Journal of Architectural Research and Development

Editor-in-Chief

S. Ravi

Anna University, India

BIO-BYWORD SCIENTIFIC PUBLISHING PTY LTD
(619 649 400)
Level 10
50 Clarence Street
SYDNEY NSW 2000
Copyright © 2021. Bio-Byword Scientific Publishing Pty Ltd.
Complimentary Copy

ISSN (ONLINE): 2208-3537
ISSN (PRINT): 2208-3529

Journal of Architectural Research and Development

Focus and Scope

Journal of Architectural Research and Development is an international peer-reviewed and open access journal which is devoted to establishing a bridge between theory and practice in the fields of architectural and design research, urban planning and built environment research.

Topics covered but not limited to:

- Architectural design
- Architectural technology, including new technologies and energy saving technologies
- Architectural practice
- Urban planning
- Impacts of architecture on environment

About Publisher

Bio-Byword Scientific Publishing is a fast-growing, peer-reviewed and open access journal publisher, which is located in Sydney, Australia. As a dependable and credible corporation, it promotes and serves a broad range of subject areas for the benefit of humanity. By informing and educating a global community of scholars, practitioners, researchers and students, it endeavors to be the world's leading independent academic and professional publisher. To realize it, it keeps creative and innovative to meet the range of the authors' needs and publish the best of their work.

By cooperating with University of Sydney, University of New South Wales and other world-famous universities, Bio-Byword Scientific Publishing has established a huge publishing system based on hundreds of academic programs, and with a variety of journals in the subjects of medicine, construction, education and electronics.

Publisher Headquarter

BIO-BYWORD SCIENTIFIC PUBLISHING PTY LTD
Level 10
50 Clarence Street
Sydney NSW 2000
Website: www.bbwpublisher.com
Email: info@bbwpublisher.com

Table of Contents

1 **Expressway and Urban Road Interchange Design Strategy**
Jinxi Ding

4 **Application Strategy of BIM Technology in Highway and Bridge Design**
Zhongyu Wang

7 **Reviewed Interpretations and Inspirations on the Development and Strategies of Garden City Theory in Singapore**
Qinyu Feng

14 **The Options Are Available for Controlling Residual Risk**
Zitong Gao

16 **A Study of the Anatomy of Decision Making in the Planning and Appraisal of Hong Kong Section of Guangzhou-Shenzhen-Hong Kong High Speed Rail**
Junyou Liu

20 **Research on the Problems and Countermeasures of Taiyuan Smart City Construction**
Lifang Shi

Call for papers – Journal of Architectural Research and Development

ISSN (Online): 2208-3537
ISSN (Print) : 2208-3529

Submission open for July - 2021

Dear Researchers,

Journal of Architectural Research and Development is an international peer-reviewed and high quality open access journal which is devoted to establish a bridge between theory and practice in the fields of architectural and design research, urban planning and built environment research.

The Journal Publishes in both online and print version. *Journal of Architectural Research and Development* publishes research and review paper in the field of:

- Architectural design
- Architectural technology, including new technologies and energy saving technologies
- Architectural practice
- Urban planning
- Impacts of architecture on environment

The *Journal of Architectural Research and Development* is published by Bio-Byword Scientific Publishing Company, it is a fast growing peer-reviewed and open access journal publisher, which is located in Sydney, Australia. As a dependable and credible corporation, it promotes and serves a broad range of subject areas such as medicine, construction, education and electronics for the benefit of humanity. By informing and educating a global community of scholars, practitioners, researchers and students, it endeavour's to be the world's leading independent academic and professional publisher.

All Bio-Byword journals are free from all access barriers, allowing for the widest possible global dissemination of their manuscripts and highest possible citations. Bio-Byword publisher online submission will go through a rapid peer review and production, making the process of publishing simpler and more efficient, which benefit from its user friendly online submission system that reduces the overall time from submission to publication.

Acceptance Notification: Within 21 days from the date of manuscript submission

Send your manuscript to the editor at: **info@bbwpublisher.com**

With Warm Regards,
Editor in Chief
Dr. Ravi S.
Journal of Architectural Research and Development

Journal of Architectural Research and Development, 2021, Volume 5, Issue 3
http://ojs.bbwpublisher.com/index.php/JARD
ISSN Online: 2208-3537
ISSN Print: 2208-3529

Expressway and Urban Road Interchange Design Strategy

Jinxi Ding*

China Merchants Chongqing Communications Technology Research & Design Institute Co., Ltd., Chongqing 400067, China

Abstract: Highway is an important kind of infrastructure which the transportation sector depends on. The rationality of the interchange design between urban roads and expressways is related to the relieving of urban traffic pressure. Based on the status quo of interchange design between urban roads and expressways, this paper discusses the types and applications of interchange design, hoping to provide reference for the design and construction of highway projects and ensure the rationality of interchange design.

Key words: Expressway; Urban road; Intercommunication; Design strategy

Publication date: May, 2021; ***Publication online:*** 31 May, 2021

****Corresponding author:*** Jinxi Ding, 270872203@qq.com

1 Introduction

In the process of road transport, highway belongs to an important kind of carrier. The rapid development of the current society has accelerated the urban growth to a certain extent. Large traffic volume makes requirements for the interchange of the road higher. As traffic pressure keeps increasing, it may be difficult for old urban roads to meet the actual needs of their development. In order to improve the efficiency of transportation, some expressways which were constructed near by the city and applied with loop design, can effectively relieve the internal traffic pressure. The interchange design between urban roads and expressways is helpful to solve the tension of existing urban roads. In the design phase, the actual traffic and transportation demand of the road should be taken into consideration, and regional planning, topographic features and surrounding environment should be clarified to ensure a reasonable choice of the type of interconnection.

2 Current status of expressway and urban road interchange design

2.1 Restrictions

As land resources are scarce in cities, the design of road and road interchange usually carried out at the entrances and exits to different urban boundaries. Therefore, the interchange design is usually far from the city center, and the environment is complex. There are hospitals, factories and schools and other buildings, which may have an impact on the design. At the same time, the interchange design and construction stage also needs to make full use of land resources, protect the construction area, so as to avoid a large number of excavation and destruction, and control the impact of design on the urban landscape environment. In addition, the design process also needs to consider the water and soil erosion, public facilities occupancy, to ensure that the construction can meet the expected requirements[1].

2.2 Detour design

In the design of interchanges, the design of sidewalks and non-motorized vehicle lanes should be strengthened, and the above content should be focused on, so as not to affect the use of crosswalks and non-motorized vehicle lanes. It is necessary to ensure the rationality of the interchange plan. If there are crosswalks or non-motorized vehicle lanes, a detour design scheme can be adopted to ensure that the design is connected longitudinally.

2.3 Coordination with urban planning and construction.

In the process of urban development, urban planning is an important spirit of construction, and a complete planning form is closely related to the quality of urban construction, and it will also affect the lives of residents. In terms of the interchange design of expressways and urban roads, it should be coordinated with the urban planning to ensure that the interchange design can meet the overall planning and construction requirements of the city.

3 Interworking design strategies of expressways and urban roads

Since most of the interchange designs are located at the ring road with small traffic flow, the different design spacing should be considered in the choice of the type of interchange design. The expressway mainly adopts the toll interoperability design, and the toll location should be considered. Usually, the horn interoperability, the "Y"-shaped design, and the mixed design type are used. Reasonable selection of interchange type can ensure design quality and prevent traffic from affecting the surrounding environment. In terms of the application of interoperability design strategy, it is also necessary to comprehensively confirm the type of interoperability according to the characteristics of regional traffic and interoperability functions, and then develop the graphic design and vertical design. In addition, it is necessary to follow the design requirements for interchange in the design specifications of the highway route to ensure that the ramp design, urban roads and expressways can be effectively connected.

3.1 Application of trumpet-shaped design

In terms of the design of toll intercommunication, the horn-shaped interchange is a common design type, and its application range in the transportation network is relatively wide, and the application value is relatively high. According to the traffic volume, the horn-shaped interchange can be selected, including A-shaped and B shape.

The A-shaped horn interchange design has a relatively strong capacity in ramp inflow and transportation, but the radius of vehicle driving link is relatively small. If the speed is relatively fast, it is easy to cause the danger of the vehicle overrunning the ramp. Therefore, the entry speed of the vehicle should be reasonably controlled, which should be within 40km/h. If the inner ring ramp is used, it should be noted that the radius should be controlled between 50 and 55 m to ensure the match between the radius and the design speed. Meanwhile, the safety of the vehicle in the driving process should be ensured to the maximum extent according to the characteristics of the surrounding environment,. In addition, the plane indicators should be reasonably selected under the environment of maintaining the stable driving of the vehicle, and several indicators should be selected as many as possible to complete the ramp design.

The B-shaped horn design should reserve the position of the vehicle. This design method is suitable for application in expressways with low traffic flow. Most of the B-shaped horns are designed on the lower level of the highway, so that it will not affect the traffic on the highway. The design of interchange needs to focus on the driving stability of the vehicle at the connecting position on the highway. The water-drop-shaped horn shape design can be applied in the design stage, and the crossing relationship existing in the intersecting section should also be considered. The ramp position should be adjusted reasonably to ensure the reasonable vertical and horizontal planes. design. When designing the plane and vertical line types of toll stations, it is necessary to design the acceleration and deceleration lane forms and specific lengths in the interchange design in strict accordance with the specified requirements and the design speed of the expressway. In addition, the actual situation should be considered in the design of interoperable entrances and exits. If conditions permit, direct exits can be used.

3.2 Application of Y-type interchange design

Slightly adjusting the horn-shaped design can become a "Y-shaped interchange" design method. The structure of this design method is large in scale, but the actual area occupied is relatively small, and the maximum number of floors can reach three floors. In the actual design, various technical parameters are roughly similar to the horn-shaped design, and can be adjusted according to the specific traffic flow at the location of the interchange node. The ramp speed of this design type should be within 50 km/h, and it has a good degree of coordination with the toll station location. It should be noted that there should be no sudden descents in front of the toll area to ensure the safety of the vehicle during the driving process. The advantage of using the Y-type interchange design method is that it can reduce the scale of the project, make a reasonable selection of the construction location to control the scale of the bridge, and ensure the rationality of the weight design. If the traffic

volume around the interchange design is relatively small, then the plane index should be appropriately reduced, and the interchange design should be flexibly adjusted according to the surrounding environment and the design scale[2].

3.3 Application of semi-clover leaf-shaped design

If in the design process of highway and road interchange, the semi-clover leaf design method may be selected. Its traffic capacity may not be as strong as the horn-shaped and Y-shaped designs. Therefore, the vehicle may be intertwined when driving on the top, which makes the driving There are relatively many conflict points, so this design method can meet the design of relatively small traffic flow interchange area. In the design stage, interchange interchanges should be designed, and this type of design usually has intersections with the road plane, but there are two independent ramps. A toll station should be set up on each ramp, and the management after use is scattered. . This type of interchange design is similar to a horn-shaped interchange design in terms of flat and vertical indicators. It needs to occupy relatively small ground space and has relatively small impact on the environment. It will not affect the slow-moving system in the city. The application of this design form to locations with relatively small urban traffic flow has good practicability.

3.4 Case analysis

The interchange nodes of the airport road in a city belong to an important transportation system. The existing roads belong to the ring expressway, and a cross-dimensional interchange is set up between the city's main roads and the airport expressway. As the elevated expressway of the airport road needs to be transformed, corresponding transformation measures must be taken at the interchange nodes to ensure efficient traffic conversion between the interchange nodes, the main road of the airport expressway, and the auxiliary road on the ground. Due to the double horn-shaped design used for the airport interconnection, the interchange structure between the toll station and the single horn position of the main line does not need to be modified, and the main road needs to be transformed into an urban expressway. Therefore, in the design stage, attention should be paid to the good connection between the exit section of the toll station and the elevated main line and the ground auxiliary road. It is confirmed that the design focus is to transform the original single-speaker interchange between the airport road and the toll station.

The design ideas are as follows: First, the elevated main line is connected to the interchange toll stations of the expressway to form a fast and efficient continuous flow to ensure smooth connection between traffic flows; second, because of the passenger transportation system of the elevated main line, the ground side road belongs to the freight system, so the location of the interchange toll station on the expressway should consider the demand for separation of passenger and freight; third, separate different forms of traffic to ensure traffic safety; fourth, integrate space resources and make full use of existing ramps [3].

4 Conclusion

In short, in the process of urban road construction, future urban traffic development needs should be considered, and reasonable design for interoperability between expressways and urban roads. According to the surrounding geological and topographical conditions, consider interoperability design functions, and clarify whether interoperability design will be feasible. It has an impact on the lives of residents, analyzes and formulates design plans from many aspects, and through inspection and adjustment, rationally selects the interchange design plan to ensure the practicability of the interchange design and improve the design efficiency.

Disclosure statement

The author declares no conflict of interest.

References

[1] Mao CY. Analysis of the design essentials of the special-shaped interchange between expressways and urban roads[J]. Building Construction, 2020, 42(04): 583-587.

[2] Fu CN. Research on shared traffic corridors between expressways and urban roads[J]. Enterprise Technology and Development, 2020(02): 88-89+92.

[3] Liu D. Discussion on the design of interchange between expressways and urban roads[J]. World of Transportation, 2018(36): 20-21.

Journal of Architectural Research and Development, 2021, Volume 5, Issue 3
http://ojs.bbwpublisher.com/index.php/JARD
ISSN Online: 2208-3537
ISSN Print: 2208-3529

Application Strategy of BIM Technology in Highway and Bridge Design

Zhongyu Wang*

China Merchants Chongqing Communications Research & Design Institute Co., Ltd., Chongqing 400067, China

Abstract: For the highway and bridge construction industry, the traditional management model has been difficult to adapt to the current information management background. In recent years, in order to comprehensively improve the information management level of highway and bridge engineering, the highway and bridge industry advocates the use of emerging technologies to achieve full-cycle dynamic management of highway and bridge engineering management, and try to ensure the quality of highway and bridge engineering management while improving The efficiency of highway and bridge design management. In view of this, this article is mainly based on the background of information management, researching and analyzing the application strategy of BIM technology in highway bridge design for reference.

Key words: BIM technology; Highway bridge design; Application strategy

Publication date: May, 2021; ***Publication online:*** 31 May, 2021
Corresponding author: Zhongyu Wang, ccrdiyu@gmail.com

1 Analysis of the application advantages of BIM technology

1.1 3D visualization function

The BIM technology embodies the core technical content mainly through the use of computer terminals or the Internet to construct a scientific and reasonable three-dimensional model of an engineering project. And use digital technology to realize the integrity and real-time analysis of the three-dimensional model of construction engineering. For example, the geometric information and physical properties of building components can be obtained through analysis, and key information such as non-component objects such as space and motion behavior can also be obtained through analysis[1].

It is not difficult to see that through the rational use of the three-dimensional visual information model, the degree of data integration of the project has been significantly strengthened, providing a good platform for information exchange and information sharing for relevant stakeholders. In addition, decision makers can also use the virtual construction method in the BIM 3D visualization function to merge structural parts to form a 3D solid structure. And in accordance with the 1:1 simulation form, the three-dimensional entity structure is drawn and analyzed, and the project structure model is output in the form of drawings.

1.2 Digital application characteristics

BIM technology is a derivative product of the development of modern computer technology, and has the characteristics of informatization and digitization in terms of technical application characteristics. Among them, in terms of the performance of the characteristics of digital applications, research and analysis can be conducted mainly from three aspects: completeness, relevance and consistency. Taking completeness as an example, all the information in the model needs to include 3D geometric information, engineering information, and so on. In terms of relevance, if an object in the model changes, the corresponding prefabricated information will also change significantly. In addition, in terms of consistency, the same information only needs to be entered once in the entire life cycle to achieve the entire process control effect[2].

1.3 Advantages of collaborative management

The collaborative management advantages of BIM technology can help all parties involved in a project to jointly solve problems and ensure that information transparency is strengthened. For example, in the design stage, collaborative design can be carried out between different disciplines. Different majors can coordinate and deal with the contradictions in the current design work according to the information feedback, so as to reduce the contradictions and risk problems that exist during the subsequent construction operations. For example, the main body of the project can take advantage of the collaborative management of BIM technology to conduct a comprehensive simulation analysis of the safety and economy of the project. According to the analysis and feedback results, the control and management efforts were strengthened from the aspects of design, construction and operation and maintenance management.

2 Analysis of application strategy of BIM technology in highway bridge design

2.1 Construction strategy of collaborative design platform based on BIM technology

At present, bridge professional designers have actively combined the advantages of BIM technology to fully develop, promote and apply BIM design software. In the specific application process, the design basis is mainly based on the results of digital survey and design. Combine the content of the design data to construct a scientific and reasonable BIM model of the bridge plan. And according to the functional advantages of collaborative design, the BIM model of each professional information and the environmental model are integrated and applied to ensure that the design effect of the large-scenario BIM model can meet the expectations[3].

In this process, professional designers need to actively combine professional characteristics and technical standards to accurately judge the feasibility of the current bridge design plan. It should be noted that all majors must ensure that the design schemes are properly connected in order to achieve collaborative processing effects. Or you can also use the BIM collaboration platform, after review and confirmation by various professional designers, appropriate improvements and adjustments to the relevant design content to ensure that the information transmission function and application function can meet expectations.

2.2 Application strategies selected for comparison of bridge schemes

The prefabricated bridges account for a large proportion of the entire line of bridges, and traditional bridge design methods are difficult to achieve optimization, improvement and dynamic management of the overall design of prefabricated bridges. Although from an objective point of view, traditional highway bridge design is mainly based on 1:2000 topographic maps and route design data for planning and design, and can achieve the goal of rapid design, but this design method is prone to imperfect structural structure and the location of the crossed object Problems with unclear relationships.

If it is applied to on-site construction operations, it is prone to construction risks. Through the scientific use of BIM technology, the staff can construct the highway bridge BIM model in advance. Utilize the visualization function and collaborative design function of BIM technology to identify and prevent potential risks in the construction site in advance. And with the aid of the BIM model, the bridge construction content is collaboratively designed to solve the problem of imperfect structural structure or unclear positional relationship of the crossed objects in the past[4].

2.3 Application strategy in steel bridge detail design

Based on previous construction design experience, the more common bridge types are mainly long-span rigid frame bridges and cable-stayed bridges. Due to the complexity of this part of the bridge itself, complex node methods should be adopted for targeted treatment in the design process. In other words, the traditional two-dimensional drawing method has been difficult to meet the current bridge design requirements. It is suggested that the designer can use BIM technology to make overall planning and reasonable deployment of the detailed design content of the steel bridge.

On the one hand, the visualization function and simulation function of BIM technology can be applied to the structural design of steel truss main girder node anchor bolts and cable saddles. According to the data analysis and feedback, the designer can predict the error problems that may occur in the current on-site construction in advance, and reduce the occurrence of hidden construction hazards.

2.4 Application strategies in the disclosure of bridge visualization technology

Scientific use of the visualization function of BIM technology can efficiently complete the technical

clarification work. For example, designers can use the simulation function of BIM technology to realize the simulation analysis of each key construction process. According to the analysis and feedback results, the design intention is directly expressed, and the key points are marked during the construction operation stage to ensure the efficiency of on-site communication and the quality of work to be deepened and strengthened.

3 Conclusion

All in all, the promotion and application of BIM technology has effectively overcome the disadvantages of traditional highway bridge design to a certain extent, such as breaking through the previous design mode dominated by human experience, and not only effectively improving the safety and reliability of the design process At the same time, it also promotes the realization of interconnection between people, visual information models and structures to ensure the efficient operation of highway and bridge projects. However, it should be noted that the current BIM technology in my country has not yet reached the stage of mature application, and there are still problems that need to be overcome in some technical systems. Therefore, in the future development, relevant researchers should strengthen the research on BIM technology to ensure that the highway bridge design system based on BIM technology can be more intuitive and integrated, and provide a good guarantee for the sustainable development of my country's bridge construction industry.

Disclosure statement

The author declares no conflict of interest.

References

[1] Yue LF. Discussion on the design of highway bridge based on BIM[J]. China Construction, 2019(03):166-167.

[2] Ma B. Analysis of the application of BIM technology in highway bridge design[J]. Sichuan Cement, 2019(08): 54.

[3] Wang J. The application of BIM technology in highway bridge design [J]. Heilongjiang Transportation Science and Technology, 2021, 44(01): 246-247.

[4] Wang LW, Ren Jiao. Application of BIM technology in highway bridge design [J]. Heilongjiang Transportation Science and Technology, 2021, 44(03): 236-237.

Journal of Architectural Research and Development, 2021, Volume 5, Issue 3
http://ojs.bbwpublisher.com/index.php/JARD
ISSN Online: 2208-3537
ISSN Print: 2208-3529

Reviewed Interpretations and Inspirations on the Development and Strategies of Garden City Theory in Singapore

Qinyu Feng*

The University Of Sheffield, Sheffield S10 2TT, UK

Abstract: Reconceptualising the construction of Garden Cities in Singapore from the perspective of the history of urban development and urbanization, in conjunction with the development and trends of vertical greening systems. To summarise the principles of development in modern ecosystems in the context of rapid urbanisation and high population density trends: 1. Long-term planning and adherence to ecological principles are required for urban construction and development. 2. Urban development should insist on controlling and guiding the urbanisation process. 3. Strong executive and coordination capacity of the government is an essential force for the development of new cities. 4. The cultivation of urban culture is required to be initiated by the government to promote social consensus and directing the power of the public. 5. Respond to the trend of the times and make flexible use of science and technology (vertical ecosystems) to solve urban problems.

Key words: Garden City Ecology City History, Vertical Greening System

Publication date: May, 2021; ***Publication online:*** 31 May, 2021

Corresponding author: Qinyu Feng,

1 Introduction

The concept of the garden city comes from the book 'Garden Cities of Tomorrow' by Howard, who is considered to be a pioneer of modern urban planning, a theory that played a major role in 20th century urbanism and spearheaded the construction and development of modern cities (Gatarić et al. 2019, pp. 33-43). However, urbanization is not declining and the proportion of urban areas is expected to reach 66% by 2050 (UNDESA 2014) (Figure 1).

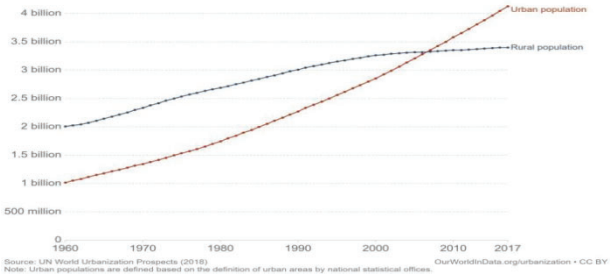


Figure 1. Number of people living in urban and rural areas (UNDESA 2018).

The concept of the garden city comes from the book 'Garden Cities of Tomorrow' by Howard, who is considered to be a pioneer of modern urban planning, a theory that played a major role in 20th century urbanism and spearheaded the construction and development of modern cities (Gatarić et al. 2019, pp. 33-43). However, urbanization is not declining and the proportion of urban areas is expected to reach66% by 2050 (UNDESA 2014). With the development of technology, urbanization has brought about new urban problems, towering buildings are an inevitable part of future urban development (Ibrahim 2007), and the contradiction between urban construction land and urban greening land is becoming increasingly prominent (Colding 2020), as traditional greening methods are falling below the greening requirements of modern urban development (Russo 2018, p. 2180). Singapore is acknowledged worldwide for the successful construction of the Garden City, and its famous vertical ecosystem has pointed the way to a new direction for the future of urban development (Abel 2020). Nevertheless, looking at the vast amount of understanding and research on the Singapore Garden City, it is clear that

the approach to greening and the construction of gardens is not enough. Simple imitation produces useless landscaping, encroaching on the already tight urban land resources and bringing about more urban and social problems.

This paper looks at the history and strategies of garden city development in Singapore, Combining the development of vertical greening systems, and analyses the Singapore garden city model to reconceptualise the experience of building new garden cities.

2 The Garden City Singapore

Only Singapore bears any resemblance to the polycentric city Howard planned. With its constellation"of high-density new towns all linked to the main city by a circular metro system, the city- state combines elements of both Howard's and Le Corbusier's visions (Le Corbusier experimented with replacing individual houses with public housing, interpreting Howard's vision in his own way, creating a series of high-rise "vertical garden city" project parks (Bessette 1987).) together in a rare, infrastructure led urban strategy (Liu 1998), that is now the envy of planners around the world (Able 2010).

2.1 The process of building Garden Cities in Singapore

2.1.1 Objective setting for Garden City

Before 1958, Singapore was a British colony for a long time, and the last version of the master plan before independence was the 1958 master plan. In this plan (Chew 2009), the colonial government explicitly responded to urban development with a decentralization layout, which also included the development of new towns and the use of the Green Belt to limit further growth in the central city (Dale 1999). These measures have similarities to the 1944 Greater London Plan (Abercrombie 1944), and are clearly influenced by Western urban planning theory, which has significant relevance to the Garden City movement advocated by Howard in England.

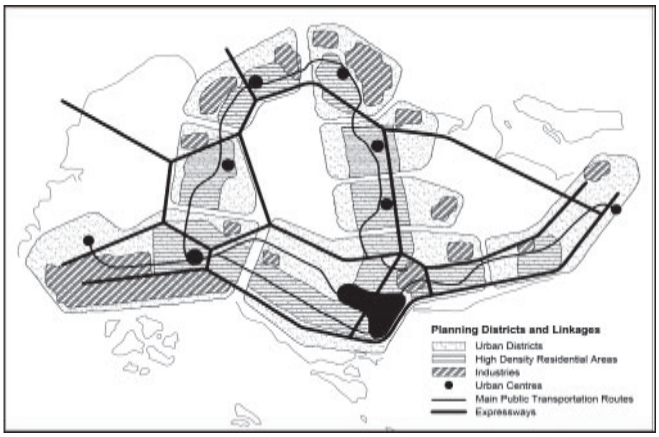


Figure 2. Professor Otto Koenigsberger, a planner from UN, proposed the concept of Ring City in 1963.

One of the most popular planning schemes was the decentralization pattern - when the central city grew to a certain size, it was surrounded by a number of idyllic cities, forming urban communities, which would allow for more efficient management of the city (Howard 2013). This idea has resulted in a systematic management model in Singapore. In 1959, when Singapore became independent, the massive construction of the city began in earnest. In 1963, Professor Koenigsberger, a United Nations expert on urban development, helped to develop a new version of Singapore's concept plan (Chew 2009). This plan introduced the concept of the 'Ring City' (Abrams and Koenigsberger 1963). The concept planned a city of four million people, with a large natural area at its centre and a series of new towns linked by a ring of traffic on the periphery. This concept provides a fundamental spatial structure for garden city in Singapore (Figure 2).

In the immediate post independence period, the Singaporean nation was in shambles, with the largest urban slums in Southeast Asia and an unemployment rate of 13% (Schelander 1998). On 15 December 1968, Lee Kuan Yew formally introduced the concept of the "Garden City" to guide and improve the overall habitat of Singapore, which formed the first holistic urban concept to guide the development of Singapore's habitat. This urban concept was a continuation of the " Garden City" movement and was in response to the needs of the Singaporean people (Lin 2010). The concept of the 'ring city', mentioned in 1963, was established in the 1971 plan. Singapore's rapid urbanization was accompanied by the preservation of the natural areas of the city centre (the central catchment and the original forest), a strategy that continues to this day, making it the largest

ecological core in Singapore today. "The 'ring' also defines a decentralization, ribbon pattern of new towns, a necklace pattern of rings linked by a modern transport system. This structure forms the basis of the Garden City of Singapore (Lin 2010) (Figure 3).

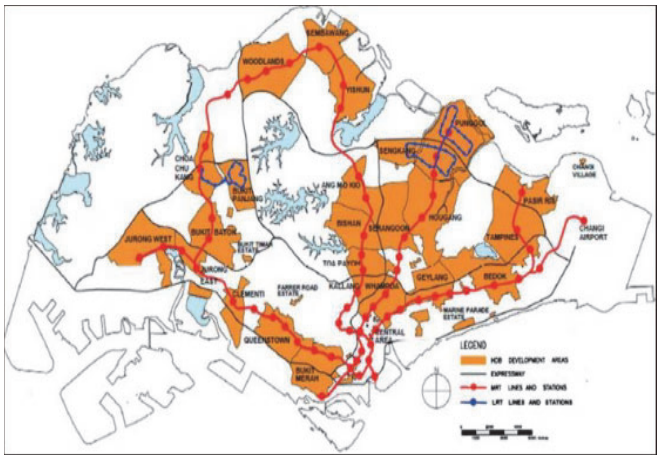


Figure 3. Planning of new towns in Singapore. Uploaded by June Wang.

2.1.2 Nation-wide green open space construction

After 1980, open space became the mainstay of the urban design and planning in Singapore as the city grew and urbanites began to emphasise a high quality of life and the need for natural and open public spaces increased. In 1981, the Singapore government proposed a five-year plan to promote five large public parks island-wide. In 1989, the government began to plan for an island-wide green linkage system that would attempt to link all types of open space together through walkways, cycle paths and lanes. In that year, a plan for a network of parks was clearly formulated, specifying six types of open space in Singapore (natural open space, major parks and gardens, sports and open spaces, boundary separations, intrinsic greenways and connectors, and others), with the construction of open space in Singapore thereafter beginning to evolve towards a complete network system.

2.2 Vertical greening in Singapore

Anticipating the tension between a rapidly growing population and limited land area, Singapore's new towns take the form of high-rise tenements interspersed with parks, unlike European neighbourhood units. This new format is Singapore's vertical greening system.

2.2.1 The origin and development of vertical greening

The origins of the concept of 'vertical greenery' can be traced back to around the 17th century AD. The labyrinths built by the Greek dynasties of Crete contained mazes that were hedged with greenery to separate spaces, creating an impermeable green wall. After years of exploration, people gradually realized that wall greening could produce better results, so climbing plants were used to decorate the walls and halls of buildings in Eastern Europe, the former Soviet Union and Europe and America. The Patrick Blanc later named this particular form of greenery 'Vertical Gardens', also known as 'Vegetated Living Walls', and 'Living Green' (Blanc 2008).

In recent times, the accumulation of gardening techniques has led to the development of dimensional greening in a more practical direction. In 1959, a 1.2 hectare rooftop garden was built at the Kaiser Center in Oksing, California, USA (Osmundson 1999). Tokyo, Japan, which brought vertical greening into the legal fold in April 1991 and issued an urban greening law (Chang 2010). The Polish government has made Warsaw the world's greenest capital after decades of greening, with 78 square metres of green space per person (Szymańska 2015). In Germany, the "Green House Project" has commercialized the components needed to build walls, and 80% of German roofs are now green (Doroshenko 2018). Brazil has developed a 'bio-wall', which is a wall made of hollow bricks and filled with resin, grass and fertilizer for vertical greening (Huaqing 2015). the garden city of Singapore has buildings, street sides, roofs, balconies and walls covered in green everywhere (Beatley 2012). Germany, Japan and South Korea and other countries of vertical greening related technology has been quite mature.

The development of vertical greening has developed globally, diversified and intensified. As an urban greening method that integrates ecological, economic and aesthetic benefits, vertical greening has been strongly promoted by countries such as the United States, Germany, Japan and Singapore (Perini and Rosasco 2013). First of all, vertical greening can effectively alleviate the contradiction between greening and building land, and break away from the limitations of traditional greening in terms of the number of plants and planting area, creating the greatest greening effect with the smallest footprint, finding a breakthrough for increasing the greening rate of the city, and also finding a new direction for urban land resource planning (Pérez-Urrestarazu 2015). Secondly, vertical greening can

improve the urban heat island effect, beautify the environment, effectively reduce the urban drainage load, avoid urban water logging, absorb dust and reduce noise, and be ecologically friendly (Price and Jefferson 2015). In addition, from the overall perspective, vertical green walls have a high initial investment cost, but a low maintenance cost later on. The special planting process ensures that the plants are evergreen throughout the seasons, saving the cost of planting, achieving automatic drip irrigation and fertilization, saving water resources and reducing manual maintenance costs (Perini and Rosasco 2013).

The "vertical greening system" has created the "Garden of Singapore", and it can also be said that Singapore's garden ecology philosophy has created the unique "vertical green garden" appearance of Singapore. Singapore has spent 53 years creating a "garden city" that incorporates greenery into the urban fabric.

2.2.2 Skyrise greenery in Singapore

In Singapore, the combining of vertical greening systems with skyscrapers has given rise to sky gardens and high-rise greenery that help reduce the heat island effect in the city and fill in the pristine greenery encroached upon by buildings.

Pictured below is the Sky Park on the roof of Marina Bay Sands Hotel, which overlooks the Singapore skyline. At 200 metres above ground level, Sky Park is larger than three football pitches and comes complete with viewing decks, over 250 trees and a 150-metre infinity pool (Figure 4).

Figure 4. Marina Bay Sands Integrated Resort Skypark®

Parkroyal Singapore claims to have a total leafy green cover of over 200% of the total floor area and uses vertical greenery to replace the original greenery lost when the hotel was built. The 12-storey tower features a curved solar-powered sky garden overlooking the city park in the Central Business District (Figure 5).

Figure 5. Hotel Review: Parkroyal Collection Pickering, Singapore.

2.2.3 Vertical gardens in Singapore

The impressive ‘Gardens by the Bay’ development is an integral part of an ambitious strategy by the government to transform Singapore from a ‘Garden City’ into a ‘City in a Garden’ (Han 2017).

The Bay Gardens, a popular retreat for many local residents, features 'super trees' that use technology that mimics the ecological functions of trees. The solar-powered photovoltaic cells on these Super Trees have various practical functions, including lighting and rainwater harvesting for irrigation and fountain displays. The Super Trees also provide some of the intake and exhaust functions of the greenhouse cooling system (Figure 6). These unusual vertical gardens perform a multitude of useful and aesthetic functions, such as providing shade and working as environmental engines for the gardens.

Figure 6. Supertrees, Gardens by the Bay, Singapore.

The 2,289 square metre Treehouse Apartments on Chestnut Avenue in Singapore has become the world's largest vertical garden. Standing 24 storeys high, this green wall is expected to save the building over $500,000 in energy and water costs annually (Figure 7).

Figure 7. The world's largest vertical garden - Tree House condominium, Singapore

2.2.4 Vertical communities in Singapore

The Kampung Admiralty is the first public building complex in Singapore to combine all public facilities and service spaces into a single building volume (Figure 8).

Figure 8. Kampung Admiralty aerial view of west elevation©k. Kopter

2.2.5 Vertical Greenery Policy in Singapore

With the progress of urbanisation, more cities are affected by the current situation of more population and less land, and tall buildings are the inevitable condition of future urban development. The traditional greening methods are far from meeting the greening needs of modern urban development. Environmental problems such as atmospheric pollution, noise pollution, heat island corresponding, greenhouse effect have become the main factors restricting the healthy development of urban ecology, which makes vertical greening an inevitable choice for future urban development.

The Singapore government has encouraged the widespread use of new technologies to address the conflict between scarce land resources and the growing demand for public green space with vertical greening systems, and has collaborated with designers from around the world to create a stunning array of architectural and landscape works.

2.3.The leading role of the Singapore government

2.3.1 Control of the urbanisation process and public housing policy

Singapore's Garden City has been built on the strength of the government. The government has progressively and rationally controlled urbanization through policies to build public housing in the city. During the rapid urbanization stage, such a policy avoided the massive acquisition of land by bloated capitalists, which inflated the cost of housing and encroached on the public interest, and preserved and built a large number of public green zones. The Singaporean government has guided urbanization through public housing construction in such a way as to keep the scale of each new city within a limited space without overspreading, thus achieving the 'new city model'. Furthermore, the Singapore government has established a number of regulatory bodies. These governing bodies have played an important role in promoting the development of the Garden City.

2.3.2 Garden City Action Committee

In 1973, the Garden City Action Committee (GCAC) was set up and headed by the top state employee, comprising the Ministry of National Development (Tan 2006), the Jurong New Town Corporation and the Housing and Development Board, as an overarching The GCAC is a coordinating body. This organization not only coordinates different government agencies and oversees land use planning, but also provides planning standards for open space and park development. The National Parks Board and the Department of Development, the Housing Authority and the Urban Development Authority have all played a key role in the development of the Garden City (Ooi 2005).

2.3.3 The development of urban culture

Therefore, the success of Singapore rested on the cultivation of an urban culture of the " Garden City ". This culture became the core of Singapore's national identity and national culture. It is because the conceptual objectives of

Singapore's Garden City are for the betterment of the nation's citizens, to have ensured the basic interests of its citizens and to have limited the encroachment of capital and inequality that this culture has been able to reach the hearts and minds of the people. The 'Garden City' concept was initiated from the top down by the government and gradually transformed into a bottom up public effort, with the nation working together to promote the development of the 'Garden City'.

3 Conclusion

The success of Singapore in the Garden City is both an inheritance and development of the spirit of Howard's Garden City, and a new direction for future urban development. However, simply imitating the vertical greening model of Singapore is meaningless, as it takes up huge amounts of public space, causes land prices to rise and brings about more urban problems. Therefore, it is worthwhile to review and learn from the strategies of Singapore for urban development and planning.

Firstly, urban construction and development should maintain ecological principles and ensure a minimum area of public greenery. In addition, the government should take the lead in the urbanisation process, control the involvement of capital, keep housing prices stable and protect the quality of life of the citizens, in order to achieve universal participation. Finally, technology should be used wisely and boldly to solve urban problems. Vertical ecosystems are embedded throughout Singapore, influencing all aspects of urban development. These technologies have enhanced the quality of life of people.

Disclosure statement

The author declares no conflict of interest.

References

[1] Abel, C. (2010). The vertical garden city: towards a new urban topology. CTBUH journal, 2(1), 20-30.

[2] Abercrombie, P. (1944). Greater London Plan. HM Stationery Office. Anon, 2002. Half the world will go urban in five years. (World Urbanization Prospects: The 2001 Revision). UN Chronicle, 39(3), p.36.

[3] Abrams, C., Kobe, S., & Koenigsberger, O. (1963). Growth and urban renewal in Singapore (pp. 63–84). Retrieved August 1, 2014, from MIT Students' Portal website: http://stuff.mit.edu/afs/athena/course/11/11.337/www/MIT_Workshop_Material/MIT_Workshop_ Material/readings/abrams%20kobe%20koenigsberger_singapore_1963. pdf; The Straits Times, 23 Mar 1970, p. 8.

[4] Beatley, T. (2012). Singapore: How to grow a high-rise city in a garden. SiteLINES: A Journal of Place, 8(1), 14-17.

[5] Besset, M., & Corbusier, L. (1987). Le Corbusier/to Live With the Light. Rizzoli International Publications.

[6] Blanc, P. (2008). The vertical garden: From nature to the city. WW Norton & Company.

[7] Colding, J., Gren, Å., & Barthel, S. (2020). The Incremental Demise of Urban Green Spaces. Land, 9(5), 162.

[8] Chang, K. F., & Chou, P. C. (2010). Measuring the influence of the greening design of the building environment on the urban real estate market in Taiwan. Building and Environment, 45(10), 2057-2067.

[9] Chew, V. (2009). History of urban planning in Singapore. National Library Board. Retrieved July 23, 2016 from http://eresources. nlb. gov. sg/infopedia/articles/SIP_1564_2009-09-08. html.

[10] Doroshenko, V. (2018). THEORETICAL AND METHODICAL APPROACHES TO DETERMINATION OF CONCEPT" GREEN BUILDING". THE ACTUAL PROBLEMS OF REGIONAL ECONOMY DEVELOPMENT, 2(14), 31-38.

[11] Dale, O. J. (1999). Urban planning in Singapore: The transformation of a city. Oxford University Press, USA.

[12] Gatarić, Dragica et al., 2019. The origin and development of Garden cities: An overview. Zbornik radova (Univerzitet u Beogradu. Geografski fakultet), 2019(67-1), pp.33–43.

[13] Huaqing, M. A. (2015). Application and Development of Vertical Greening in Urban Landscaping. Journal of Landscape Research, 7(1), 41.

[14] Howard, E. (2013). Garden cities of to-morrow. Routledge.

[15] Han, H. (2017). Singapore, a garden city: Authoritarian environmentalism in a developmental state. The Journal of Environment & Development, 26(1), 3-24.

[16] Ibrahim, E. (2007). High-Rise Buildings–Needs & Impacts. In CIB World Building Congress (Vol. 2007).

[17] Lin, Y. U. A. N. (2010). Renewed Interpretation and Inspirations of the Singapore Garden City under the Context of City History. Landscape Architecture, 6.

[18] Manso, M., & Castro-Gomes, J. (2015). Green wall systems: A review of their characteristics. Renewable and sustainable energy reviews, 41, 863-871.

[19] Ooi, G. L. (2005). Sustainability and cities: concept and assessment. World Scientific.

[20] Osmundson, T. (1999). Roof gardens: history, design, and construction. WW Norton & Company.

[21] Pérez-Urrestarazu, L., Fernández-Cañero, R., Franco-Salas, A., & Egea,

[22] G. (2015). Vertical greening systems and sustainable cities. Journal of Urban Technology, 22(4), 65-85.

[23] Price, A., Jones, E. C., & Jefferson, F. (2015). Vertical greenery systems as a strategy in urban heat island mitigation. Water, Air, & Soil Pollution, 226(8), 247.

[24] Perini, K., & Rosasco, P. (2013). Cost–benefit analysis for green façades and living wall systems. Building and Environment, 70, 110- 121.

[25] Russo, Alessio & Cirella, Giuseppe, 2018. Modern Compact Cities: How Much Greenery Do We Need? International journal of environmental research and public health, 15(10), p.2180.

[26] Szymańska, D., Lewandowska, A., & Rogatka, K. (2015). Temporal trend of green areas in Poland between 2004 and 2012. Urban Forestry & Urban Greening, 14(4), 1009-1016.

[27] Schelander, B. (1998). Singapore: A History of the Lion City. Center for Southeast Asian Studies with the School of Hawaiian, Asian, and Pacific Sudies at the University of Hawaii at Manoa.

[28] Tan, K. W. (2006). A greenway network for Singapore. Landscape and urban planning, 76(1-4), 45-66.

Journal of Architectural Research and Development, 2021, Volume 5, Issue 3
http://ojs.bbwpublisher.com/index.php/JARD
ISSN Online: 2208-3537
ISSN Print: 2208-3529

The Options Are Available for Controlling Residual Risk

Zitong Gao*

Jinshan Vocational Technical College, Yangzhong 212200, Jiangsu Province, China

Abstract: Macquarie Dictionary define 'Risk' as the chance of an adverse event depending on the circumstances. In the field of engineering, the risk is often described as a specific unwanted event and including the consequences or loss. Usually residual risk from civil engineering project would lead to serious effects. The control of residual risk is an important subject in modern civil engineering management research. In this paper, a residual risk controlling methods will be present. Firstly, the definition and other mentioned concepts will be introduced. It includes the definition of residual risk and other concepts of risk that are often confused. Next, basic ways of dealing risk will be mentioned.

Key words: Risk management; Residual risk; Secondary risk

Publication date: May, 2021; ***Publication online:*** 31 May, 2021

****Corresponding author:*** Zitong Gao, 2531244473@qq.com

Definition about Residual Risk:

The residual risk in this paper only refers to the 'residual risk' in the engineering project, which is not the same concept as the residual risk in other industries. According to information security management requirements ISO27001 , residual risk is "the risk remaining after risk treatment". ISO/IEC27001 was proposed by the British Standards Institute (BSI) in February 1995 and revised in May 1995. The strength areas for BSI are health, electrical, engineering, materials, chemicals, consumer goods and services, information technology. BSI has thus become one of the world's recognized standards in the field of engineering.

Residual risk is the risk that remains after nearly all efforts to eliminate, the risk still exist. This also can be defined as the modified risk has been implemented; however, it could still affect results. Usually in actual projects, residual risks should be further evaluated and sorted out. Generally speaking, residual risk is after considering all external elements, the risk will remain at a certain level. This means this kind of risk is 'unavoidable'.

Differences between Residual Risk and Inherent Risk:

Residual risk is a different concept from inherent risk, and often beginner or less experienced project managers may confuse the two concepts. Inherent risk is the risk level before management actions, which is generally composed of contractual reasons and technical reasons. The most important difference between these two risk is residual risk be controlled in the whole project schedule, but inherent risk is that an activity would pose no controls factors. It has been mentioned in the last section that residual risk is inevitable, but this does not mean that it is an uncontrollable factor.

Why we need to compare these two risks is that they are usually assessed in the same way. This is why they are often lumped together. The Institute of Project Managers (APM) published a systematic approach to risk management in 1997, which is called Project Risk Analysis and Management (PRAM), and it defines a set of risk management steps. The main elements include specification, focus, identification, framing, ownership, estimation, evaluation, layout, and control. In addition, the process is simplified as organization and scope, identification, risk analysis, risk solution, response planning, continuous management and feedback.

Residual risk is tending to define within the simple risk model; however, the inherent risk is more problematic. The risk cannot be eliminated completely and control the risk to an acceptable level is our target.

Differences between Residual Risk and Secondary Risk

The PMBOK® Guide defines secondary risks as "those risks that arise as a direct outcome of implementing a risk response". In simple ways, managers already identify a risk and have a response plan to deal with that one. Image this plan had been successful implemented, the new risk could arise from this implementation, which is called a secondary risk. Differently, residual risks are the leftover risks. The secondary risk is required actions and it takes creation of a response plan. For residual risk, it not always needs actions and depends on the situations. It may need a contingency action plan.

For instance, in order to have a road construction, the engineers decided to close George St. This means cars cannot go through George St; however, a bicycle may get into the construction site. This kind of risk is called secondary risk.

Why we need to compare these two risks is that they are usually being confused. Engineers may have established a risk of traffic congestion that may last 10 days or one month and which may not disrupt the construction. To manage this risk, engineers have scheduled other plan with a buffer of couple of days. So that even if it traffic congestion for few days, other plans are not disrupted. Even though it has a risk control, this does not eliminate the risk of the timetable getting messed up; but only lowers the risk. The risk still exists, which is called 'residual risk'.

Negative result from residual risk:

- Adverse result of operation (e.g. decrease of productivity);
- Adverse result of management (e.g. high human resource turnover rate);
- Adverse result of budget (e.g. high cost about maintenance of equipment);
- Adverse result of corporate reputation (e.g. project delay);
- Adverse result of personal safety (e.g. fire)

Basic ways of dealing risk:

The control methods will help reduce the damage in the effects of risk but it cannot remove the danger completely. What remains there after taking all these controls into account is a residual risk.

1. Appetites for risk

The project managers, evaluate the adequacy and effectiveness of these controls in order reduces residual risk to an acceptable level by the board. If the acceptable level of risk is higher than the level of risks, the manager could accept these risks formally.

2. Reassess risk plans

If the acceptable level of risk is below than the level of risks, there is a requirement about evaluation, reviewing and analysis of plan implementation.

Risk Priority Number (RPN) without Control = Frequency * Detection * Severity (1.1)

Residual Risks with Administrative Control = Frequency * Detection * Severity (1.2)

Risk Rating (RR) = Frequency (F) x Likelihood (L) x Severity (S) (1.3)

3. Reconsider the Construction Project Feasibility Studies

If all feasible and practical actions have been widely undertaken to decrease the risks but still has high risks, a system of residual risk approval should be developed and applied.

Disclosure statement

The author declares no conflict of interest.

References

[1] Bignozzi, V. and Tsanakas, A. (2015). Parameter Uncertainty and Residual Estimation Risk. *Journal of Risk and Insurance*, 83(4), pp.949-978.

[2] Ishandbook.bsewall.com. (2017). *Inherent & Residual Risk*. Available at: http://ishandbook.bsewall.com/risk/Assess/Risk/inherent_risk.html [Accessed 10 May 2017].

[3] Park, Y. (2016). Project Management Using a Risk Mode and Action Plan Method. *The Korean Academic Association of Business Administration*, 29(10), pp.1549-1564.

[4] Leigh, N (2017). *What is Residual Risk? - Objective Controls*. Available at:http://www.objectivecontrols.com/blog_2015/2015-08-12_objective_blog.html [Accessed 10 May 2017].

Journal of Architectural Research and Development, 2021, Volume 5, Issue 3
http://ojs.bbwpublisher.com/index.php/JARD
ISSN Online: 2208-3537
ISSN Print: 2208-3529

A Study of the Anatomy of Decision Making in the Planning and Appraisal of Hong Kong Section of Guangzhou-Shenzhen-Hong Kong High Speed Rail

Junyou Liu*

School of Architecture and Art, Central South University, Changsha 410075, China

Abstract: This paper will study the anatomy of the decision making of Hong Kong Section of Guangzhou-Shenzhen-Hong Kong High Speed Rail (XRL). The paper will focus on five aspects. They are drivers of megaprojects, mega infrastructure project as an agent of change, early and effective stakeholder engagement, Iron Triangle and context awareness. XRL will be regarded as a resonance test of the international literature findings.

Key words: Decision making; Anatomy; Risk

Publication date: May, 2021; ***Publication online:*** 31 May, 2021

Corresponding author: Junyou Liu, 531623827@qq.com

1 Introduction

Megaprojects are defined as projects which cost a billion US dollars or more at 1999 prices[1]. This paper will study the anatomy of the decision making in the planning and appraisal of XRL. Firstly, this paper will critically review international literature in this field. The case study will be based on the critical literature reviews. The resonance test of the project will be conducted.

2 Literature review

Mega transport projects have multiple environmental, economic, spatial, and other implications. They frequently become crucial 'agents of change'. However, decision-makers often under-appreciated their ability to change the context[1]. Project can only be thought as successful, when it measured against varies criteria such as social impact, economic impact and environmental impact[2]. This paper thinks this assessment can help to examine the role of these projects as an agent of change. Four sublimes drive megaproject boom and make megaproject attractive to decision makers. They are technical sublime, political sublime, economic sublime and aesthetical sublime. Technological sublime generally means pushing the boundaries for what technology can do. Political sublime means building monument for politicians and their influence. Economic sublimes highlights business people and trade union earn money and get jobs from megaprojects. Aesthetic sublime focuses on the appearance and good design of Megaprojects. These make many stakeholders benefit from it and work for it[3].

During the Mega urban transport project planning and delivery stage, it is crucial that there is a clearly identified public sector agency clearly tasked with taking a multi-function or multi-discipline view of roles, functions and implementation needs associated with the project development. This can avoid project planning and delivery reflect departmental or professional siols such as the Transport Department mainly consider transport matters, other departments may insert wider considerations[2]. Sponsors are the guiding hand for the projects. They provide resource, shape, anchors, and strategic direction. Projects have to meet sponsors' objectives. Because they do not have perfect knowledge, and need to engage with stakeholders to identify a project. The role of planners is to identify a project and ensure the project has a good Business case, is adaptable to future change and is intensely supported. Because of the high cost of major project, the planner is placed a heavy reasonability to develop a suitable appraisal[4].

Early and effective engagement with stakeholders is thought as critical for megaproject. This is effective for the

treatment of risk of the project. Omega centre (2011) stated all key stakeholders should be involved in setting project objectives in one lesson of its study [2]. This can contribute to consensus in decision making. It is less effective that project promoters negotiate with stakeholders after objectives have been set[1]. More respectful and balanced relationship between the experts and lay communities are good[5]. Risk can be shared between different stakeholders[1]. Lay people are helpful for effective hazard management. However, some people criticize community involvement lead to project delay and focus on NIMSY(not in my backyard) issue.

Iron Triangle of project performance is a wide used criteria of finishing mega-project on time, within budget and specification have not prevailed as the overriding criteria for successful project. Although some projects finished on time within budget and specification, in broader term, they may finish at the wrong time, in the wrong place serving only a narrow set of stakeholders and generate unsustainable outcomes. Due to different perception, some projects were claimed by others as 'failure' are now seen as 'successes'[6]. Cost overrun is common for Megaprojects. Based on large data set of major projects, project delay causes cost overrun and benefit shortfall. One year delay correlate with 4.64 percent cost overrun. Keep implementation stage short and delay small is thought as effective for keeping cost down. Many Megaprojects suffer from the problem of overestimated benefit. Up to 50 % benefit shortfalls are common. Because of cost overrun and benefit shortfall, many appraisal methods like Business case, Cost-benefit analysis, Social and Environmental Impact Assessment cannot be trusted[3].

Context has varied dimensions. Several contexts which thought as having great influence on megaprojects in 21 century are Unstable economic circumstance, new technology, energy concern and climate change and the extended time required in completing MUTP planning and development process. Decision makers have to be sensitive about the context which the project will be delivered. It can decide the successes of the project. Context awareness is crucial for the treatment of contextual risk. Planners have to be context sensitive[2].

3 Case study

The map 1 shows the route of XRL. The XRL is an approximately 26KM long underground high speed rail route in Hong Kong. The XRL runs from west Kowloon Station in Hong Kong. It connects with the Mainland China High-speed rail network. The operation of the high-speed rail service began on 23 September 2018. The last estimated project cost was HK dollar 84.42 billion (roughly 10.97 billion US dollars) [7]. The Megaproject includes the tunnel and the underground rail link and Hong Kong West Kowloon Station [8].

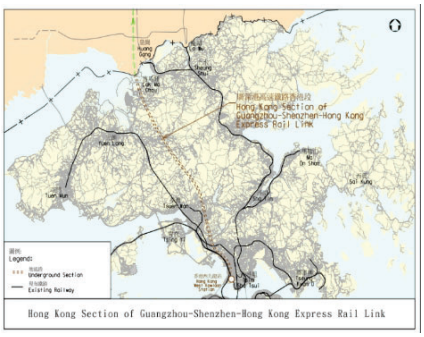


Figure 1. Hong Kong Section of Guangzhou-Shenzhen-Hong Kong High speed rail

Politicians think the connection is beneficial for the social and economic development of Hong Kong[9]. Economic sublime is a drive force for the project. Before the planning of XRL, an ordinary train rail link (Train speed 80KM/h to 120 Km/h) exists between Hong Kong and the mainland China. Decision makers believe high-speed rail as technical improvement is required. Political sublime also influenced the project. The administrative official of HKSAR Carrie Lam Cheng Yuet-ngor believes the project is not only beneficial for social and economic development but also improve people's livelihood[10] (Figure 1).

The Sponsor of the project is the HKSAR Government. The HKSAR Government decided to build the high-speed rail to connect Hong Kong and mainland China. This shows sponsor is the guiding hand of the project. MTR Corporation Limited (MTRCL) was designated for the further planning and design of the XRL in 2008. Evidence shows MTRCL actively negotiated with other departments and district councils for the project. MTRCL also carried out Environmental Impact Assessment to identify the project meet the environmental needs pinpointed by the Environmental Department[8]. The MTRCL also played a role to avoid political departmental or professional siols. MTRCL as an identified public sector agency for XRL also played an active role in choosing contractors for further planning, appraisal and construction of the project and facilitated the agreement between different stakeholders.

This negatively influenced the project[11]. This paper believes if planners can play a more active role about the early estimation of the project cost and benefit, the project may obtain more funding and not suffer from so serious cost overrun.

Table 1 shows key stakeholders of this megaproject. In 2005, Transport and Housing Bureau of HKSAR Government negotiated with the Ministry of Railway of mainland China. This early negotiation mainly occurred between these two authorities. This shows they did not have early and effective engagement with many stakeholders such as MTRCL, design corporations, communities. They did not hear much public opinions about the project. In 2008, MTRCL was required to further plan and design this project. The community liaison group of the XRL project was established in 2010, when the project construction began. Community liaison group did not play a role in the early stage. However, some consultation meetings occurred since MTRCL responsible for the project in 2008. The consultation between MTRCL and some HKSAR Government departments such as Transport and Housing bureau, Yuen Long District Council occur since MTRCL is responsible for the project. This paper thinks stakeholders involvement can be improved[8].

Table 1. Key stakeholders of XRL

Stakeholder	Role
HKSAR government	Provide funding and regulate different aspects of the project
Transport and Housing Bureau of HKSAR	Set policies and directions for Hong Kong' transportation sector
MTRCL (This is a semi-privatised corporation)	Responsible for the design and construction of the project
ARUP and Atkins China Ltd	Carry out the primary design of Hong Kong tunnel section for XRL
Construction Contractors (more than 10 contractors) such as ATAL Engineering Ltd, Siemens Ltd, and Wan Chung Construction Co. Ltd	Responsible for construction of the project
Communities	Can express the opinion about the project
Independent Board Committee	Examine the project and write report about the project
Ministry of Railways (China)	Regulate different aspects of the project
District councils	Negotiate with MTRCL about their opinions about the project

The initial agreement between HKSAR Government and MTRCL was the MTRCL obtain a funding of HK$ 65 billion to finish the project by 4 August 2015[12]. However, the actual cost suffered from around HK $ 20 billion cost overrun and the project suffered from serious delay, the real operation time of the project was September of 2018 [8]. Cost overrun was a common problem for many previous Megaprojects. The HKSAR Government and MTRCL did not have a good estimation about the cost of the project. In addition, they did not take suitable measure to avoid the problem of cost overrun. This paper has pinpointed delay can contribute to or exacerbate cost overrun. The delay and cost overrun issues occurred again in this project. In addition, the project also did not finish within the specification of HK$ 65 billion. Based on Iron Triangle, the HKSAR government and MTRCL was not quite successful [13]. This project is predicted to provide time saving value of HK$ 80 billion in next 50 years[14]. Many factors have been taken in to account when consider the alignment such as effect on community, land requirements and operational, safety, technical, geological aspects[8]. From these aspects, this may be a suitable time for the project to be constructed in Hong Kong.

HKSAR Government signed monument with Ministry of Railways (China) about the project before further construction this project[8]. This shows decision makers realized political context can influence the project. The XRL is built using taxpayers' money. This paper believes the public involvement can be improved in the early planning stage of the project. If the project does not have a good consideration about the social context, this project may suffer from negative influence such as public opposition. XRL is an underground rail link project. Thus, relevant stakeholders should notice specific underground space context may influence the project. Two other reasons caused the project delay were waters running in to the tunnel and malfunction of tunnel burning machine[14]. If MTRCL and relevant construction cooperation can value the context and be more effective in treating these risks during the planning and appraisal step, these negative outcomes may not happen.

4 Conclusion

Four sublimes (political, economic, technical and aesthetical) have been considered. Mega infrastructure project can play the role of agent of change and increase its attractiveness for decision makers. Early and effective engagement of different stakeholders before the objectives of the project set can make the objectives meet the needs of more stakeholders. A clearly identified public sector agency can avoid political departmental or professional siols, contribute to the agreement between different stakeholders and play a positive role in managing risk. Some projects may not meet the

criteria of Iron Triangle. However, based other criteria such as whether it is finished at right time, in right place, contribute to sustainable outcome, they are successful. Context can seriously influence the project. Decision makers should have good context awareness.

Disclosure statement

The author declares no conflict of interest.

References

[1] OMEGA centre. Mega projects executive summary lessons for decision-makers: An analysis of selected international large-scale transport infrastructure projects. London: Bartlett School of Planning. University College London;2012.

[2] Omega. Omega Research Programme Uk Case Studies; Project And Country Findings. London, Omega centre of UCL;2011.

[3] Flyvbjerg B. What You Should Know About Megaprojects, and Why: An Overview[J]. Project Management Journal,2014,45(2):6-19.

[4] Allport R. Planning Major Project. London. Thomas Telford; 2010.

[5] Littau P. *Managing Stakeholders in Megaprojects: The MS Working Group Report,* COST European Cooperation in Science and Technology, University of Leeds, Leeds http://www.megaproject. eu/assets/exp/docs/ Managing _Stakeholders_ in_Megapoects.pdf.

[6] Dimitriou H. Ward J. Wright P. Mega transport projects—Beyond the 'iron triangle': Findings from the OMEGA research programme, Progress in Planning,2013,86: 1–43.

[7] MTR. Express Rail Link in Hong Kong. viewed November 25 2018, http://www.expressraillink.hk/en/database/xrl-in-hk.html.

[8] MTR. Express Rail Link. viewed November 27 2018, http://www.expressraillink.hk/en/project-details/key-information.html.

[9] MTR. *Environmental Impact Assessment of Hong Kong Section of Guangzhou-Shenzhen-Hong Kong High Speed Rail Link*. viewed November 27 2018, https://www.epd.gov.hk/eia/register/report/eiareport/eia_1692009/EIA%20Report/Main%20Text/pdf/EIA%20TOC.pdf,.

[10] Xinhuanet. The Hong Kong section of the Guangzhou-Shenzhen-Hong Kong high-speed railway opened to traffic on 23rd --Hong Kong enters the era of high-speed rail. viewed November 28 2018, http://www.xinhuanet.com/gangao/2018-09/22/c_129959046.htm.

[11] MTR. *MTR Corporation welcomes Government's decision on Guangzhou-Shenzhen-Hong Kong Express Rail Link*, viewed November 27 2018, http://www.expressraillink.hk/pdf/en/press-release/mtrpressrelease-20080422.pdf.

[12] Anon. Construction work delays of XRL. viewed November 29 2018, https://www.info.gov.hk/gia/general/201405/21/P201405210325.htm.

[13] Government of the Hong Kong Special Administrative Region Transport Bureau. Railway Development Strategy 2000. viewed November 29 2018, https://www.thb.gov.hk/eng/psp/publications/transport/publications/rds.pdf.

[14] South China morning Post. The delays, inflated costs and legal wrangles that have plagued the MTR Corporation's Guanghzhou-Shenzhen-Hong Kong Express Rail,viewed November 29 2018. https://www.scmp.com/news/hong-kong/hong-kong-economy/article/2165217/delays-inflated-costs-and-legal-wrangles-have.

Journal of Architectural Research and Development, 2021, Volume 5,Issue 3
http://ojs.bbwpublisher.com/index.php/JARD
ISSN Online: 2208-3537
ISSN Print: 2208-3529

Research on the Problems and Countermeasures of Taiyuan Smart City Construction

Lifang Shi*

School of Political Science and Public Management, Shanxi University, China

Funding: This paper is a phased result of the project: Research on the Construction of Smart City in Shanxi Province in Big Data Era (Project no.: 2017041033 - 4).

Abstract: Taking Taiyuan City as the research object, this paper sorts out the problems in smart city construction from four aspects, and based on the analysis of their deep-seated reasons, combined with the practice and development trend of Taiyuan City's smart city construction, 4 items have been put forward. Strong operability countermeasures and suggestions: strengthen the top-level design, clarify the construction ideas; formulate preferential investment policies to solve the capital dilemma; give full play to geographical advantages, clarify the focus of construction, etc.

Key words: Smart city; Digital economy; Transformation development; Livelihood services

Publication date: May, 2021; ***Publication online:*** 31 May, 2021

Corresponding author: Lifang Shi, slf780430@163.com

Global economic integration, together with the wave of world urbanization and informatization, has promoted the development of cities in various aspects such as economy, society, and politics. At the same time, they have also been subjected to severe tests. In this context, "smart cities" have become a This strategy has been proposed and has become an irreversible trend for my country and even the world to solve urban development problems and achieve sustainable urban development. "Smart City" is the application of the Internet of Things, the Internet, cloud computing, and a new generation of information technologies that go beyond sensors, big data, and spatial geographic information integration systems, with high integration of smart technologies, high-end development of smart industries, and efficient and convenient services for the people A new urban operation model constructed for the main features.

As a "national smart city pilot" and a pioneering area for smart cities in Shanxi Province, Taiyuan City is building platforms represented by the "Smart Taiyuan" spatio-temporal information cloud platform, city management represented by digital city management, and the "Sky Eye" project as a representative Initial construction results have been achieved in the areas of livelihood services and other areas.

1 Problems in the construction of smart city in Taiyuan

After decades of construction, Taiyuan's "smart city" has made great efforts to achieve smartness in energy, environmental protection, transportation, medical care, and urban management, with remarkable results. However, there are still some problems and challenges in the construction process, which need to be solved urgently.

1.1 The linkage between city management and operation is not strong.

At present, Taiyuan City has a relatively good foundation for management and operation, but the overall platform construction lags behind. Most of the departments are built separately and operate independently. The level of cross-departmental business collaboration is low, and there are "information islands" between departments. As a result, the construction of smart projects currently being carried out by various departments is fragmented.

1.2 The pulling effect of the industry is not strong

There is a shortage of high-end talents in Taiyuan, and there are not many high-level and high-educated talents in the inflow population. The stimulus for the development of the entire industry is not strong, and the dividends have not been effectively released. The information industry, especially the cloud computing, big data, and Internet of Things related to the construction of smart cities, has developed slowly, and has not been able to drive traditional industries.

1.3 Insufficient innovation and lack of its own characteristics

Taiyuan is an energy-heavy industrial city, and its ultimate goal is to build a green, low-carbon environmental protection model city. However, in the actual construction process, it did not work towards this goal. It just copied the construction experience of other cities mechanically, and did not form its own distinctive features, without its own characteristics.

1.4 The promotion of citizen wisdom applications is not high.

At present, the depth, breadth, and benefits of smart applications in Taiyuan City are not ideal, and some citizens have very weak awareness of smartness. According to the survey, only 3% of the population of "My Taiyuan" APP download behavior, and only 30% of them actually use this APP for water, electricity and heating payment and other application services. More people are Browsing local news.

2 Analysis of the causes of problems in Taiyuan's smart city construction

2.1 Lack of practical long-term planning

In the early stage of building a smart city, Taiyuan did not have a reasonable planning plan and phased development goals, which did not provide good guidance for the development of smart cities, making the construction of some projects progress by leaps and bounds, and the construction of some projects stagnated. The reason is that the leadership role of Taiyuan's smart city construction organization has not been fully brought into play, and the government has not attached much importance to smart city construction.

2.2 The smart city collaborative promotion mechanism has not yet been established

In the construction of smart cities, there are bottlenecks such as ambiguity of responsibilities, insufficient synergy, low efficiency, and insufficient overall planning. The key lies in the inadequate innovation of the system and mechanism of smart city construction. Smart cities are a brand-new urban development concept and a brand-new urban operation form. Requires all government departments to use data thinking creatively, break down departmental interests and barriers, share information, and coordinate cooperation. It also requires the joint efforts of the government, enterprises and all walks of life to ensure and support.

2.3 People's livelihood service capacity cannot meet construction needs.

The improvement of people's livelihood services is the starting point for the construction of smart cities. It involves smart education, smart transportation, smart medical care, smart communities, smart culture, etc., which are closely related to life. The ultimate goal is to improve the quality of life of the public and improve the convenience of public life. Since Taiyuan does not have a unified urban data center planning and standards, most of the urban infrastructure libraries are currently in a state of separation, and some still have the problem of repeated construction. Moreover, due to the immature technology and operating mode of cloud computing, the construction and application of cloud platforms is still in its infancy, the actual application level is still relatively low, and the sharing between various cloud platforms is far from being realized.

2.4 Shortage of professional organizations and talents

A smart city is not accomplished overnight, but a complex and huge system project. Errors and problems in any link will affect the entire construction cycle. This requires professional organizations and personnel to track and guide at any time to solve problems in a timely manner. Although Taiyuan City has established a smart city construction leadership group headed by the mayor, it is not a professional organization, and the decision-making is unscientific and the implementation is not in place, which greatly reduces the scientific and rationality of smart city construction. Sex and efficiency.

2.5 Lack of funds needed for smart cities

According to the experience of "smart cities" already under construction, it is difficult to successfully build smart cities without sufficient capital investment. In recent years, the economy of Taiyuan City, which is based on Energy and Heavy Industries, has faced more severe challenges. There are more fiscal revenues and expenditures, less revenue,

limited disposable fiscal revenues, narrow financing channels, and the funds used for smart city construction are decreasing year by year. Intensified the difficulty of smart city construction.

3 Proposals for perfecting the construction of Taiyuan's smart city

3.1 Strengthen the top-level design and clarify the construction ideas.

In the planning and construction of smart cities, we must strive not to follow the trend and blindly follow the trend, and to fully integrate the actual conditions of the region to build a new model of sustainable development of smart cities that suits the characteristics of each region.

3.1.1 Strengthen top-level planning and coordinate construction.

Promote Taiyuan's industrial upgrading and structural adjustment with new technologies and new thinking, establish a new development model with more vitality and potential, and at the same time follow the objective laws and national standards of smart city construction, and use our rich experience in smart city planning to follow technology The law of evolution, the establishment of a smart city expert research group, to provide intellectual support for major project decision-making. Fully understand that the construction of a smart city is a long-term and arduous major project, pay attention to overall planning and overall coordination, and coordinate advancement in a planned and hierarchical manner.

3.1.2 Government guidance and market operation

Give full play to the decisive role of the market, and earnestly bring into play the role of new smart city construction in promoting economic and social development, improving services to the people's livelihood, and improving people's quality of life, and use the application effect as the main indicator to measure the construction effectiveness. Gradually introduce diversified social investment in smart application projects involving people's livelihood to make up for the lack of government financial funds, reduce smart city operating costs, achieve open cooperation, and build a win-win situation.

3.1.3 Put the foundation first and lay the framework.

Complete the government cloud platform construction project as soon as possible, and gradually shift the focus of e-government work from the construction and improvement of infrastructure to the focus on promoting the construction of a security system and data sharing and exchange. Use big data and "Internet +" thinking to promote the adjustment and transformation of urban governance models and economic structures, innovate governance decision-making models, enhance the initiative, accuracy and convenience of urban management and services, and establish new business models, business models and consumption mode.

3.1.4 Resource sharing and clear ownership

Promote the data integration of different industries, systems, and departments, promote the interconnection and interoperability of business systems, and further clarify the possession and use rights of data resources, establish a basic structure of data ownership and use rights, and design corresponding restriction mechanisms. Avoid problems such as duplication of construction, development, fighting each other, and fragmentation that may arise in the construction process. At the same time, it is necessary to establish a number of demonstration projects based on the actual development of the city to promote the construction of application systems in key economic and social fields.

3.2 Improve the organizational structure and establish a departmental linkage mechanism.

Improve the work leadership team with the main leaders of the municipal government as the team leader and the relevant departments as the team members to undertake various coordination tasks for the construction of smart cities.

3.2.1 Strengthen target assessment.

Study the establishment of scientific and reasonable smart city construction goals, and establish a smart city construction evaluation and assessment mechanism. Decompose the construction goals layer by layer and implement them to various departments, regularly organize assessment and assessment of smart city construction and release assessment results, and use the assessment results as the basis for the performance evaluation of government departments at all levels and the assessment of rewards and punishments for leading cadres to ensure smart city projects The construction achieved the expected results.

3.2.2 Strengthen the training of relevant departments.

The construction of a smart city is a complex and huge project that cannot be completed overnight. This requires the continuous improvement of the quality of relevant business departments and the leadership's awareness and attention to the construction of smart cities. By opening training courses

and hiring relevant experts to explain professional knowledge, problems and doubts existing in the current construction process can be resolved. At the same time, by strengthening publicity, encourage the whole society to join the enthusiasm for smart city construction and create a good atmosphere.

3.2.3 Establish a working mechanism for departmental coordination and linkage.

Construct a promotion system that is led by the government, with enterprises and citizens as the main body, market-oriented, and a combination of production, education, research and application. Unify the ideology of all responsible units, enhance the overall awareness and sense of responsibility of all departments, establish a work system where the leaders in charge are specifically responsible, the division of responsibilities is clear, the departments actively and closely cooperate, and complete tasks on time and according to requirements, and promote the construction of smart cities in a planned and step-by-step manner Work to ensure the smooth development of smart city construction.

3.3 Formulate preferential investment policies to solve funding difficulties.

3.3.1 Reasonably choose the investment and financing model.

From the construction of infrastructure, to the interconnection of information between various systems, the upgrade, operation, and maintenance of the city after the completion of a smart city requires a large amount of capital investment, which requires a high level of urban economic development. Taiyuan City can guide social funds to participate in smart city construction through franchising and purchasing services, and encourage qualified companies to issue corporate bonds to raise funds for smart city construction, such as the PPP model.

3.3.2 Formulate preferential taxation and investment policies.

Various projects for smart city construction require a large amount of funds, and the investment return cycle is long. Relying solely on credit from financial institutions is bound to increase the operating costs and liabilities of enterprises. If the government's industry guidance fund takes the lead, formulate preferential tax and investment policies, encourage and guide individuals, enterprises and social organizations with investment intentions to invest in smart city projects and smart industries in the form of direct investment, equity participation, etc., and enrich their financing channel.

3.4 Give full play to geographical advantages and clarify the focus of construction.

Domestic and foreign experience in the construction of smart cities has shown that the effect of full bloom in the construction of smart cities is not obvious. It must reflect its own characteristics and rely on local superior resources to carry out focused construction.

3.4.1 Build a cloud computing integrated computing center.

Establish an operating model of "government building and enterprises taking the stage", strengthen the application of cloud computing in smart markets and smart government affairs, and promote the establishment of Internet data processing centers by communication operating companies.

3.4.2 Improve the construction of urban basic data resources.

A true smart city should include various aspects such as public service management, market economy organization, and citizens' living needs. Therefore, we need to build on our own big data resources and integrate information service data in many fields such as economic society, market development, and residents' lives to promote the construction of smart cities.

3.4.3 Construct a data interoperability carrier.

Promote the unity of data management between multiple fields and organizations, and on this basis, vigorously support the construction of urban data interoperability carriers. Form a government service management sharing and coordination system mechanism with data sharing standards and interfaces, and realize information sharing and business coordination between government departments.

3.4.4 Data management and operation carrier construction

Based on the optimization and improvement of multiple databases and data resources, and establish a consistent standard data management service system. Public release through the data release platform to promote enterprises, scientific research institutions, commercial service units, etc. to provide continuous impetus for the development of urban people, enterprises, and industries, and promote the development of emerging industries in the city.

3.4.5 Full coverage of smart city communication infrastructure construction

The first is to accelerate the construction of the city's data system and build a fiber-optic city. The second is to promote

the full coverage of urban 5G networks. Integrate the data resources of various private networks and general networks, continuously expand the service boundary of Internet government affairs, form an "Internet +" government service mechanism managed by "one network", and promote the full use of e-government service efficiency. Construct a wireless network infrastructure with strong levels, wide coverage, and sufficient service effects, and promote the wirelessization of the urban Internet.

3.4.6 Speed up the construction of urban smart infrastructure.

It is necessary to integrate the information and data resources of various underground infrastructure constructions in the city, such as power supply, water supply, urban heating services, optical cables and other resources. Such integrated resources are the basis for the development of a smart city, and can effectively improve the service level and management level of the smart city.

3.5 Vigorously implement the strategy of bringing in and going out.

The construction of a smart city must focus on long-term development. Technicians cannot only rely on the introduction from outside the region. They can cultivate and produce results on their own to truly serve the long-term construction. The problems encountered at the technical level can be realized through the cooperation of government, school, and enterprise, led by the government; through the integration of the school's faculty, more attractive conditions are opened, such as student settlement, teaching investment, employment guidance, etc. Ways to create convenient conditions for the school; the enterprise invests funds to allow the school’s scientific research achievements and outstanding talents to land in the enterprise. Through the orderly cooperation of the three parties, a win-win situation will be created.

3.5.1 Implement the introduction strategy.

Establish a complete professional talent team, and through the talent "introduction" strategy to attract more high-end compound talents who understand technology and management. In order to further stabilize the professional talent team, it is necessary to provide a multi-faceted guarantee for talents from the aspects of system and mechanism. This guarantee is not only material incentives, but also spiritual encouragement. It is necessary to establish a number of preferential development policies for Only talented people can configure a good atmosphere.

3.5.2 Implement the strategy of going out.

By strengthening "city cooperation", let young cadres or talents in professional fields learn to build better cities intelligently, or ask the other party to send an expert group for guidance to realize talent sharing.

Disclosure statement

The author declares no conflict of interest.

References

[1] Huang C, Peng CC, Su J. Smart governance [M]. Beijing: Tsinghua University Press, 2017.

[2] Green Ben. The Smart Enough City, [M]. New York: The MIT Press, 2019.

[3] Liu J, Chen BS. Public dialogue policy implementation: an important breakthrough for building a service-oriented government [J]. Chinese Administration, 2013, (05): 34-38.

[4] Yu SY, Yang DL. Smart government portal based on big data: from idea to practice[J]. E-government, 2013, (02): 65-74.

[5] Guo XR, Wu XF. Research on the construction model of smart city[J]. Journal of Surveying and Mapping Science and Technology, 2013, (3): 319-323.

[6] Sun XX, Smart City Management: A New Exploration of City Management towards Smart City-Taking Hangzhou as an example [J]. City Management and Technology, 2013, (05): 61-63.

BIQ-BYWORD
SCIENTIFIC PUBLISHING PTY LTD

Author Guidelines

Before your submission, please check that your manuscript has been prepared in accordance to the step-by-step instructions for submitting a manuscript to our online submission system. We recommend that you keep this page open for your reference as you move through the submission process.

If there are any differences in author guidelines between the print and online version, it is recommended that authors refer to the online version for use.

Manuscript Format

[*Journal title*] accepts manuscript that is in MS Word or LaTeX format. All manuscripts must be written in clear, comprehensible English. Both American and British English are acceptable. Usage of non-English words should be kept to a minimum and all must be italicized (except for e.g. and i.e.) If you have concerns about the level of English in your submission, please ensure that it is proofread before submission by a native English speaker or a scientific editing service.

Cover letter

All submissions for [*Journal Title*] should include a cover letter as a separate file. A cover letter should contain a brief explanation of what was previously known, the conceptual advancement with the findings and its significance to broad readership. The cover letter is confidential and will be read only by the editors. It will not be seen by reviewers.

Title

The title should capture the conceptual significance for a broad audience. The title should not be more than 50 words and should be able to give readers an overall view of the paper's significance. Titles should avoid using uncommon jargons, abbreviations and punctuation.

List of Authors

The names of authors must be spelled out rather than set in initials with their affiliations footnoted. Authors should be listed according to the extent of their contribution, with the major contributor listed first. All corresponding authors (maximum 2) should be identified with an asterisk. Affiliations should contain the following core information: department, institution, city, state, postal code, and country. For contact, email address of only one corresponding author is expected within the manuscript. Please note that all authors must see and approve the final version of the manuscript before submitting.

Abstract

Articles must include an abstract containing a maximum of 200 words. The purpose of abstract is to provide sufficient information for a reader to choose either to proceed to the full text of the article. After the abstract, please give 3-8 key words; please avoid using the same words as those already used in the title.

Section Headings

Please number all section headings, subheadings and sub-subheadings. Use boldface to identify major headings (e.g. **1**, **2**, **3**, etc.) and subheadings (e.g. **1.1**, **1.2**, **2.1**, **2.2** etc.) For the sub-subheadings, please distinguish it further using non-boldface numbers in parenthesis (e.g. (1), (2), (3), etc.)

Introduction

Introduction should provide a background that gives a broad readership an overall outlook of the field and the research performed. It tackles a problem and states its important regarding with the significance of the study. Introduction can conclude with a brief statement of the aim of the work and a comment about whether that aim was achieved.

Materials and Methods

This section provides the general experimental design and methodologies used. The aim is to provide enough detail to for other investigators to fully replicate your results. It is also required to facilitate better understanding of the results obtained. Protocols and procedures for new methods must be included in detail to reproduce the experiments.

Ethics

Ethics information, including IACUC permit numbers and/or IRB name, if applicable. This information should be included in a subheading labelled "Ethics Statement" in the "Methods" section of your manuscript file, in as much detail as possible.

Results

This section can be divided into subheadings. This section focuses on the results of the experiments performed.

Discussion

This section should provide the significance of the results and identify the impact of the research in a broader context. It should not be redundant or similar to the content of the results section.

Conclusion

Please use the conclusion section for interpretation only, and not to summarize information already presented in the text or abstract.

Conflict of Interest

All authors are required to declare all activities that have the potential to be deemed as a source of competing interest in relations to their submitted manuscript. Examples of such activities could include personal or work-related relationships, events, etc. Authors who have nothing to declare are encouraged to add "No conflict of interest was reported by all authors" in this section.

Funding

Authors should declare all financial and non-financial support that have the potential to be deemed as a source of competing interest in relations to their submitted manuscript in this section. Financial supports are generally in the form of grants, royalties, consulting fees and more. Examples of non-financial support could include the following: externally-supplied equipments/biological sources, writing assistance, administrative support, contributions from non-authors etc.

Appendix

This section is optional and is for all materials (e.g. advanced technical details) that has been excluded from the main text but remain essential to readers in understanding the manuscripts. This section is

not for supplementary figures. Authors are advised to refer to the section on 'Supplementary figures' for such submissions.

Text

The text of the manuscript should be in Microsoft Word or Latex. The length of the manuscript cannot be more than 50000 characters (inclusive of spaces) or approximately 7000 words.

Nomenclature for genes and proteins

This journal aims to reach researchers all over the globe. Hence, for both reviewers' and readers' ease in comprehension, authors are highly encouraged to use the appropriate gene and protein nomenclature. Authors may prefer to utilize resources such as http://www.ncbi.nlm.nih.gov/gene

Figures

Authors should include all figures into the manuscript and submit it as 1 file in the OJS system. Reference to the "Instructions for Typesetting manuscript" is strongly encouraged. Figures include photographs, scanned images, graphs, charts and schematic diagrams. Figures submitted should avoid unnecessary decorative effects (e.g. 3D graphs) as well as be minimally processed (e.g. changes in brightness and contrast applied uniformly for the entire figure). It should also be set against a white background. Please remember to label all figures (e.g. axis etc.) and add in captions (below the figure) as required. These captions should be numbered (e.g. **Figure 1**, **Figure 2**, etc.) in boldface. All figures must have a brief title (also known as caption) that describes the entire figure without citing specific panels, followed by a legend defined as description of each panel. Please identify each panel with uppercase letters in parenthesis (e.g. A, B, C, etc.)

The preferred file formats for any separately submitted figure(s) are TIFF or JPEG. All figures should be legible in print form and of optimal resolution. Optimal resolutions preferred are 300 dots per inch for RBG coloured, 600 dots per inch for greyscale and 1200 dots per inch for line art. Although there are no file size limitation imposed, authors are highly encouraged to compress their figures to an ideal size without unduly affecting legibility and resolution of figures. This will also speed up the process of uploading in the submission system if necessary.

The Editor-in-Chief and Publisher reserve the right to request from author(s) the high-resolution files and unprocessed data and metadata files should the need arise at any point after manuscript submission for reasons such as production, evaluation or other purposes. The file name should allow for ease in identifying the associated manuscript submitted.

Tables, lists and equations

Tables, lists and equations must be submitted together with the manuscript. Likewise, lists and equations should be properly aligned and its meaning clear to readers. Tables created using Microsoft Word table function are preferred. Place each table in your manuscript file right after the paragraph in which it is first cited. Do not submit your tables in separate files. The tables should include a concise but sufficiently explanatory title at the top. Vertical lines should not be used to separate columns. Leave some extra space between the columns instead. All tables should be based on three horizontal lines to separate the caption, header and body. A few additional horizontal lines MAY be included as needed (example below). Any explanations essential to the understanding of the table should be given in footnotes at the bottom of the table. SI units should be used.

Supplementary information

This section is optional and contains all materials and figures that have been excluded from the entire manuscript. This information are relevant to the manuscript but remains non-essential to readers' understanding of the manuscript's main content. All supplementary information should be submitted as a separate file in Step 4 during submission. Please ensure the names of such files contain 'suppl. info'.

In-text citations

Reference citations in the text should be numbered consecutively in superscript square brackets. Some examples:

1. Negotiation research spans many disciplines [3, 4].
2. This result was later contradicted by Becker and Seligman [5].
3. This effect has been widely studied [1–3, 7].

Personal communications and unpublished works can only be used in the main text of the submission and are not to be placed in the Reference section. Authors are advised to limit such usage to the minimum. They should also be easily identifiable by stating the authors and year of such unpublished works or personal communications and the word 'Unpublished' in parenthesis.

E.g. (Smith J, 2000, Unpublished)

References

This section is compulsory and should be placed at the end of all manuscripts. Do not use footnotes or endnotes as a substitute for a reference list. The list of references should only include works that are cited in the text and that have been published or accepted for publication. Personal communications and unpublished works should be excluded from this section.

For references in reference list, all authors must be stated. Authors referenced are listed with their surname followed by their initials. All references should be numbered (e.g. 1. 2. 3. etc.) and sequenced according to the order it appears as an in-text citation. References should follow the following pattern: Author(s) followed by year of publication, title of publication, full journal name in italics, volume number, issue number in parenthesis, page range and lastly the DOI (if applicable). If the referred article has more than three authors, list only the first three authors and abbreviate the remaining authors to italicized 'et al.' (meaning: "and others").

Journal

Journal article (print) with one to three authors

[1] Yao Y., Xia B. Application of Phase Frequency Feature Group Delay Algorithm in Database Differential Access. Computer Simulation, 2014, 31(12): 238-241.

Journal article (print) with more than three authors

[2] Gamelin F.X., Baquet G., Berthoin S., et al. Effect of high intensity intermittent training on heart rate variability in prepubescent children. European Journal of Applied Physiology, 2009, 105: 731–738.

Journal article (online) with one to three authors

[3] Jackson D., Firtko A., Edenborough M. Personal resilience as a strategy for surviving and thriving in the face of workplace adversity: a literature review. Journal of Advanced Nursing, 2009, 60(1): 1–9,

Journal article (online) with more than three authors

[4] Hargreave M., Jensen A., Nielsen T.S.S., et al. Maternal use of fertility drugs and risk of cancer in children—A nationwide population-based cohort study in Denmark. International Journal of Cancer, 2015, 136(8): 1931–1939.

Book

Book with one to three authors

[5] Schneider Z., Whitehead D., Elliott D. Nursing and midwifery research: methods and appraisal for evidence-based practice. 3rd edn. 2009, Elsevier Australia, Marrickville, NSW.

Book with more than three authors

[6] Davis M., Charles L., Curry M.J., et al. Challenging spatial norms. 2013, Routledge, London.

Chapter or Article in Book

[7] Knowles M.S. Independent study. In Using learning contracts. 1986, Jossey-Bass, San Francisco, 89–96.

Others

Proceedings of meetings and symposiums, conference papers

[8] Chang S.S., Liaw L. and Ruppenhofer J. (eds). Proceedings of the twenty-fifth annual meeting of the Berkeley Linguistics Society, February 12–15, 1999: general session and parasession on loan word phenomena. 2000, Berkeley Linguistics Society, Berkeley.

Conference proceedings (from electronic database)

[9] Bukowski R.M. Prognostic factors for survival in metastatic renal cell carcinoma: update 2008. Innovations and challenges in renal cancer: proceedings of the third Cambridge conference. Cancer, 2009, 115 (10): 2273, viewed 19 May 2009, Academic OneFile database.

Online Document with author names

[10] Este J., Warren C., Connor L., et al. Life in the clickstream: the future of journalism, Media Entertainment and Arts Alliance, 2008. viewed 27 May 2009, http://www.alliance.org.au/documents/foj_report_final.pdf

Online Document without author name

[11] Developing an argument n.d., viewed March 30 2009, http://web.princeton.edu/sites/writing

/Writing_Center/WCWritingResources.htm

Thesis/Dissertation

[12] Gale L. The relationship between leadership and employee empowerment for successful total quality management. 2000, University of Western Sydney.

Standard

[13] Standards Australia Online. Glass in buildings: selection and installation. AS 1288–2006. 2006, SAI Global database.

Government Report

[14] National Commission of Audit. Report to the Commonwealth Government, Australian Government Publishing Service, 1996, Canberra.

Government report (online)

[15] Department of Health and Ageing. Ageing and aged care in Australia, 2008, viewed 10 November 2008, http://www.health.gov.au/internet/main/publishing.nsf/Content/ageing

No author

[16] Guide to agricultural meteorological practices. 2nd edn, Secretariat of the World Meteorological Organization, 2010, Geneva.

Note: When referencing an entry from a dictionary or an encyclopedia with no author there is no requirement to include the source in the reference list. In these cases, only cite the title and year of the source in-text. For an authored dictionary/encyclopedia, treat the source as an authored book.

Submission Preparation Checklist

As part of the submission process, authors are required to check off their submission's compliance with all of the following items, and submissions may be returned to authors that do not adhere to these guidelines.

1. The submission has not been previously published, nor is it before another journal for consideration (or an explanation has been provided in Comments to the Editor).

2. The submission file is in OpenOffice, Microsoft Word, RTF, or WordPerfect document file format.

3. Where available, URLs for the references have been provided.

4. The text is single-spaced; uses a 12-point font; employs italics, rather than underlining (except with URL addresses); and all illustrations, figures, and tables are placed within the text at the appropriate points, rather than at the end.

5. The text adheres to the stylistic and bibliographic requirements outlined in the Author Guidelines, which is found in About the Journal.

6. If submitting to a peer-reviewed section of the journal, the instructions in Ensuring a Blind Review have been followed.

Integrated Services Platform of International Scientific Cooperation

Innoscience Research (Malaysia), which is global market oriented, was founded in 2016.Innoscience Research focuses on services based on scientific research. By cooperating with universities and scientific institutes all over the world, it performs medical researches to benefit human beings and promotes the interdisciplinary and international exchanges among researchers.

Innoscience Research covers biology, chemistry, physics and many other disciplines. It mainly focuses on the improvement of human health. It aims to promote the cooperation, exploration and exchange among researchers from different countries. By establishing platforms, Innoscience integrates the demands from different fields to realize the combination of clinical research and basic research and to accelerate and deepen the international scientific cooperation.

Cooperation Mode

Clinical Workers

In-service Doctors

Foreign Researchers

Hospital

University

Scientific institutions

BIQ-BYWORD
SCIENTIFIC PUBLISHING PTY LTD

OUR JOURNALS

The *Journal of Architectural Research and Development* is an international peer-reviewed and open access journal which is devoted to establish a bridge between theory and practice in the fields of architectural and design research, urban planning and built environment research.

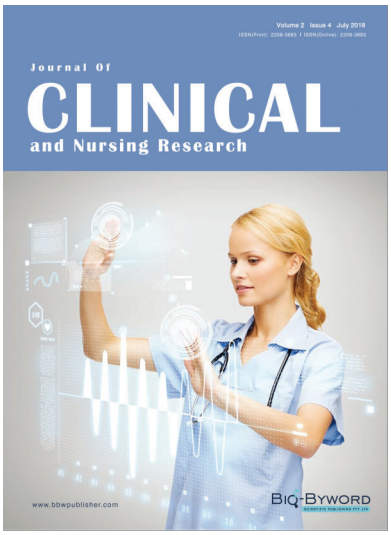
Topics covered but not limited to:

- Architectural design
- Architectural technology, including new technologies and energy saving technologies
- Architectural practice
- Urban planning
- Impacts of architecture on environment

Journal of Clinical and Nursing Research (JCNR) is an international, peer reviewed and open access journal that seeks to promote the development and exchange of knowledge which is directly relevant to all clinical and nursing research and practice. Articles which explore the meaning, prevention, treatment, outcome and impact of a high standard clinical and nursing practice and discipline are encouraged to be submitted as original article, review, case report, short communication and letters.

Topics covered by not limited to:

- Development of clinical and nursing research, evaluation, evidence-based practice and scientific enquiry
- Patients and family experiences of health care
- Clinical and nursing research to enhance patient safety and reduce harm to patients
- Ethics
- Clinical and Nursing history
- Medicine



Journal of Electronic Research and Application is an international, peer-reviewed and open access journal which publishes original articles, reviews, short communications, case studies and letters in the field of electronic research and application.

Topics covered but not limited to:

- Automation
- Circuit Analysis and Application
- Electric and Electronic Measurement Systems
- Electrical Engineering
- Electronic Materials
- Electronics and Communications Engineering
- Power Systems and Power Electronics
- Signal Processing
- Telecommunications Engineering
- Wireless and Mobile Communication