Arabia Authorities already started applying new regulations. Starting from April 2019, was The Transport General Authority (TGA) - has formerly known PTA - applied one big action by enforcing all heavy and medium commercial trucks to install monitor and tracking devices on them (Transport General Authority, 2019).

In this paper, I will cover the techno-business impact of applying those systems from different angles, and from the perspective of all market players.

Introduction

In purpose to reach a thriving economy, Saudi Arabia is planning to leverage its unique position.

Saudi Arabia is right at the center of important international trade routes, between three continents: Asia, Europe, and Africa. and maximize the benefits from its exceptional and strategic geographic position, agree on new strategic partnerships to grow the national logistical infrastructure.

With a GDP of SAR 2.4 trillion, the Saudi economy is already the largest in the Middle East. They enjoy close economic ties with the Gulf Cooperation Council and other Arab countries, as well as constructive relations with Islamic countries (Saudi Vision 2030, 2016).

The Public Transport Authority's new regulations are forcing transporter to install monitor and tracking devices that are able to read very important details of truck activities, such as location speed and weight (Transport General Authority, 2019).

Besides Saudi Food and Drugs Authority (SFDA) is planning to go beyond that to monitor the environmental changes inside those trucks and the good status inside them (Saudi Press Agency, 2019).

Those regulation are impacting major players on the logistic market in Saudi Arabia, i.e. :

- Governmental Logistical Authorities.
- Transportation Companies.
- Technology Enablers.
- Transportation Client.
- End Consumers.

Conclusion:

Market Prices

• Market Prices is currently are stabled for below reasons:

• The same reason mentioned in the regional and national economical slowing down gives no space for companies to increase the fees.

• The increase in offering and competition.

• The time frame is given by GTA, and modification of regulation to except trucks which just renewed its operational license (SAFEROAD, 2019).

• Even more, for near future no price raising or dropping are expected.

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Residents' Satisfaction towards Transformation of Klang River in Klang District

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Keywords

Residents' satisfaction;

River restoration;

Redevelopment of riverbank;

Klang River

Abstract

Klang River is one of the most polluted river in Malaysia. Government decided to transform Klang River through "Rehabilitation and Redevelopment Project of Klang River (PPPSK)". However, cooperation of public is crucial for achieving the goal. Residents stay along Klang River play vital roles in this transformation project. Thus, the research objectives were to study the residents' satisfaction towards the transformation and develop strategies to improve residents' satisfaction in the transformation of Klang River in Klang district. The research was implemented mixed research method. Qualitative data were collected through structured interview with two experienced government officers from Town Planning Department. Content analysis was used to analyse the entire database. Quantitative data were collected by distributing questionnaires to the residents from ten villages along Klang River. The data was analysed by using SPSS software. Finding showed that residents still dissatisfied with the transformation of Klang River in the aspect of river water quality, recreation uses, and flood protection. Strategies to improve residents' satisfaction were developed by integrating of residents' expectations and government's development concepts in this river restoration project. In conclusion, this research can be a reference for local government to transform Klang River into a better place for public.

1. Introduction

Klang is one of the oldest city in Malaysia, it was occupied since over 2,000 years ago. It is a royal town and former capital of Selangor state, Malaysia. It is divided into North Klang and South Klang, which are separated by the Klang River. Klang River roles as the subject of this research which is the heart of the development and growth of Klang City as the river mouth is the main exit for foreign traders to Klang Valley area. Therefore, Klang River was the catalyst for the development in Selangor state in the early age. Besides that, the importance and roles of Klang River will be highly impact the property development and future development of Selangor state (Abdul Rahman, 2010).

Unfortunately, Klang River, Selangor's iconic river, which is also one of the dirtiest and most polluted in Malaysia. According to Department of Environment, the water quality for Klang River is in the third and fourth class which is slightly polluted and polluted. Human caused this pollution happened because of industrial discharge, improper sewage treatment, residential discharge and land development and soil erosion. This pollution had affected quality of public life due to the unpleasant sight and smell of river (Rajan, 2011). It also endangered public health as dengue cases that caused by mosquitoes breeding in clogged drains (Perumal, 2015).

In 2010, Selangor government initiated to transform Klang River through "Rehabilitation and Redevelopment Project of Klang River (PPPSK)". This project is still on-going. The goal of this project is to make Klang River as a beautiful and clean river as well as a new resources for generating economy of Selangor state. The mission is to preserve and enhance the river water quality of Klang River with the involvement of all the stakeholders in a sustainable, holistic and integrated way. After working for 7 years, the image of Klang River that full of dirt and rubbish is now changing into a cleaner river. After river becomes cleaner, there are people fishing, bringing children to sightseeing and jogging around the bridge. The surrounding areas of Klang River is decorated with mural paintings. Besides that, there is a 'key love' attraction like in Paris had become a photo shooting place for married couple (Ibrahim, 2017).

With the transformation of Klang River, Klang Municipal Council promotes Klang River as a "Visit Klang 2017-City of Heritage" program meanwhile achieving the goal of making it becomes one of the attraction place (Ibrahim, 2017). However, a continuous public commitment is very crucial for supporting this program. Residents that are staying along Klang River play vital roles for this on-going transformation project. Therefore, it is important to

study the residents' satisfaction towards the transformation of Klang River and develop strategies to improve residents' satisfaction in the transformation of Klang River in Klang district.

Conclusion

Based on the result, it can be concluded that the transformation of Klang River for this 9 years still far to achieve the goal and missions. Majority of the respondents didn't notice Klang River had become better place to visit and their frequency of visit decreased after the changed. From the study, we can see that majority of respondents dissatisfied with the transformation of Klang River. Residents still dissatisfied with river water quality of Klang River and recreational use at Pengkalan Batu Park in the aspect of accessibility, cleanliness, value and facilities and amenities. For river water quality, "odour" and "colour" were the most dissatisfied as the smell of river is very strong and colour of river was filthy during ebb tide period. For the aspect of recreation use, there were 10 out of 27 indicators in the category of dissatisfied which included accessibility of public transport, cleanliness of toilet and park, educational, historical and culture value, available public toilet, direction board, street light and shades. However, flood protection was enhanced after the restoration of Klang River. Only two villages' residents dissatisfied with flood protection at their villages as flood happened recently. Appropriate strategies had been developed to fulfill the perceptions and expectations of government and residents along Klang River in this transformation project. The overall proposed strategies can be referred to Table 4 and Figure 6. In this research, it also discovered challenges of this river restoration project. Budget problem caused the project cannot carry out smoothly. Local government had difficulties when dealing with other local governments at upstream areas of Klang River. They also lacked of communication and interaction with public. Through this research, government can understand more about residents and proposed strategies can be a reference for government in transforming Klang River into a better place for public.

Table 1. Summary of strategies to improve transformation of Klang River in Klang district

Aspect	Villages ranked as top 3 aspects	Strategies of improvement (proposed location)
Flood protection	• Kg. Sungai Sireh • Kg. Delek • Kg. Sungai Bertek	▪ **LID – Block Design** (Kg. Sungai Udang) ▪ **LID – Stormwater Treatment Parks** (Kg. Delek & Kg. Bertek)
Cleanliness of the Environment	• All villages except Tmn. Hijrah and Tmn. Dagang	▪ **Raising awareness of cleanliness** (All villages) ▪ **Installing floating cattails bed** (Kg. Delek, Kg. Sungai Udang, opposite Kg. Sungai Bertek) ▪ **Enforcing environment law** (Kg. Kuantan)
Ecological Condition	• Kg. Sungai Sireh • Kg. Kuantan	▪ **Fish hotel** (Kg. Sungai Sireh & Kg. Kuantan)
Economy	• Kg. Sungai Udang • Kg. Sungai Bertek • Kg. Pandan • Kg. Bukit Jati • Kg. Kuantan	▪ **Water activity park** (Kg. Sungai Udang & Kg. Sungai Bertek) ▪ **Maritime industry** (Kg. Pandan & Kg. Bukit Jati) ▪ **Local market stalls** (Kg. Kuantan)
Value & Aesthetics	• Tmn. Hijrah • Tmn. Dagang • Kg. Atap	▪ **Mangrove-based tourism** (Tmn. Hijrah & Tmn. Dagang) ▪ **Historical heritage park** (Kampung Atap)
Accessibility	• Kg. Bukit Jati	▪ **Bridge** ▪ **Pedestrian path** ▪ **Bike lane** ▪ **Water taxi**
Facility & Amenities	• Kg. Delek • Tmn. Hijrah • Tmn. Dagang	▪ **Waterfront** (Kg. Delek)

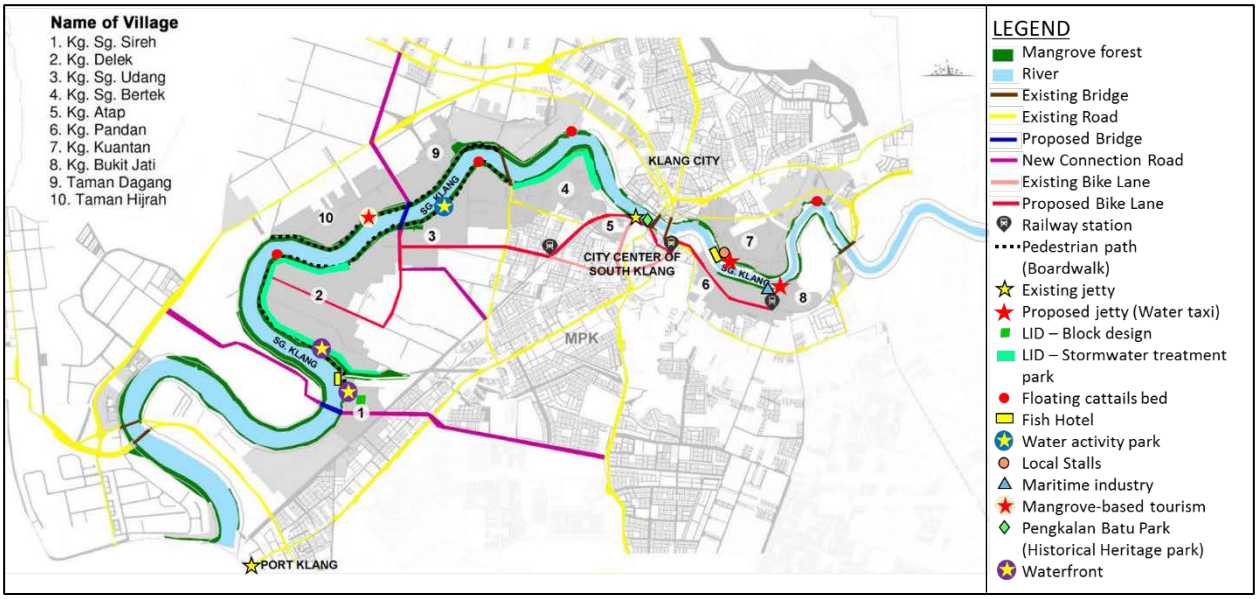

Figure 6 Map of Proposal Strategies to Improve Residents' Satisfaction in the Transformation of Klang River

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Integrating Pedestrian Circulation with Proposed Rapid Transit Route: Design Proposal of a Skywalk for Smart Dhaka

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Keywords

Pedestrian ***;Skywalk; Smart Dhaka***

Abstract

The average traffic speed of Dhaka, one of the most densely populated megacity in the world, has fallen to 6 km per hour according to World Bank, which is almost similar to the usual walking speed and this congestion eats up 3.2 million working hours per day. Till now, a lot of policy measures and plans have been taken and some of the developmental works i.e. the construction of MRT(Mass Rapid Transit) , BRT (Bus Rapid Transit), Elevated Expressway, numerous flyover etc. are in progress. But the proposals barely accommodated the pedestrian mobility issue and to some case is accidental, that needs to be taken into consideration.

In this backdrop, this research conduct extensive field survey in New market area where there is a proposal for elevated BRT line. The land use, traffic, pedestrian behavior, street vendor's information etc. were surveyed. The impact of proposed BRT line and the station is analyzed by analyzing the proposed design by the Government and then connecting the literature survey with field survey. Then an integrated elevated skywalk below the BRT line is proposed which has the possibility to minimize traffic congestion and ensure a safe pedestrian walking. The connection with adjacent land uses and walking level functions are carefully considered along with the energy efficient measures and pollution reduction. Not only this, the wide skywalk may promote art and culture through the design strategy. The proposed design of the skywalk dovetailed with urban life requirements will certainly contribute towards a smart Dhaka.

Introduction

Dhaka, the most densely populated megacity in the world, became the second least livable city by the Economic Intelligent Unit (EIU) of Economist's Global Livability Index 2018 and eventually, it surpassed the war-torn Damascus, Syria in the lower infrastructural score. Right now, the average traffic speed of Dhaka city has fallen to 6 km per hour according to World Bank, which is almost similar to the usual walking speed and this congestion eats up 3.2 million working hours per day. According to UK based firm Zipjet, Dhaka is the second least livable city after Lagos, Nigeria in terms of physical health condition. Generally, cities are considered as the hubs for ideas, business, culture as well as a home of regulators which enable humanity to advance both socially and economically. For us, it's become burdensome that are really hammering to all sorts of our activities including country's productivity.

Till now, a lot of policy measures and plans have been taken and some of the developmental works i.e. the construction of metro rail, BRT(Bus Rapid Transit), elevated expressway, numerous flyover etc. are in progress. Definitely, after ending the ongoing city projects, people's mobility around the city would definitely increase. Only metro line-6, itself, (Uttara to Motijheel) will carry 60,000 passengers per hour at both ends, according to Japan International Cooperation Agency (JICA). Moreover, after the inception of the Padma Bridge, mobility around the city would manifolds. One fact needs to be pointed out here that the ongoing project wouldn't meet the growing demand as the city population is expected to double by 2035. Expert's always focus on a major point that- 'The roads of Dhaka City is made for Vehicles not for People.' It is indeed a major topic to discuss. Designing for people has the potential to reduce traffic pressure on road which is a passive but very efficient way. Other smart cities have acknowledged it well and practicing this option. After all, what must be said that the above plans barely accommodated the pedestrian mobility issue that must need to be taken into consideration.

This study is an approach to propose the concept of skywalk in the city by integrating it with the propsed infrastructure and thus solving the pedestrian mobility issue.

Conclusion

Bangladesh validated exceptional performance in the Millennium Development Goals (MDGs) and likewise unswerving to achieving most of the targets of Sustainable Development Goals (SDGs) by 2030 when Dhaka is conjectured to be the 4th largest Mega City in the world. Thus, sustainable cities and communities (SDGs-11) are also sustained by the government's development vision. The proposed skywalk can help in achieving that vision. Lot of infrastructural development are carried out in Dhaka in transport sector and the pedestrain circulation incorporation should get the priority for a smart future of the city. Actually the pritiority of the people should be at the center for any transport related development.

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Socio-Economic and Political Dimensions and Their Impact on the Urban Form of the Kuala Lumpur Metropolitan Region

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***Keywords*:**

Urban planning and design, climate responsive design, neoliberalism and property led development, regional planning

ABSTRACT

Kuala Lumpur, with a population of 316,000 emerged as a capital of the newly independent Federation of Malayan States in 1957. Over the next sixty years, the city expanded into a major urban regional conurbation covering an area of 2790 km2 and having a population of 7.7 million.

The current urban transformations taking place in the Kuala Lumpur Metropolitan Region (KLMR) are mainly market-driven and characterised by fast track development with a strong priority on the road infrastructure. This is a typical example of the intensive property led development that is becoming a central driver of the national economies and a common characteristic for major urban centres in Southeast Asia. In the last two decades, the Kuala Lumpur Metropolitan Regional has witnessed a spate of urban redevelopment including commercial and retail complexes, specialised centres, industrial parks, educational complexes and residential estates.

The major aim of this study is to determine how political and economic global trends such as neoliberalism and property led development, followed by socio-cultural changes influenced the remaking of Kuala Lumpur's cityscape.

The major findings of this research will reveal how much globalisation and social implications have affected the traditional and tropical climate responsive urban development of Kuala Lumpur and its region. It will also identify necessary measures that should be undertaken to achieve more balanced and sustainable physical, political social and economic urban environments.

Introduction

The main objectives of this paper are to identify the urban evolution of Kuala Lumpur since its beginning; to ascertain the role of political and economic determinants, and to identify the global forces that shape the urban form and structure of the Kuala Lumpur Metropolitan Region today.

The research adopted a multi-dimensional and complex approach in urban planning and development analysis. Qualitative research methodology in data collection involves conducting extensive literature including the review of the growth of Kuala Lumpur Metropolitan Region, its phenomena and responses from the local, state and federal governments. Besides, applied methods include documentary research and policy analysis. The major portion of this study is based on secondary data sources, such as planning documents and policies, and information from the professional literature and journals.

To address the objective, this study concentrates mainly on the use of qualitative research methods. The major qualitative research methods include qualitative analysis and observations.

Conclusions

The analysis revealed that over the past decades Kuala Lumpur has transformed from a medium-size tropical city to a major urban conurbation of 7.7 million inhabitants. Kuala Lumpur of the 1960 and 70s was friendly city embedded in tropical green landscape and inclusive to all social groups. Today it has developed into a prominent globalised urban conurbation sprawled across the Klang Valley, layered by a web of highways and dotted by a fragmented network of exclusive gated communities, semi-private townships and up-market mixed use complexes.

The fast track development triggered by neoliberal principles is market driven and often disentangled from local building traditions and the tropical climate.

Although the living standards of the residents have increased significantly and the quality of urban services radically improved, there is a growing discontent across large sections of the community. An interview with a Non-Government Organisation, Coalition to Save Kuala Lumpur (CSKL) [2] revealed that part of the residential community feels that basic social needs such as green open spaces, quality public areas and amenities, affordable public housing and efficient urban infrastructure have been neglected and overshadowed by exclusive international development projects. The community is frustrated with issues such as increased traffic congestions, the problem of safety and lack of community participation in urban planning and decision making. The fact that city mayors are not elected through popular vote but appointed by the state or federal government only widens the gap of misunderstanding between the local authority and the urban community.

The lack of a regional plan and a regional advisory body, comprising representatives from federal, state governments and each of the ten local councils, has a detrimental effect on the future growth. The KLMR is growing in an uncoordinated and rudimentary way. Although the construction of the road network and development of the public transport system has been managed and coordinated on a regional scale by the federal government, bulk of planning and development decisions are made at the local levels. A systematic framework for consultation between the various local authorities has not been established.

A city that promotes smart growth must prepare a vision for the entire metropolitan area. This vision should inform all the local plans and planning strategies. Such vision has to enforce walkable and sustainable urban communities, climate responsive and compact built form, strong sense of place and identity, efficient and sustainable public transit and quality urban infrastructure. All physical development must respond to the principles of a smart growth vision. The current KLMR does not have a smart growth vision and piecemeal urban solutions cannot solve the overall problem.

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A Novel Method of Trajectory Data Visualization to Analyze the Current Traffic Situation in Smart Cities

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Keywords

Trajectory Data Visualization; urban congestion; JavaScript Object Notation; Google Map

Abstract

As modern society develops, cities become the major living places where people are living in. This phenomenon leads to the high population density in cities, which causes many problems including urban congestion. To better analyze the traffic, models for trajectory data visualization has been come up with by researchers. While there has been much research on trajectory visualization, some research performed low quality in users experience. Therefore, in this paper, an improvement in one existing visualization method will be proposed a more perceptional way to visualize, giving the end-users a clearer information perception.

Technically, the data used in this research is collected from the existing method, including vehicle speed, traffic direction, location of vehicle and traffic volume. Further, the color system used is of better perception and the visualization method is based on JavaScript Object Notation (JSON) and Google Map. With these methods, a final prototype with high effectiveness and better perception will be proposed. Moreover, an evaluation of user study is designed to test user acceptance. By using the improved traffic visualization, drivers will have a better user experience and it is more efficient for traffic observers to analyze the macro traffic.

Introduction

In recent years, trajectory data visualization has become a popular topic and researchers have designed many methods to study different trajectory visualizations, for instance, “Visual Exploration of Sparse Traffic Trajectory Data” from the study of Zuchao Wang [1]. However, a good visualization method can provide readers with intuitive information and a solid basis for decision making, while Wang’s study was partial to data processing. Therefore, after summarizing several kinds of related studies, an improved method in Wang’s trajectory visualization is proposed. In the evaluation section, a comparison between the proposed visualization method and the existing method is conducted. From the point of perception and effectiveness, this proposed method is able to provide a better user experience.

Conclusions

In this study, a new visualization model for sparse trajectory data is proposed, aiming at providing readers with more intuitive information and solid basis for marco traffic analysis. Firstly, after the analysis and evaluation between different trajectory data visualization models, we defined the visualization problem within Wang’s work on the map view of sparse trajectory data visualization, including low color discriminability, low attribute separability and few pop-out data. Then, to solve these problems, a new map viewis purposed by us, using a more appropriate channel and mark. Comparisons between the existing method and method we purposed are made in the evaluation section from the aspects of the accuracy, discriminability, separability, pop out and grouping. Finally, qualitative research is conducted by using a questionnaire to test the user acceptance and effectiveness of the new method. According to the result from 100 responses, 100% of them think the new method has a better perception and 90% of them agree that the new one is easier to understand.

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Visualization System for Traffic Accident Data

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Keywords

Information visuliztion, Visualization system, Three-dimensional model,Traffic accident

Abstract

At present, the traffic problem is a problem that the government attaches great importance to. Many papers also put forward their own visualization models for traffic problems. This research focused on the Map-matching and Spatial-temporal Visualization of Expressway Traffic Accident Information and improves the original two-dimensional visual model of accident rate into a three-dimensional model. The goal is to represent more attributes in a visual model and make them easier to compare, so as to provide users with more intuitive visual information.

1. Introducation

Since the beginning of the 21st century, there is a large amount of traffic accidents over the world because of increasing number of vehicles and complex urban construction.

Previous data analysis models were more planar and in the form of digital tables, which made it difficult to analyze all the data information.

Considering the seriousness of this problem, it is necessary to design a traffic accident data visualization system, which allows the traffic departments to visually analyze accident data so as to better improve the traffic and road planning.

Based on that, this study will based on the 2D modeling of traffic accident data from *Research on the Map-matching and Spatial-temporal Visualization of Expressway Traffic Accident Information*, and improved it into a three-dimensional model that can represent more attributes in a visual model and make them easier to compare, so as to provide users with more intuitive visual information.

In this regard, the transportation department can separately analyze the occurrence of accidents at different time points according to the results of the visualization, and can clearly see the accident trends of working days and non-working days, so as to formulate more feasible transportation law. In addition, people can also plan the travel arrangements by looking at the visual results to avoid peak accidents and avoid high-risk roads.

Conclusion

In this study, we first selected the paper Research on the Map-matching and Spatial-temporal Visualization of Expressway Traffic Accident Information and improve the visualization model. Regarding the traffic accident rate of a certain area every two hours, every day and every week, the two-dimensional time-space visualization model of the original paper was first changed to calendar model to display more data. And then the calendar model was changed to three-dimensional model so that each attribute can be clearly compared. Finally, the 3d model was further improved, more colors were used to represent the accident rate and the legend was also improved. In a word, compared with the models in the paper, the final three-dimensional model has the advantages of displaying more data, easier comparison, clearer representation information and easier understanding.

Reference

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Is greener commuting possible?

A campus case study in Schwäbisch Hall as contribution to climate protection

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Keywords

Green commuting; sustainable mobility; rural area; renewable energies; modal split

Abstract

In its recent report, the UNIPCC has described the impacts and possible magnificent disturbances that arise from climate change. Rising temperatures, droughts and heat waves will affect many regions. This brings special attention to cities, where the population density is high and surroundings are characterized by built-up areas that tend to keep the heat. Cities need to take action to secure healthy living conditions in times of transition and change, such as increasing green areas inside the city, reduction of waste and emissions. Thereby, shifting mobility and transport to emission free resources is one major factor. Innovative mobility concepts are necessary that are based on renewable energy supply and offer multimodal mobility solutions that also integrate the rural surroundings. By executing an empirical case study, the authors try to investigate the implementation potentials for green mobility at universities. The campus Schwäbisch Hall, part of the University of Applied Sciences Heilbronn, is located in a rural area and serves as an exemplary setting for a field test. Thereupon a climate-friendly concept that promotes green mobility on the campus will be developed as a contribution to the city's greening and climate protection activities. The aim of the project is to devise a valuable solution that creates incentives for all parties involved to dispense individual car traffic and switch to public transport or e-bikes instead. The introduction of a new bus line and the possible use of e-bikes will be examined in a test phase. The implementation of the test phase is linked to a quantitative and qualitative collection of mobility data (modal split), current mobility behaviour and the acceptance of green mobility by students. Incentives for other mobility opportunities and potential obstacles are investigated. In a later stage of the project measures and recommendations for action and the potential for CO_2 emissions savings will be derived.

1. Introduction

"Eleven million Germans commute to work" (ZEIT ONLINE, 2018). This means that more than every fourth worker in Germany commutes; two-thirds of them use a car (Stahnke et al., 2016). The transport sector is one of the fastest growing producers of CO_2 and other greenhouse gas emissions, comprising both goods and passenger transportation (public and private) (WHO, 2019). The amount of daily traffic puts pressure especially on densely populated or urban areas, in terms of managing traffic flow, parking spaces but also noise and emissions. Negative effects are measurable, both on local and global level. In its recent report, the IPCC (IPCC, 2018) described the impacts and possible magnificent disturbances that arise from climate change. Rising temperatures, droughts and heat waves will affect many regions. The German Environment Agency (Umweltbundesamt – UBA) regularly measures concentrations of air pollutant in German cities (UBA, 2019). Just currently, results of this year's assessment show that in 57 cities the measured Nitrogen oxides (NOx) are above the limit values (Spiegel Online, 2019). The majority of NOx emissions stems from diesel exhaust gases used for transportation issues, which might have a severe impact on health condition (UBA, 2019).

More and more cities need to take action to adapt to changing climatic conditions and hence secure healthy living conditions in a double sense (Reckien et al., 2018, Heidrich et al., 2016). Globally cities should contribute to the overall global goal of mitigation of climate change. Appropriate measures are e.g. reducing emissions and substituting the dependence on fossil fuels according to international and national guidelines and policies. On the local level, this means to invest into bottom-up approaches for sustainable urban development that consider the

diverse characteristics of their local areas (Biesbroek et al., 2010, Carter, 2011). Transforming urban design into a green, more sustainable urbanism requires a multidisciplinary approach following the “triple zero framework of zero fossil-fuel energy use, zero waste and zero emissions (aiming for low-to-no-carbon emissions)” (Lehmann, 2010). Shifting mobility and transport to emission free resources is one major "adjusting screw**”** for cities to reach their climate protection goals.
However, at the same time, innovative mobility concepts have to integrate more complex and sometimes conflicting aspects, besides renewable energy use. They need to offer good access to transport services both for commuters and residents of an area that help to “reduce automobile dependency, but also the need to travel” (Lehmann, 2010). They should offer multimodal mobility solutions, stimulate behavioural change, being affordable, avoiding additional land consumption and use smart technological solutions.

This paper discusses the implementation potentials for green commuting as part of climate protection activities. In a small-scale case study at the university campus of Schwäbisch Hall the mobility behaviour of students and staff was examined. A field test of green commuting alternatives was executed. The aim of the project is to devise a valuable solution that creates incentives for all parties involved to dispense individual car traffic and find alternatives to fossil fuel based traffic modes. The project is still in progress. The modal split as well as identified obstacles and barriers for developing a green commuting concept will be presented in this paper. The findings might add general input for other researchers and practitioners in the field of sustainable, fossil fuel free urban development.

Conclusion/ solution approach

The campus Schwäbisch Hall serves as a role model for greener commuting solutions at universities but also in a more generalized way for sustainable and fossil fuel free transport modes in rural areas. The survey and test phase was focused on the particular local framework conditions at the campus, so the results are limited and need to be adapted to contribute to the overall climate protection activities of the city, but also to create synergies with the total university’s sustainability performance.

Nevertheless, the authors are of the opinion that the main obstacles that can be derived are “typical” obstacles for universities respectively cities in rural surroundings and also reflect the general challenges in the transition phase of society, politics, public institutions and technology in the field of sustainable, fossil fuel free urban development and transport solutions. By this, the findings might add general input for other researchers and practitioners working on similar questions.

It becomes clear that the factor and reasons for transport means preferences are manifold. When developing measures for alternative solutions this needs to be considered and shall include technological aspects as well as incentives for behavioural change. The primary focus should be on integration of stakeholders such as the local public transport suppliers and associations, the city administration and municipal utilities to generate competitive public transport offers. Further work of the authors will concentrate on evaluating possible scenarios that can be integrated into already existing approaches for climate protection or sustainable mobility or that help to develop such concepts accordingly on local or regional level. Connecting with other projects conducted at the University of Applied Sciences of Heilbronn is also a goal of the project. Advantages of different innovative technologies in the mobility sector will be discussed as well as costs and financing possibilities for specific measures. The mobility solutions shall not only address students but also offer attractive alternatives likewise for staff members.

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Economic Feasibility of Personal Rapid Transit (PRT) Mode of Transport: A Case for Ahmedabad City, Gujarat

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Keywords

Public transportation; Personal Rapid Transit; Economic Feasibility; Automated Vehicles

Abstract

Rapid urbanization is inherited with the challenges to provide appropriate transportation facilities to cater the demand of Indian cities. Looking to the current demand and inefficiency of the present public transport services, private modes hold the opportunity to cater the service demand which further create traffic congestion on limited road space. Most of the Indian metropolitan cities are facing certain challenges with severe traffic congestion and pollution. The present study focuses on the city of Ahmedabad; India's first heritage city which is equipped with the existing infrastructure that includes the old heritage buildings, narrow streets and congested housing plan in the city centre that adds difficulty to continue with the traditional current transportation system such as Ahmedabad Municipal Transport Service (AMTS), Bus Rapid Transit system (BRTS) and other prospective transport system to streamline the travel needs of the city. The requirement for the new mode of transport was established through the collected data set of BRTS, primary survey and expert consultation. Indian cities are focusing on the concept of elevated transportation corridor or such system which runs above ground level, most of the time attention is restricted to Metro. Personal rapid transit (PRT) is such type of transportation mode, which address the challenges similar to metro and unconventional choice for the Ahmedabad City. In PRT, the small automated vehicle is operating on a network of the special predefined guided transit route. This paper mainly focuses on Economic Feasibility of the mode for a selected stretch of city with key recreational points (Kankaria Lake, Manek Chowk, and Sabarmati Riverfront) and its planning aspects. It is being observed that the travel time is significantly higher though the distance between these three places are precisely lower (3.5 kms) which offer delays (14 mins) in travel route. The paper points towards the operational and financial feasibility of the PRT mode of transport which incorporates the challenges like higher commute time and the installation cost in an effective manner.

Introduction

The contemporary concept of Personal Rapid Transit (PRT) invoked during the late 1960's as it was pointed in a report by the U.S Department of Housing and Urban Development. As witnessed in the last decade, a revolution in both efforts and interest to assimilate PRT as the contemporary mass transit systems of the country. PRT is functional as the network of one-way tracks facilitating the traveling among the passengers from station to station through individual pods cars. This system is totally different from the existing systems of transport; the user of PRT can individually or independently choose his/her destination station and experience non-stop transportation. The changes in the direction and various travel routes are operated through interchanges within the PRT track. A computer-aid monitoring system optimizes the flow of traffic along the track along with the flow entering and exiting each station. The entire system run on the non- stop and flawlessly manner to furnish the passenger with the

potent mark to mark travel access. Annotator often condemns the size of the POD Cars or vehicles and the system are inadequate to cater to high-density travel areas and a higher level of difficult to either built around existing structures and various infrastructure facilities or to assimilate into modern cities. [2]
PRT would be functional as a service which is on-demand and would operate as a more efficient method of transportation than the existing modes such as buses, trains. The nature of on-demand of the PRT system avoids the congregation of large groups of pod cars in stations, the largest problem in the existing mass transit systems. As PRT stations will be situated at a distance from ten to fifteen kilometer apart on an average, it will facilitate passengers to opt for several departure and arrival locations for each trip. The ultimate importance of the system is the fact that PRT is not subject to traffic, weather, peak hours, or accidents.

Conclusion

From The Table 4 it is clearly visible that Installation cost would be paid back in the tenure of 15 years from the inception and after that it would be in profit (Provided annual growth in volume is 5%). 51 Crore INR would incur to the infrastructure which comprises of 26 Crores from Ministry of urban Development by increasing FSI (Floor Space Index) by creating transit oriented zone, 25% of budget would be incurred from the FAME Scheme GOI for electrical vehicles implemented in 2016 and the rest would be incurred by advertisements in specific allotted zone in PRT Infrastructure.

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Part III
A Computing Perspective: Global Trends & Strategic Approaches

A New Vision For Future City In The Middle East

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Keywords

Smart City; Environmental Challenges; Opportunities; Future Vision; Technology; Sustainable Potentials

Abstract

Nowadays, the Middle East region is suffering from the rapid growth of population living in urban agglomerations. Modern cities have become more complex with a multiplicity of actors and of tangible and immaterial constituents that combined together shaping contemporaneous city life. Although there are a lot of facilities, most of these cities face critical problems concerning social cohesion and well-being, public amenities and safety, economic growth, energy use, and environmental quality. Consequently, Cities governments and authorities have seek for a way to solve these concerns and emerging new cities characterized by flexibility, connectivity and mobility and the term of (Future Cities) have been introduce to define sustainable and smart cities which aim to enhance the performance and quality of the cities based on cognitive strategies in relation to intelligent knowledge, environmental efficiency and information technology for a future-oriented and effective urban context. The research paper discusses the new strategies and future visions adopted in the Middle East to pursue their own paths toward becoming more livable and sustainable. The aim of the paper is to analyze the future cities in the Middle East by understanding the various challenges, potentials and opportunities cities face. In the end, authors introduce effective strategies that help tackle the growing challenges of urbanization for future cities

1. Introduction

During the last two decades, the notion of "Smart City" has gained significant attention among the cities worldwide, and researchers start to understand the main aspects and dimensions for transforming cities to smart ones that could adapt with the future changes and urban growth, especially that there is a huge increase in the percentage of people living in urban areas which will raise to 70% to reach 9.7 billion by 2050 according to the United Nation Population Fund (UN, 2015). Figure. 1 shows the increase of world population til 2050. This phenomena affects the economy of the cities and consumes all the natural resources leading them to decrease the environmental performance, since cities consume around 60-80% of the energy worldwide and responsible for the huge emission of the Greenhouse gas (GHG) and other resources that are consumed for the transportation and electricity (Hammer et al., 2011). Cities start to find the effective solutions and approaches to face this kind of challenges and increase their abilities to enhance the quality of urban services, transportation linkages and enable the mixed land uses to boost the economy of the city in future.

Nowadays, many cities have thought of becoming "smarter" by utilizing the technologies including Information and communications technology (ICT) to improve various aspects and urban services of city operation and management, including: transportation, environment, traffic management, local economy, electronic delivery of public services and quality of life for their citizens (Li, Zhu, & Wang, 2017). The goals of creating such cities are to optimize existing infrastructure, provide more efficient services to citizens, and increase collaboration and innovation among various economic sectors (Marsal-Llacuna et al., 2014).

Several smart city projects are currently developed in different regions around the world (Lee et al., 2014), one of these regions is the Middle East region which starts to establish smart cities through the integration between economic growth and social needs of their citizens to provide them with a safe and sustainable environment. Governments of the Middle East cities, especially Gulf Cooperation Council (GCC) have launched long-term plans and programs to reduce the dependency on non-renewable resources (fossil fuel) and hydrocarbon energy and replace them by clean alternative energies like solar and wind, and intelligent systems and technologies.

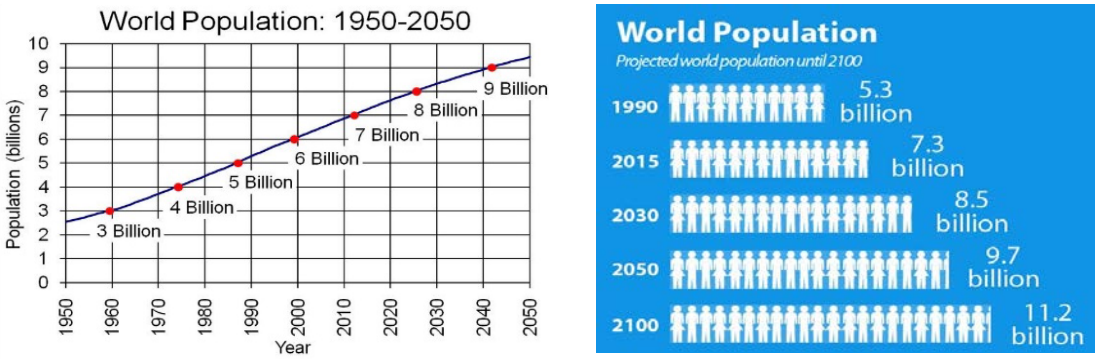

Figure 1: Shows the increase of world population till 2050 – Source: U.S. Census Bureau

The paper will discuss the meaning of smart cities, and understand the different dimensions of them. In addition, the study will concentrate on explaining the new strategies and future visions adopted in the Middle East to pursue their own paths toward becoming smarter and the researcher will analyze their attempts by understanding the various challenges, potentials and opportunities cities face.

Conclusion

Middle East cities are suffering now from the growth in the population and the migration of people to urban areas straining the infrastructure of the cities. In order to find a solution for such problems, cities have started to think embedding technology as a tool for improving resilience, meeting citizens' needs, raising standards of living, attracting investments and creating and developing themselves to be sustainable and smart cities.

KSA is one of the Middle East cities that starts to transform its province to be smart and encourage investments. City planners and governments have adopted the new vision "Saudi Vision 2030" that drives changes using different approaches of technology and support the collaboration across the public and private sectors. When we look at Saudi Vision, it could clearly be seen that it follow the principle and component of smart city and that most of the large cities there are working on the transformation process and each of them has used its resources for overcoming the different challenges it faces and achieve its aspirations and ambitious.

Throughout the study, the researcher has proved that KSA is moving towards achieving its vision that is part of the smart practice and that its starts with transforming its capital "Riyadh" and large cities "Makkah, Al-Madinah, and Jeddah" to be smart using the different potentials of the city. According to the analytical study, it was found that not all cities had fulfilled all components and dimensions of smart cities, especially smart living and people.

Moreover, the researcher found that all the selected cities had covered the smart mobility through developing smart grids using CleanTech energy sources which offer the chance for urban environments to improve the lifestyle for its citizens, workers, and visitors. All the selected cities have developed and create a new smart mobility system and use smart grid and monitor them to prevent the peak power outages. In addition, they are reducing the pressure on the energy generation facilities by finding alternative sources. Riyadh and Jeddah have adopted the smart system that has the ability to collect real-time data and information from sensors and cameras is an effective tool for monitoring the traffic, reducing congestion, managing pedestrians' movements through the smart ID and providing safety to them.

Although Umrah and Hajj have added a layer of complexity to Hejaz region, but the cities of Jeddah, Makkah, and Madinah were able to overcome this challenge through the good rail network (Metro and tram projects) that is supported by an effective control centers and station management systems at transport hubs along with clear passenger information systems.

KSA has succeeded to divert its economic resources from petroleum manufactures and oil production to other industrial manufacture through the economic cities such as KAEC, Jubail and Yanbu and ports in Jeddah, but there are some key initiatives to guarantee success; Special zones that have competitive regulations and procedures; visa exemptions; real estate mix and direct connections to mass transit and airport infrastructure.

Despite the clear and ambitious attempts of the selected cities to be smart, some of them still does not move towards smart people dimensions like Makkah and Al-Madinah, so it's recommended to seek for new practices to enhance and promote this dimension especially that investing in people through fostering the level of education and merge it with the industrial field would raise the economic growth and divert the city to a truly intelligent city that will end to be fully smart city that will be able to compete with the top global cities.

KSA is now working on digitalizing all government services with the collaboration between public and private sectors through the e-government program using ICT systems, and the facilities in procedure offered by the government to facilitate the governmental issues and avoid the waste of time.

Finally, it was crucial to mention that guarantee the continuity of the development and transformation process of KSA, cities should promote the digital knowledge content, provide cheap and qualified connectivity services, keep on updating and developing mobile supportive application and fixed broadband penetration, improve business-to-business market structure and enhance government services and consider human resources as tool for developing strategies and involve it in the industrial development.

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Developing projects for realizing of the program "Skopje 2020 Smart strategy" by enhancing citizen approach, engineering, digitalization and sensing of the city district toward smarter sustainability urban potential in the Small Ring of Skopje

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Keywords

sustainability; sustainable urban development; sustainable mobility; biodiversity; bio-technological innovations; urban landscape; urban structure; compact city; planning documentation; smart solutions; smart hub; IoT; smart technology; smart city; digital city; open data; innovative solutions; living lab; human resources; renovating; constructing.

Abstract

We live in a world of changes and nowadays our sustainable future becomes our sustainable present. Cities today are complex environments where live multiples communities all with their common habits and needs, problems and expectations. Cities are also an urban system which established nets of innovative solutions and technologies in order to satisfied and improved communities, by increasing resilience and livability. This type of new cities is changing everyday rapidly by innovative solutions and technologies at the service of local communities.

Innovative solutions in the sustainable urban development are what *challenges* this research, but the main *interest* is enhancing living conditions in the city of Skopje, the capitol of the North Macedonia, one of the world's most polluted city. Beside of pollution, because of the energy consumption and overcrowding, the city becomes unsafe and unhealthy place to live.

The research is part of the multilevel program for smart city solutions in the district of Small ring in the center of the city of Skopje. Program "Skopje 2020 Smart strategy" has aim base of ambitious social and urban innovations with the final goal to reduce urban emissions by 40% to 2030. The projects which followed this research will develop innovative actions that will consist: smart urban intervention; energy efficient solution; engagement of the community, craft-sourcing and stakeholders; investing in new technologies; sensors and information exchanges. Evaluation of the projects will be presented at this research in the following levels: *renovating and constructing* by applying energy plants for own energy production (solar power plants, bio-gas installations ... in the facility and building complex); *sustainable mobility* by a car free urban matrix that means redesigning to the public space in the sensory-covered network for bikes and pedestrians with possibility of network on electronic vehicles; *bio-technological innovations* that would include permaculture and urban forest garden solutions and treatment on the facade by materials that have photo-catalytic properties for self-destruction of organic pollutants in the air (paint on titanium dioxide, zinc oxide ...)and *human resources* with living lab approach engagement in the informal social activities in the free zone area, and constant interactivity through the network and exchange of information in the district. All levels of the program and the projects will build a dedicated platform for citizens to improve ICT services.

Introduction:

This research call attention to sustainable urban development of the city of Skopje, the capital of the Republic of North Macedonia. It is part of the multilevel program "Skopje 2020 Smart strategy" and consist of several project that will enhancing living conditions in the city with the final goal to reduce urban emissions by 40% to 2030. The pilot projects which are elaborated will improved access of the citizens, and also they will use innovative engineering, digitalization and sensing. The pilot projects are relate to the selected downtown district of the so-called Small Ring, with the idea of adapting the concept to the entire city. Evaluation of the projects

will be presented at this research in the following levels: sustainable mobility project “Light-my-Move”, project for applying energy plants for own energy production and distribution - a project "Power-my-Fire", bio-technological innovations for the preservation and renewal of the ecological system in the city - a project “Tight-my-Green” and smart impact and strengthening the community through the use of human resources – a project “Hold-my-Self”. All levels of the program and the projects will build a dedicated platform for citizens to improve ICT services.The program will be managed by the Skopje Smart HUB is a City Innovative Platform for recognising and attracting investment funds and financial instruments of risk capital for the support and financial sustainability of Smart City development projects.

Conclusions

Smart cities aim to address the challenges that cities face today and to this end, they are bringing together city government, the business sector, universities as centers of education, community organizations, public services, citizens and collaborate to find a solution for the future city development.

The challenge for the sustainability of the Digital City platform and model development for the Smart City is to finance and manage the process and interests of all stakeholders.

1.1. Financing pilot projects opportunities

The project "Supporting the Management of an Effective National Coordinating Mechanism in connection with the Green Climate Fund" under the auspices of the Cabinet of the Deputy Prime Minister of the Republic of North Macedonia is an opportunity to support the implementation of the projects proposed in this paper. The Green Climate Fund project will propose several pilot projects that will help develop a national coordination mechanism, as well as the necessary procedures and criteria for prioritizing climate investment in the Republic of North Macedonia. Reference international project management organizations and financial organizations as accredited Green Climate Fund funded project management institutions can support the implementation of a sub-grant regional program for the implementation of Smart City pilot projects in North Macedonia, Albania and Montenegro.

The World Bank-funded Municipality Services Improvement Project (MSIP) cycle has been promoted as a successful model of local government financing in North Macedonia, in particular as the MSIP team has completed the trust to manage around 130 million euros donor projects from the European Commission's IPA funds. The World Bank is preparing a special energy efficiency program for North Macedonia of around 20 milion euros combined with a donor fund that will be activated in 2020.

The MSIP Office has already received our proposal for a “Study on the Model for Financing and Implementing Energy Efficient Projects for SMART CITY -Smart Street Lighting” - a Light-my-Move project component valued at approximately $ 100,000.

European Union Delegation in North Macedonia is planning new Donor Program for Sustainable Development Projects for which we are preparing an elaborate on “Establishing digitalisation and sustainable management of local energy distribution networks – microgrids, powered by local micro renewable energy sources” with pilot projects worth up to 500,000 euros- a "Power-my-Fire" project component.

City of Skopje already participates in European Union donor programs - Twinning projects with EU cities devoping Tight-my-Green component projects.

“Skopje Smart HUB” is a common project concept developed by the Small Business Chamber of Commerce with the City of Skopje - estimated value for development of “Study on a Skopje Smart HUB Model for Financing ICT Companies and Projects for Sustainable Development of the Skopje Smart City is 300,000 euros - this is a component of "Hold-my-Self".

Estimated study and pilot projects value for each of the four components proposed in this work amounted to 300,000- 500,000 euros - total about 2 million euros. The value of the procurement of the relevant technical equipment is often linked to existing urban infrastructure and it is difficult at this stage to estimate the value of infrastructure investments proposed in four components of this work.

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Tracking Successive Physical Locations of Multiple Objects with Multiple Cameras

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Keywords

SCOOP; KCF; ANN; Object Tracking; Unmanned store; Hot Spot Analysis

Abstract

In recent years, various intelligent applications have flourished for the future smart city; for example, finding suspicious individuals in security activities, identifying potential customers in business activities, planning site locations in service lines, etc. In such situations, effectively tracking people's movement path and recognizing how they move has become a relatively important issue. Based on the above requirements, it needs to establish a system that can effectively track the movement path of individuals in physical space.

This study aims to combine the Kernelized Correlation Filters (KCF) and Set Covering Object Occupancy Pursuit (SCOOP) to continuously track the physical locations of multiple objects. The former is for single-camera object tracking, with high tracking speed, which can be used to track the movement of the person in real time, the disadvantage of KCF is that the person's physical location in the scene cannot be known. In contrast, the latter is for multi-camera location tracking, which can be used to find out the physical location of a person in the scene but we can't know who exactly is in that physical location, and therefore cannot serially concatenate the person's successive locations. The downside of SCOOP is the need to manually create dictionary images, which is time-consuming and error-prone. In addition, once the camera is shifted for some reason, the dictionary images must be re-established.

The contributions of this study are: (1) Integrating KCF and SCOOP, (2) Semi-automatic creation of the dictionary image, and (3) Semi-automatic correction of the shifted cameras.

Introduction

In order to make future smart cities successful, there are requirements for various innovative applications, e.g.: (1) Security: Analyze how potential offenders move and learn to find suspicious persons in public places. (2) Commerce: Observe the potential buyers' stop-and-go behavior and find potential customers in various stores. (3) Planning: According to the human flow line, plan the locations of the service stations to facilitate the processes of the railway station, bank, government, and unmanned stores.

Based on the above requirements, it needs to establish a system that can effectively track the movement path of individuals in physical space. The individual movement path obtained by this research can be further used as follows: with Recurrent Neural Network (RNN), the sequence of physical locations can be embedded into a state vector, which can then be fed into Artificial Neural Network (ANN) to predict whether he/she is a potential offender, a potential customer or not.

The main technologies used in this study are: (1) Kernelized Correlation Filters (KCF) (Henriques, 2015): Single-camera image object tracking, which performs fast, and is often used to instantly track the movement of people in the image, but cannot know the physical location of the person in the scene. (2) Set Covering Object Occupancy Pursuit (SCOOP) (Alahi, 2017; Golbabaee, 2015): Multi-cameras location tracking, which can be used to find out the physical locations of someone in the scene, but can't know who exactly is in that physical location, so it is impossible to serially construct the person's successive locations. Furthermore, it needs someone to manually create dictionary images for SCOOP, which is time-consuming and error-prone. In addition, once the camera is shifted for some reason, the dictionary images must be re-established.

The contributions of this study are as follows: (1) Integrating KCF and SCOOP, the sequence of object images tracked by KCF is converted into the sequence of physical locations evaluated by SCOOP, which can be regarded as the moving path of the person in the physical space. (2) Semi-automatic creation of the dictionary image:

According to the occurrence of pixels in the consecutive images, find the probable dictionary images of respective locations and submit them to the administrator for the ruling. (3) Semi-automatic correction of the dictionary image for the shifted cameras: Use the image of normal cameras to predict the locations, analyze the corresponding image of the shifted camera, find the probable dictionary images of that shifted camera, and submit them to the administrator for the ruling.

Conclusion

The KCF method is effective in single-camera real-time person tracking, however it's incapable of telling the physical location of the person in the scene. The SCOOP algorithm is effective in multi-cameras location tracking, however it's incapable of telling who exactly is in that physical location. This study tries to integrate these two methods, i.e., use the output of KCF as a hint of the prediction process for telling the locations of the tracked person and the reconstruction of the dictionary MSV.

The KCF method suffers from missing bounding box in the tracking process, this study tries to recover it from the historical moving path. The SCOOP algorithm suffers from the cost of maintaining the dictionary MSV, this study tries to semi-automate this process, for both cases of the first-time establishment and the next-time calibration when camera is shifted.

The KCF method needs somebody to manually specify the bounding box for the first frame; this study suggests the approach of YOLO to automate it. The SCOOP algorithm tends to raise false alarms; this study suggests the approach of Fast R-CNN to alleviate it.

The use of relative threshold greatly improves the *call* and *precision* performance of the overall system. Solutions to problems raised by the discretization of physical locations are also suggested in this study.

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Elderly Behavioural Ergonomic Data for Smart Cities' Design-User System

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Keywords

Smart Behavioral Informatics, Pragmatic Experiences, Elderly User Experience, Smart Cities, Built Environment Informatics

Abstract

Displacement of elderly people from smart cities should not happen in the future. Instead, it is a necessity to create the assistive environment to the special needs of ageing populations. Integration of tacit knowledge and physical knowledge of human experience provides a tremendous input to lead the development of database technology to ensure elderly citizen sustainability in smart cities. Hence, there is a need for user's behavioural ergonomic knowledge to aid in prolonging independence of smart cities' elderlies. The purpose of this paper is highlighting results of critical conservation of pragmatic pre-experiences for behavioural informatics of elderlies to prolong their independencies for living in smart cities. This paper documents the researchers' study regarding key elements of pragmatic experiences of a person in doing things. Then, it also highlights observation results when analyzing information from pragmatic experiences of 15 artefact/tool users for establishing selected behavioural informatics for smart cities elderlies. Later, the paper reports a case study in developing a systematic user's behavioural informatics. Among the results from selective literature review procedure include key elements of pragmatic rapport in a user's body movements during artefact usage of a person's context in selected design typology. User's pragmatic culture is discussed covering the functional information that could explain the efficacious body movement and inherent information of accumulative cognitive experience that appreciates the body's conditioning, dynamic bodily mechanics (automaticity and muscle memory) and its biobehavioral recovery. After the introduction of the background problem, this paper presents literature survey results including smart cities elderlies, pragmatic experiences, behavioural informatics, and prolonging independence of elderlies before describing the research methodology. Results in this paper are expected to lead towards the future development of a Memory System Design (MeSD) for a proposed Behavioural Informatics System (BIS) that could assist in prolonging the independence of elderlies who will continue living in smart cities. This paper contributes to the documentation of user's behavioural ergonomic knowledge.

Introduction

Smart cities are often pictured as a templated variant concept of digitalization, intelligence, sustainability & ubiquitous city that highlight three common categories of technology, people and community. In the context of technology, great presence of ICT in smart cities critically applied in infrastructure and services. Smart homes and smart building are the most popular projected vision by the trendsetter of the future. This affects the development of urban centres that are needed to be integrated, habitable and sustainable to fulfil the communities' differences.

Although these two categories seem to play an important role in smart cities, the metabolism of cities does consist of their citizens' biological inputs through consistent externalization of the users' information. In the 1980s, a fully integrated smart and user-oriented environment was defined by considering a user as the innovator. A city can only be smart if there are dynamic integration and activities of self-decisiveness, independence and awareness by its citizens. Nevertheless, a citizen-centric typology for smart cities could not, and must not, ignore the inclusion of the ageing population, the elderlies. Hence, this study supports further inclusion of user's behavioural ergonomic knowledge in aiding the prolonging of independence among smart cities' elderlies.

Over the past 150 years or so, the human pace of life has seen the life expectancy rising from about 40 years to approximately 80 years. By 2050, UNDESA (2011 & 2012) forecasted at least 2 billion persons aged 60 or over

in the world population will reside in both developed and developing countries. In the current global concern of people that practices urbanistic lifestyle, the different social lifespan and development are expected outcomes in the decline of a younger population. As a result, the world is expected to have more elderly population and the elderlies would surely require equal experience regarding efficiency, equity, sustainability, and quality of life in well-performing cities, and more so, of any future smart cities (Giffinger et al, 2007).

The idea to reconstruct the role of the elderlies in the active ageing community will promote sustainability in any planned smart cities. Active ageing will involve the intervention of four potential factors: information, communication, transaction, and administration (Llorente-Barroso et al., 2015). These factors are projected from a user's experience in physiological and biobehavioral perspectives. Hence, the purpose of this article is documenting the conservation of pragmatic pre-experiences for behavioural informatics in prolonging the independency of elder citizens in smart cities.
Literature review

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Community Participation and Sustainable Urban Development; Application of City Development Strategy Approach

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Keyword:

Sustainable Urban Development, Community Participation, Qazvin, and City Development Strategy Approach

Abstract

This paper attempts to investigate to what extent the level of community participation in the process of planning of City Development Strategy (CDS) contributes to achieve (Sustainable Urban Development (SUD) pillars. CDS is a strategic urban plan, which has been applied by many cities in developing countries to achieve SUD. However, the level of achievements to SUD are different. To address this objective, the current study has compared two CDSs, which have been implemented in Qazvin city in Iran, in regard with taking into account the community participation and sustainable urban development (SUP) pillars and assess the effect of community participation to achieve SUD.

Introduction

City Development Strategy (CDS) is a participatory and strategic urban planning approach that has been applied by many cities around the world to achieve sustainable urban development (SUD) (Rasoolimanesh et al., 2014). However, the success of CDSs in achievement of SUD goals are different, and are heavily dependent on the level of effective participation and building the consensus among stakeholders (Conroy, 2006; Rasoolimanesh et al., 2014, 2015; Yigitcanlar & Teriman, 2014).

SUD attempts to improve quality of life of citizens and was established to respond to 21st century challenges which cities are facing on, such as; rapid population growth, urban poverty, and social-spatial changes, in particular in developing world (Yigitcanlar & Teriman, 2014). The cities in developing countries to achieve sustainability need to improve economic structure and reduce poverty without damaging the environment and natural capital and inclusion of various social groups human inhabitants, especially poor people (Sachs, 2015). SUD is a dynamic process to contribute the cities in globalization era to address economic, social, and environmental concerns (Shen et al., 2011). The balance between these aspects of SUD can be achieved by applying effective participation of all levels of government, private sector and civil society (Saha & Paterson, 2008; Sachs, 2015).

Therefore, this paper attempts to review two applied CDSs in Qazvin city, Iran, to compare the role of effective community participation to achieve SUD. The first CDS of Qazvin was prepared by the Imam Khomeini International University (or Qazvin University) and the Qazvin's municipality in 2006. However, a second CDS under the Urban Upgrading and Housing Reform Program (UUHRP) task force co-jointed by the World Bank and the Ministry of Housing and Urban Development (MHUD) of Iran was applied in 2007.

Results and Conclusion

In this study, we have focused on analyzing the visions, strategies, and projects (action plans or outcome of CDS) of the Qazvin City Development Strategies (CDS) plans in 2006 and 2008, respectively.

The results of analyzing city development strategies plan of the city of Qazvin (2006) have shown, the city has several problems such as high population, lack of social services, poverty and slum dwellings, urban mismanagement, absence of effective infrastructure and transportation, and environmental degradation. The plan emphasized in the population growth as a main cause of the existing shortcomings. In fact, this plan followed a comprehensive

approach and reported sectorial studies (social-cultural, urban poverty, urban economy, urban environment and geography, …). To address these problem, the following strategies are suggested:

i) an integrated management, harmony, plan-oriented, capable and citizen-oriented.
ii) A sustainable, healthy, safe, and happy city.
iii) An active, capable, knowledge-oriented, and competitive city.
iv) A historical, identified, beautiful, attractive city for internal and external tourists.
v) A city for academic, research, and university activities in national and international levels.

Furthermore, the results showed the first three most essential characterizes of an ideal city for Qazvin would be:

i) To have an integrated, developmental, effective, professional, advanced, and coordinated management with public participations by using all urban potentials and capacities in the city.
ii) To create an industrial and transit center to show strong growth in the coming.
iii) To create a national or international academic city through a university technology center, including citizens with rich culture and higher welfare.

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Sustainable urban design strategies towards sustainable urban future. “A case of growing multiple city centers from a single traditional center within mudfort of ancient Bangalore”

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Keywords

City center ;Urbanization; Urban sprawl; Aglomeration; Public space;

Abstract

“A sustainable urban form is the key to achieve a sustainable development”, as one of the most populous urban agglomeration, fastest growing metropolis and a megacity of India, The city Bangalore’s growth in the recent decades shows the tremendous urban growth in the form of concentric rings and urban sprawl having multiple city centers with the city area of 709 square kilometers with a population of 12 million, which was earlier a mud fort built in 15th century with PETE area as its single traditional city center. The growth of city from a single city center to a multiple city centers in today’s context, are essential parts of the city as it caters the wide range of demographics, these city centers are undergoing several challenges due to heavy urbanization, This study identifies such city centers in the city structure which are under pressure based on their land uses, location, Population density etc and focuses on urban design strategies towards sustainability of these multiple city centers, These multiple centers which were designed and developed and sometimes evolved by itself are not prepared for the ongoing demographic changes. Some of the contemporary challenges faced by these centers based on observation and a questionnaire directed to city center users are congestion, vehicular and pedestrian conflict, lack of parking spaces, transportation, housing, energy systems and other infrastructure facilities, Lack of public spaces due to encroachments and violations in byelaws, This situation with all the challenges mentioned above faced by the city centers will become more critical, Hence timely rethought has to be done to underpin the sustainable development. The strategic goal of this paper is to promote sustainable urban development to city centers through analysis of existing situations, road networks, population densities, land uses etc is done towards smartening the city centers within city structure. This study is based on knowledge identified by best practices and lessons from previous studies and approaches done by advanced cities. The smartening of these city centers could be possible by urban design intervention at the levels of Physical, Social, Cultural, Economical, and Environmental strategies.

Introduction

City centers are the focal points or the elements of the city that are publicly visible and catering to all people, gains its importance by condensation of special uses and activities like social, cultural, business, entertainment etc. These concentration nodes are focus and epitome, they are typically foci of districts, but what happens when they cannot reach these points due to congestion and inaccessibility, Indian towns and cities were originally compact and designed for people on foot, with the advent of urbanization and motorization these towns became adverse to pedestrians resulting in unsustainable situations, to decongest this city a good sustainable urban design strategies are required but not by adding more concrete structures like elevated corridors which is unsustainable and disastrous for the environment, these freeways have devastating effects by adding more vehicles to city roads which already has 80 lacs vehicles on its roads.The objectives in this paper for strategies within the urban design framework embodying peoples aspiration for inclusive public places of social interactions. These strategies address their social, cultural and economic needs while mitigating the negative externalities of urbanization and to establish a strong public realm in all its centers. Bangalore is Indias third most populous city and is among top 100 cities that contribute to the global economy, several fortune 500 companies have their offices here with many foreign investment projects, hence bangalore needs to sustain its economic growth and improve quality of life for its citizens. The smartening of city centers are as important to avoid urban sprawl, also helps in smart growth of development that serves the economy, community and the environment.

Conclusions:

The evident from the analysis of different urban growth theories from famous urbanists have common goal to achieve sustainable urban development, all of the discussed theories fundamentally focus on achieving and promoting overall sustainable development by meanse of addressing issues related to congestion, in order to adress the current key urban development issues and challenges like congestion, transportation, housing shortages, infrastructural services etc, faced by Bangalore and most of the indian cities, it is time to rethink and adopt the above discussed principles to suit the local conditions.

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Urban Computing and Smart Cities: Developing a Health Policy Roadmap for Sustainable Construction Designs and Web Utilities in Public Health and Community Health Care Centres

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Keywords:

sustainable city, energy use, health policy, sustainable design, quality assurance, smart city, urban planning, supply chain project management, geoinformation

ABSTRACT

This paper explores the impact of the future web geoinformation technologies on Smart Cities. This paper proposes a smart cities innovation roadmap framework and recommendations for urban development enabled by future web geoinformation technologies. The roadmap framework aims to support the innovation policies and sustainable development strategies of cities towards becoming "smart" for sustainability and public health protection. The innovation roadmap is based on a system of innovation perspective, combining views on regimes and niches of novel solutions for sustainable construction designs, public health protection and web geoinformation utilities in sustainable community health care centers. These policies concentrate primarily on the proper management and quality assurance of fundamental efficient designs for achieving a geo-health intelligence of sustainable cities embedded on future web technologies and user-driven innovation in future smart city ecosystems.

INTRODUCTION

Nowadays, in an effort to meet growing environmental awareness, most industrial companies include in their plan investments that are related to the protection of the environment. Environmental management is the discipline that is concerned with resources once society requires them. It is necessary to manage the environmental resources of future smart cities in an sustainable way by minimizing the environmental impacts related to the operation of an environmental system especially ant community health care centers. The quality of a complicate environmental system begins to be problem when is demanded the simultaneously cover of its needs and the environmental effects of such system arise and become an environmental public health risk. Then the improvement of the monitoring and proper quality management of environmental systems is necessary.

Urban areas and cities are complex social ecosystems, where ensuring sustainable development and quality of life are important concerns. In such urban environments, local governments, citizens and companies experience specific demands and needs regarding key themes such as sustainable development, innovative business creation and employment, community healthcare, education, sustainable energy, clean technologies and environments, public health protection, efficient operations management at community health care centers, sususstainal transportation designs of goods, the sustainable mobility environment, safety, and public services.

An integrated health policy is necessary in terms of sustainability of community health centers within smart city growth and efficient planning in future smart city ecosystems. Proper web geoinformation project management utilities should be used as increasingly, these domains are facilitated and enabled by broadband networks, Internet web based applications and open platforms. At the same time, the current economic climate forces many cities to cut budgets and set priorities and consequently cities are facing tough challenges to maintain and upgrade ICT infrastructures and innovations supporting innovative health policies and associative web applications. This paper explains how the creation of a common roadmap in health policy for urban innovation and economic development at community health care centers as enabled by the future smart cities' web utilities, supported by all stakeholders and addressing agreed priorities, helps finding consensus on common longer term objectives.

However, International Standards Organization (ISO) organization has published a series of certified systems like ISO 9001; 14001 and 18001 for the protection and certification of quality; environmental management; mitigation of pollution; geoinformation tools for environmental impact assessments; health and safety respectively in emergencies [2,3,4,5,6,7,13,27]. The continuous life cycle analysis of an environmental system within community health care centers is necessary. Monitoring schemes and inspections should be made

frequently especially in emergencies not only to protect the optimum operation but also to support the necessities of a complicate environmental system [9,10,11,15,16,19,21].

The effectiveness of an Environmental System within a smart city's ecosystem which is related to an Efficient Sustainable Design of a Health Care Communal Building Facility is dependent on a huge amount of energy management saving, recovery of waste emissions, quality assurance, efficient supply chain – project management, landscape upgrade, efficient use of water resources in urban design, effective sustainable designs, proper use of renewable resources from landfill gas – waste water treatment of landfill leachates, sustainability on roof garden designs, public health protection in outdoors and indoors spaces next to community health centers, taking into account the particular systems' characteristics so as to conserve our natural resources

[1,2,3,7,15,16,17,20,22,23,24,25,26,28].

Conclusion

Robust geoinformation tools presenting the results of dynamic spatial models especially of landfill emissions are necessary in future smart cities not only to evaluate particular environmental indexes and associated risks but also to demonstrate efficient sustainable designs that minimize any environmental impacts to pathways and receptors from pollutant sources. In the examining case study an integrated health policy for community-based healthcare centers presented utilizing the right dynamic models for the needful necessities of an environmental system using proper system analysis. The results an integrated health policy should be applied properly in future smart cities for determining the right building capacities on particular urban areas and the successful operations management, sustainable designs for qualitative community health centers.

Furthermore efficient geoinformation utilities for stakeholders should be taken into account the right system analysis in the proper input-output simulation - right determination for shipment of goods; constraints of the related smart city community healthcare center's problem and its right adoption taking into account the particular topographic characteristics of urban areas. Field data are of great importance, not only for making estimations, comparisons and predictions, but also for calibrating field data in mathematical models in order to develop useful risk assessments and take the right measures for a given urban area topography in emergencies in time. The ISO standards should be followed during the inspection, construction and maintenance of an integrated environmental system for qualitative community-based health care centers.

Communal building facilities should be expanded in urban areas applying proper geoinformation utilities for future sustainbale smart cities in urban growth so as to serve massive population for people with particular disabilities. Health tourism activities combined with other types of tourism should be promoted in the web at community health centers that support such services. Demographic data should be updated frequently utilizing properly geographic information systems so as to follow the ongoing process of evaluating the health needs of social communities on given geographies. It should facilitate prioritization of health care needs and a strategy to address current solidarity support measures for people with disabilities. Moreover, a continuous monitoring schedule is necessary for hydrological data; water levels; water quality parameters to be monitored continuously on site of a health care unit and recorded by a data logger; Internet of Things sensors; where results can be either manually downloaded or automatically sent back to a website in real time for data sets processing so as to take the right measures in time protecting public health.

Furthermore, based on the above the right geoinformation utilities in future expansions smart cities for efficient community healthcare centers are necessary not only to alert nursing staff and health care professionals but also for patients with disabilities to learn how to use proper ICT's utilities so as to avoid any probable accidents in a community health care unit. Constructions in a community health care unit should be focused on people to be included in the society. Design for all people with and without disabilities should exist supported by proper geoinformation tools of community health centers including infrastructures for trekking, sports, rowing, gardening activities, other interactive activities especially for elderly people and people with disabilities in future qualitative sustainable smart cities.

Moreover, the efficient development of e-infrastructures are important for expansions in smart cities and right decision making in an integrated health policy including proper development of web geoinformation utilities, digital contents for public information, Sustainable designs, Project Management (PM), quality assurance, life cycle analysis (LCA), logistics - supply chain supporting tools, risk assessment (RA), sanitary drawings, monitoring tools and open web e-portals. In this way can be supported facilities in urban growth expansions of smart cities for citizens, patients, visitors, tourists and stakeholders at community health centers. Efficient designs in architecture, landscapes, mobility and other associated civil sanitary engineering designs should be updated and investigated for community healthcare centers in time based on current and future necessities of

smart cities. Also efficient construction materials with IoT are necessary for opportunities in smart city designs making challenges for stakeholders.

Sanitary engineering principles should be monitored continuously in a community health care unit during sudden events in emergencies for air quality, safety of sanitary units, pipe networks, efficient irrigation systems for gardening in buildings and other associated sanitary technologies protecting public health in future sustainable smart cities.

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RumourClock: Visual Representation of Online Romour Spreading

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Keywords

Information Visualization; Online Rumour Spreading; RumourClock

Abstract

Information visualization has brought huge boons to multifarious areas such as sociology analysis, large hierarchies' representation, and big data demonstration. Specifically, online rumour spreading has become rampant due to the advanced development of social media. Effective governance of online rumours serves as a pivotal requirement for tycoons in social media areas like Facebook, Twitter and Instagram. However, due to the tremendous volume of everyday rumours and their dynamic essence, pure texts or simple graphs can hardly demonstrate them accurately and comprehensively. Thus, in this study, we proposed a new intuitive visualization model called RumourClock, which can handle large scale of rumours as well as compare holistically between different rumours across time.

Introduction

Information visualization (Keim, 2010) is a visual representation of information to help users understand specific knowledge or phenomena. It assists researchers because under some circumstances, visualization may reveal valuable findings behind the data. A great deal of information can be shown in a clear and organized way as well, making it easier to perceive complex issues.

Social media has promoted the dissemination of information, and becomes an ideal platform for rumour diffusing (Luo, et al., 2010). The governance of network rumours is important to social stability, economic development and national security (Zhao, et al., 2014). However, the information spreading in social media is usually large scale and social media is dynamic and complicated (Dang, et al., 2016). Related works are concentrating on analyzing who spread rumours online, why, and how. Various novel models are proposed to study the spreading mechanism of network rumours or concrete propagation relationships.

In this study, we propose RumourClock, a new intuitive visualization model, which can handle a large scale of rumours as well as compare holistically between different rumours across time.

Conclusion

To recapitulate, our research was to select published papers related to Information Visualization field and detect as well as ameliorate their visualization flaws. Our thesis mainly focused on online rumour spreading and we had selected one paper among three as our base model to further design our own visualization representation methods. Our final model RumourClock successfully outperformed all the baselines of the selected paper when we conducted validation test both by ourselves and by participants.

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Towards building of visualization method to highlight top users' trends in social networks

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Keywords

Information visualization; social network; 5G topic

Abstract

Social media takes an important role in people's daily life. It is really popular among young generation. Social media application such as Microblog Sina Weibo, Twitter, Facebook, Instagram are occupying significant position in society connection and human being communication. Social media application like weibo provides the function of publishing, viewing, commenting and sharing information. It also provides a platform for people to freely express their true feelings and opinions about the events through comment, retweets and thumb up. Information transmission on Weibo is real-time, timely and continuous, which helps track public interest and attitudes on a particular topic. Based on the information transmission on these similar social media networks, the sense of time, space and strangeness between publishers and audiences is eliminated.

Using information visualization can make the public opinions in social networks clearly show. The layered visualization composed by flower graph, radar graph and pie chart allows users to have an in-depth understanding of popular trends from comprehensive to detailed.

We choose Sina Weibo and 5G themes as visualization examples to demonstrate visualization methods applicable to all social media networks. We used questionnaire survey to evaluate our visualization model. The analysis result shows the model is creative, accurate and easy to understand. In the end, the Social Network Public Emotion Information Visualization Model (SNPEIVM) is put forward.

1. Introduction

In this paper, the users' attention information of 5G is extracted and visualized by using the data from social media Weibo (Chinese famous social media application). Chinese users prefer to share their news or opinions about interesting or attractive things on Weibo. This application is the place where the news broadcasts most quickly and widely. Topics related to 5G are very hot, its topics are transferring in Weibo. There are many posts and discussions related to it in Weibo every day. The users' attention is keep changing with the development of its developing progress. There exists relationship between different hot topics and the time they happened. It is similar like a flower, which has relationships between different leaves and main trunk.

It is very interesting and useful if the changes of user attention can be extracted and visualized to make people understand the public general attitude and trend changing of this topic. In the same time, the relationship among related topics is helpful to make people understand the whole topic rather than just a subtopic. There are some differences among different subtopics, they can be analyzed by comparing different heat value of thumb, comment and transferring. These heat value is really helpful to make people understand the differences among different subtopics. There is no information visualization tool or model can get all the value in a quick time.

Using information visualization can make the public opinions in social networks clearly show. We collect relevant information, analyze it from different dimensions, and then visualize the information in appropriate ways. There are around 100 questionnaires collected based on literature review paper's information visualization methods and own methods. The layered visualization composed by flower graph, radar graph and pie chart allows users to have an in-depth understanding of popular trends from comprehensive to detailed.

We choose Sina Weibo and 5G themes as visualization examples to demonstrate visualization methods applicable to all social media networks. We used questionnaire survey to evaluate our visualization model. The analysis result shows the model is creative, accurate and easy to understand. In the end, the Social Network Public Emotion Information Visualization Model (SNPEIVM) is put forward.

Conclusion

Mentioned in the above phases, our information visualization model makes 5G as our tested topic. Under 5G topic, our information visualization model can give users chance to understand the relationships and heat value of different subtopics, public's most popular action (like, comment or share) toward those subtopics, most significant KOL in the information transferring, public's emotion and most discussed keywords distribution and clouds. By using our information visualization model, the users can get the whole generating trend of their interested topics together with related topics or subtopics. Compared with other media or information visualization tools, they can not only get knowledge of these topics, but understand public's attitude of these topics.

Our information visualization model composes many tools and generate our new model. The tools like Wei index application (using to get the heat values like amount of thumb, comment and transferring), google draw.io tool (using to draw and generate the diagrams), Weibo public data (using to grab related data in order to get public's attitude and discussions keywords), Excel tool (using to draw basic graph like radar chart), and WordItOur word cloud tool (using to generate keyword and emotion keyword cloud) are all used in our visualization model. By analyzing our testing and evaluation results, we find our information visualization model is good enough to attract users to use our model.

In this paper, we just put forward our information visualization model. In the future we will develop more tools to make our model more efficient to deal with user actions. In the same time, the interaction part of our information visualization tool will be improved. We will make our information visualization tool good enough to deal with the whole social media network topics and subtopic.

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