



Science

URBAN INFRASTRUCTURE PROJECTS AND CHALLENGES, RISK IDENTIFYING FOR EMERGING NEW CITIES OF NEPAL

Madhav Prasad Koirala *¹

*¹ Associate Professor, Pokhara University, School of Engineering, Kaski-30, Nepal
ORCID: <https://orcid.org/0000-0003-3649-0198>

Abstract

Nepal is beautiful country. According to new geographical structure there are six metropolitan cities, eleven sub-metropolitan cities. Seventeen cities are already urbanized and two hundred and seventy-six municipalities are also newly emerging cities. The objective of this research is mainly urban infrastructure development, its challenges, explore the problems, identify defective coordination within the interdisciplinary ministry, suggest for integrated infrastructure, to aware risk factors associated during urban infrastructures. The methodology adopted was according to various literature reviews and surveys conducted on the spot. Respondent were selected from concerned authorities, this research shows everyone want affordable housing, public hospital, school, college, university, drinking water, communication, drain and sanitation facilities and wide road are prime needs. It was found the defective procurement policy including various risk factors, a lack of adequate government's act with necessary policies, vision of leader is not globally thinking and locally acting, human resource is not compatible, the poor performance of contractor and consultant, project manager is not being professional and allocating budget is not enough, since one authority built, immediately other authority dig the trench. If government started integrated urban infrastructure projects would better for future and proper risk management plan needs to establish.

Keywords: Urban Development; Projects; Emerging Cities; Developing World and Risk Factors.

Cite This Article: Madhav Prasad Koirala. (2018). "URBAN INFRASTRUCTURE PROJECTS AND CHALLENGES, RISK IDENTIFYING FOR EMERGING NEW CITIES OF NEPAL." *International Journal of Research - Granthaalayah*, 6(12), 97-108. <https://doi.org/10.5281/zenodo.2532343>.

1. Introduction

Nepal is a beautiful country consisting of higher number of rural areas or villages than urban areas or cities. According to new structure, there are six Metropolitan cities namely Kathmandu, Pokhara, Lalitpur, Bharatpur, Birganja and Biratnagar. Similarly, there are eleven sub metropolitan cities namely Janakpur, Ghoorahi, Hetauda, Dhangadhi, Tulsipur, Itahari, Nepalganja, Butwal, Dharan, Kalaiya and Jitpursimara. According to new geographical structure, there are 276 Municipalities and 460 are rural municipalities.

We can see two processes of urbanization: (a) small town development driven by the state and (b) massive inflow of rural-to-urban migrants to large cities. By putting social policy into this context of urbanization, we argue that social policy has not been properly developed to facilitate small town development. On the contrary, it has been used deliberately as a barrier to limit migration to large cities. The results are clear. Small towns are not attractive and often are abandoned. Large cities are under tremendous social pressure (Li & Piachaud, 2006). The plan of government is to execute sustainable infrastructure project management in urban development sectors. There are lot of challenges and risk factors involved in the urban sector. Meanwhile, Department of Urban Development and Building Construction of Nepal has been bringing programs to make modern cities for following Towns, Dhankuta, Mirchaiya, Chandrapur, Kabre Valley, Bharatpur, Waling, Tulsipur, Dullu, Amargadhi, Tikapur. Among them specially following are taking into consideration as Basantapur of Terathum, Phidim of Panchthar, Dumre of Tanahu, Burtiban of Baglung, As discussed above, the newly-formed municipalities lack basic infrastructure facilities. Unified model for urban development is being incorporated in the plan. Along with the plan, the ministry of urban development (MoUD) would have been preparing detailed project report (DPR) of two feasible projects that could be immediately implemented in select municipality. The major aim of DPR must be to facilitate private sector, if any local unit is ready to implement the project. The plan must include some details like long-terms, necessary infrastructure for those units, the possible size of the population and status of the government service in the municipalities. Most of the newly-formed municipalities are lagging in terms of basic infrastructure. So, the government needs to take the initiative to enhance them, eventually the central and the local governments must jointly work for the infrastructure development of the municipalities.

1.1. Beginning

It is obvious that the urbanization is increasing in both the developed and developing countries so, in Nepal, rapid urbanization, particularly the growth of cities, associated the problems of unemployment, poverty, inadequate health, improper sanitation, increasing urban slums and environmental degradation are inviting challenges in many developing countries. It is very important to understand the current trend in urban growth to know if it is sustainable infrastructures considering the accompanying urban challenges.

1.2. Ending

For city governments, the need to increase climate variability imposes additional challenges to effective urban management and the delivery of key services, increasingly affects the lives and livelihoods of residents due to more frequent floods, landslides, heat waves, droughts, and fires. There is an urgent need for cities to consider the assessments of related risks in their planning and management as well as delivery of services.

1.3. Problems

Already established cities need to reform with accessible services and facilities while for new emerging cities, more services need to be introduced by starting urbanizing infrastructure project even if it is challenging and risky. Old cities in Nepal have suffered due to unavailability of fire

fighting vehicles, which in turn is due to unavailable wide road access, no drinking water supply, and inadequate drainage and sanitation service in old cities.

1.4. Objectives of the Studies

Main objective is the issue of urban infrastructure development and its challenges

The specific objectives are:

- 1) To explore the problems
- 2) To identify the lack of coordination within the interdisciplinary ministry or Department
- 3) To suggest for starting the integrated infrastructure project
- 4) To identifying risk factors associated during urban infrastructure Projects

1.5. Limitations

The limitation of this research is validity and reliability in similar urban cities developing countries like Nepal, and one cannot generalize all economically developed countries all over the worlds.

2. Literature Review

2.1. Regarding the Urban Infrastructure Development and Its Challenges

Asian urbanization is becoming more challenging in terms of being unmanageable and unplanned for accessing road, communication, drinking water, sanitation, health facilities. The peoples living in big or old cities are facing unemployment, becoming poor. Various health problems are being faced due to degradation of environment. The global train of population by forecasting for next 30 years is expected to be concentrated in urban areas in the developing world. While much of the current sustainable cities debate focuses on the formidable problems for the world's largest urban agglomerations, the majority of all urban dwellers continue to reside in far smaller urban settlements. Many international agencies have yet to adequately recognize either the anticipated rapid growth of small and medium cities or the deteriorating living conditions of the urban poor (Cohen, 2006). The problems to urban and semi-urban dwellers include technological risks, air, water, and soil pollution, crime, fire, eviction, ethnic and social conflict, accidents, environmental health risks, and a whole, expanding list of natural threats such as flooding, landslides, and earthquakes (Davis, 2010). Over the past 50 years, the south Asian region's urban population has grown by around 300 million people. In 1950, only 18% of the region's population around 72 million people lived in urban areas. But by 2000, 27% of the region around 372 million people resided in urban areas. The latest UN projections suggest that an additional half a billion people will be added to urban areas in South Asia over the next 30 years, presenting a daunting challenge for urban management (Cohen, 2004). First, the historic context of the Valley's uncontrolled urbanization sets the scene. Second, the optic is narrowed to focus upon the geographical features of the resultant urbanized landscape that includes spatial arrangements and of houses, population densities, road networks, vehicular densities, garbage problems, and available open spaces. Also, seismic vulnerabilities is in the urban areas (Bhattraï & Conway, 2010).

2.2. Problems Related to Urban Infrastructures Projects

Some problems are lack of clarity and consistency of national projects, mixed access to designations, project being complex and inflexible approval processes, weak integrated decision-making capacity and Efficiency and adequacy of the land acquisition process. Infrastructure construction, there need to take quick decision which makes success and failure. Multi-criteria decision making analysis arose to model complex problems like these (Espinoa et all, 2014). With its ancient monuments, Kathmandu is an emerging city where several plans and concepts have been implemented for its development. Like many cities of the developing world, the city has been facing rapid population expansion, daunting socio-economic problems and issues of inadequate urban management of expansion, including poor infrastructure and squatter settlements, with severe environmental consequences including air, water and other forms of pollution(Thapa et all,2008) .

2.3. Coordination Defective Within Departments and Related Ministries

Sri Lanka, on the Batticaloa case study as reported in this paper reveals that local governments are facing a number of challenges in contributing to making cities resilient to disasters. Some of the issues that have emerged are inadequate financial and human resource capabilities; a lack of knowledge of disaster risks and vulnerabilities; the need for long-term political commitment; a lack of focus on pre disaster planning; inadequate legislative authority; a lack of clear cut responsibilities and coordination among agencies; and a lack of involvement in major development activities, physical planning and regulation of land use (Malalgoda et all, 2013).

2.4. Integrated Infrastructure Projects

Integrating urban and digital planning, smart cities are being marketed across the world as solutions to the challenges of urbanization and sustainable development. Using the case of Dholera, the first Indian smart city, I examine how global models of smart cities are provincialized in the regional state of Gujarat through local histories, politics and laws (Datta, 2015). The new management approach named “Deep City Method” is put forward to aid decision-makers to integrate global potential of the urban underground into city-scale strategic planning. The research output will be presented in form of two papers each with a different focus. Part 1 aims to introduce the concept, process and initial application in Switzerland; Part 2 is devoted to show methodological insight for a new zoning policy in China and investment scenarios for project cost viability. (Li et all,2013). There are increasing calls for greater policy integration within European policy documents and research programmes. In the area of land use planning, transport and environment policy, there is widespread acceptance that integrating decisions across these sectors is crucial for sustainable development (Geerlings & Stead, 2003).

2.5. Risk Factors Associated during Urban infrastructure Projects

It is difficult for a newcomer to identify new risks in a new environment. It is more difficult to assess these risks and the subtle impact of relationships among them. On the one hand, ignoring these risks is irresponsible, and unrealistic decisions will result. On the other hand, identifying and assessing all the new risks and their relationships is a very complicated, time-consuming and

expensive process. This process is almost impossible for the majority of projects, especially when there are inadequate amounts of information and time (Hhi, 1995). Almost all infrastructure projects are being overrun in terms of either time or amount and thus deteriorated the quality of the projects. New professionals and the experts are teaching, bad trains which must be stopped as soon as possible. This is because of contributed risk factors. No body, either government agency of Nepal or general public take care about this risk factors, due to which the infrastructure projects are losing a lot of quality and money every minute (Koirala, 2017).

3. Materials and Methods

It adopts snowball method for sampling. It has 50 respondents, the main person of related organizations as mentioned above. Surveyor will reach the department, metropolitan and ask questions on the spot. Same person for respondents has been chosen. Observation will be carried out in the respective department's areas where the problems were observed in severity be found first and secondly, literatures will be reviewed to identify the issues to carry out the survey of urban infrastructure projects, challenges and risk factors being volatile.

This study was formulated as an exploratory and descriptive research based on quantitative and qualitative research approaches. So far, there was no study conducted examining the pragmatic approach of urbanization and challenges of infrastructure projects in Nepal

The methodology of the study is described below:

- 1) A thorough literature review was done.
- 2) A questionnaire was developed with the help of information extracted from literature review.
- 3) Distribution and collection of questionnaire.
- 4) Analyze the collected data.
- 5) Relevant conclusions and recommendations were drawn.

The methodology is explained as follows. In the first step, a thorough literature review was performed to identify the key elements that can cause the alteration in the cost of the project. Using those factors then a questionnaire was developed. In this step a structured questionnaire was designed.

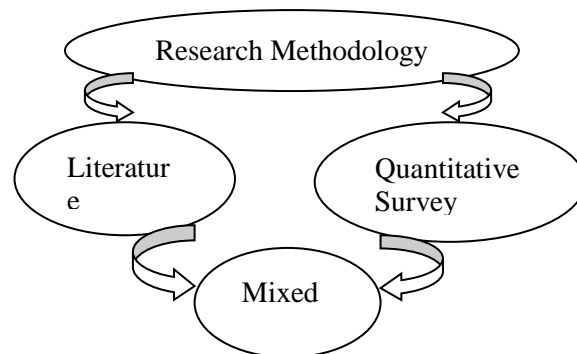


Figure 1 : Conceptual Methodology

In this research the methodology is extensively studying book, Newspaper, research articles and then research questions were prepared after adopting the pilot test. Respondents were selected by snowball system that was.

3.1. Sample

The following were the respondents from the authority were urban water supply department, urban sanitation department, department of urban development and building construction (DUDBC), and following departments related urban environment department, urban road department, urban electricity department, Nepal Telecommunications, Railway department, Representative from Contractors, Representative from Engineering Firm, The metropolitan authority of different six metropolitan cities.

3.2. Research Area

Research are was chosen the Katmandu, Pokhara, Lalitpur, Bharatpur, Biratnagar, and Birganja Metropolitan Cities

4. Results and Discussions

4.1. What is Urban Development and Its Challenges Today

It is asked to the respondents what would be the basic infrastructures while developing sustainable infrastructures projects need to plan during newly urbanized cities?

It was asked on priority based. Researcher had taken the view of 50 participants among them, all said the affordable housing is main asset; forty-nine respondents said public hospital is next and public school to university, Drinking water, Communication, Electricity, Drainage and Sanitation work, Road way-railway are 48,47,46,45,44,43 and 35 respectively

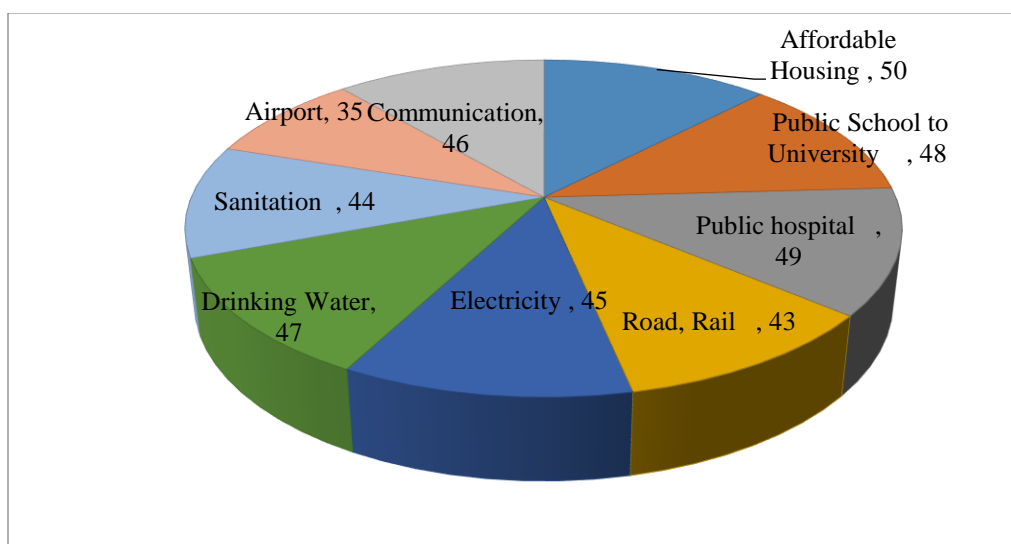


Figure 2: Different infrastructures for urban development

Source: Survey, 2018

From the above figure and the literature reviewed, it can be claimed that before conceptualized the cities primary important infrastructure is affordable housing to the urban people, secondly public hospital access from where urban people can get the treatment affordably and then requirement of public school, college, university infrastructures for teaching and learning purposes. Next important in cities is drinking water supply access to the people followed by communication infrastructure from where urban people can get the access to communicate globally and locally, and then electricity or power access, next drainage and sanitation infrastructure access, then road way or rail way infrastructure access in the cities must link up from where people can travel every day, similarly airport infrastructure access is needed to everyone near the cities.

4.2. Problems in Urban Infrastructures Projects

The respondents were asked about the main problems to perform the infrastructures projects in emerging urbanizing cities in Nepal. Respondent’s Answers are plotted in the Radar chart as given below;

All of respondents have agreed that the procurement rules are defective for being more problematic followed by Vision of government of not being globally thinker and locally acting, Low quality of human resources, Bad performance of selected contractors, Bad performance of selected consultants, Not available the good construction managers, By ignoring the risk management plan and Not enough budget allocation were 50,48,46,44,42,40,38 and 36 respectively.

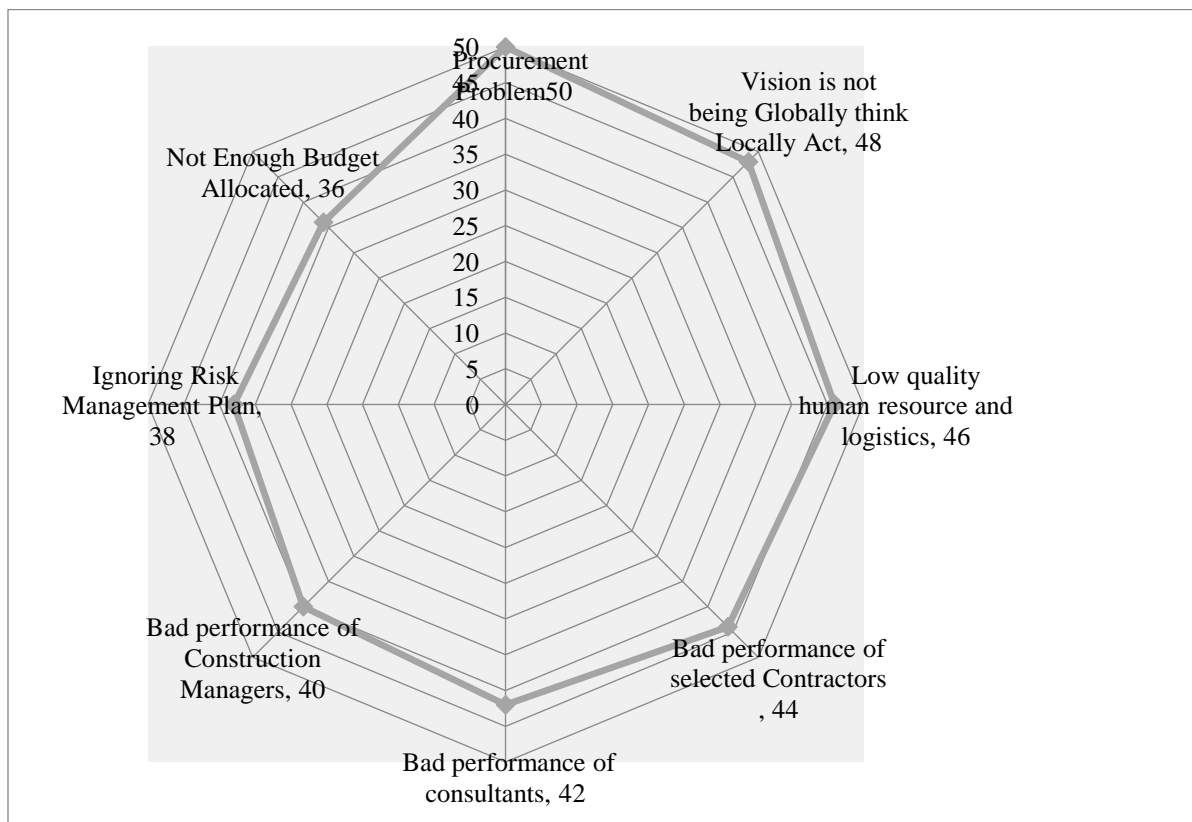


Figure 3: Problems to precede urban infrastructure

Source: (Survey, 2018)

From the above figure and the various literature reviewed it can be claimed that, main problems in urban infrastructure projects procurement policies are not being formulated, lot of construction company or firms are able to participate for performing the urban infrastructure projects but the parameters set with help of federation of construction association of Nepal have already set it so that only companies within top ten can bid for the contract. So we can say they have maintained the syndicate. Small firms cannot participate in bidding procedure. Next problem is that the leaders are not thinking globally and acting locally. The quality with political leader must have both criteria. Here we have globally thinking but not managing. Next problem is that what we produced low quality of human resource. Our school, college and university produce certificate holder human resources with very low quality of performance. Human resources produced by our university are going to Arabian countries and doing an unskilled job. It means our school, college, universities need to restructure according to the demand of technical skill needed to be given particularly to those human resource who are involved in urban infrastructure projects. Next problem is our contractor's performance is very weak or bad. Default contracts are already getting more projects. There is no reward and punishment system. The same thing is being reflected in engineering and consulting. Fresh engineers are going out of country. There is inadequacy of engineers in our country. In the same way other problem is poor performance of infrastructure project manager. Our construction managers need to be re-energized particularly those who are involved in the urban infrastructure construction projects. Next problem is ignorance of risk management plan. National pride infrastructure projects are losing ten of billions rupees due to ignoring the risk management, analyzing and response plan.

4.3. Lack of Coordination within the Department and Ministries

In Several cases department of road (DoR) makes the road, immediately after which department of drinking water (DoDW) dig big trenches. This drama doesn't only remain within DoR and DoDW but department of drainage or sanitation, electricity authority and even telecommunication and cable network authorities too. In this context, the question asked was which departments and ministries are not coordinating with each other? All of respondent said no coordination seen with departments and interdisciplinary ministries and forty-nine respondent said there is no coronation with anyone on department and ministries, forty-eight respondent said no coordination with department of building and with other department, forty-seven respondent said no coordination with department of road and department of water supply. Forty-six respondents said no coordination with department of road and department of drainage and forty-five respondents said no coordination with road and department of electricity.

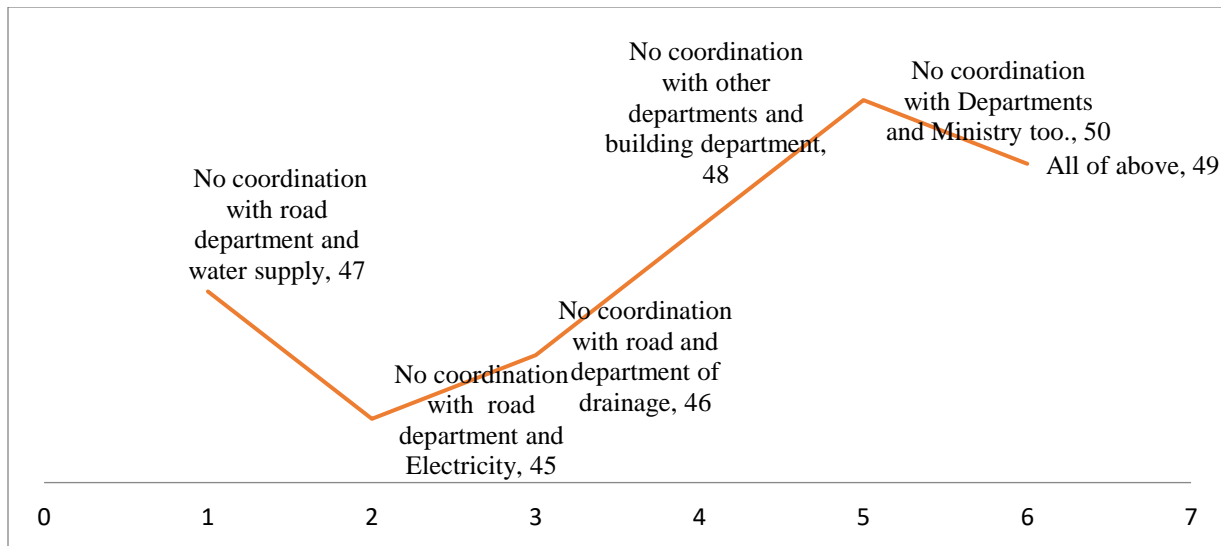


Figure 4: Lack of Coordination for Urban development

Source: (Survey, 2018)

So based on above figure it can be said that there is no coordination with each departments and even with interdisciplinary miniserries which is big problem and has created a challenge to perform urban infrastructure projects on emerging new cities in Nepal.

4.4. How far an Integrated Urban Infrastructure is Good?

Forty-five respondents said an integrated urban infrastructure is suitable in emerging new urban area, and two respondents said it is not good and three respondents said that neither good nor bad depending on the allocated budget we need to perform the urban infrastructure which is traditional system.

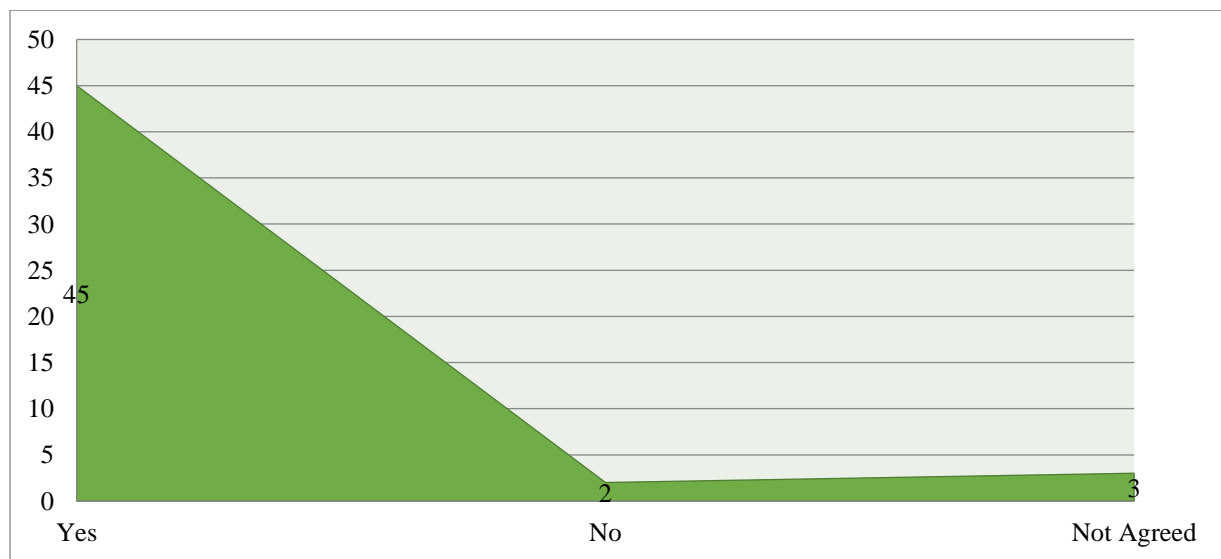


Figure 5: Integrated Urban Infrastructures

Source: (Survey, 2018)

Based on the figure, it is good to proceed the integrated urban infrastructure projects if all things goes in right direction, if budget is not enough traditionally there exists the need to compile it to proceed the projects.

4.5. Identifying Risk Factors Associated During Implementation of Urban Infrastructure

The experts involved in various field were gathered and commenced a focus group discussion regarding risk factors identification and mitigation for them.

Table 1: Risk Factors, Responsibility and Mitigation

S.N.	Risk Factors	Responsibility	Mitigation
1	Legal Risk	Centre and Local Government	Legal policy Framework
2	Financial/Economic Risk	Central and local government	Financial/Economic Policy Framework
3	Technical Risk	Related technical authorities	Technical Policy Framework
4	Socio-cultural Risk	Existing Socio-culture of the society	Socio-cultural policy framework with working environment
5	Political Risk	Unstable government and political code of conduct	Political Policy Framework
6	Human Resource Management Risk	Centre/Local Government and Other organizations	Human resource Policy framework with human resource friendly environment
7	Quality Risk	Centre/Local Government and Other organizations	Quality Policy framework with quality conscious friendly environment

The respondents point out their opinions as mentioned above in the table. They also point out the risk factors, the responsible authority and the mitigation method. Mostly they point out legal risk in first and then financial/Economics, Technical, Socio-cultural, Political, Human resource management and quality risk factors respectively. And the responsible factors were centre and local government for fist and second risk factors and technical authorities, existing socio-cultural society, politically unstable government and centre and local government. They pointed out the mitigation a method was by making respective policies.

5. Conclusions and Recommendations

Nepal needs to improve the problems associated with project implement capacity which needs to be demonstrated to people and the country. Now Service sectors has restructured and six metropolitan cities and eleven sub-metropolitan cities, seventeen are already urbanized. Similarly, two hundred and seventy-six municipalities are also newly emerging cities. Now in the urban area basic infrastructure needs to be established. Everyone wants affordable housing, public hospital, school, college, university, drinking water, communication, drain and sanitation, wide road access. The responsibility of the government is to start urban infrastructure projects. The procurement rules are corruption oriented. Good companies are not interested to work in Nepal. In the name of certain parameters, only the bidding within ten companies of contractors and consultant are allowed. Small companies cannot bid and get projects work even in small package too. Those few

companies which holds almost all of the infrastructure projects have very poor performance. One type of syndicate has been established traditionally. Government of Nepal is not taking actions due to different hidden interests. This research concentrates on the urban infrastructure projects, its challenges, integrated infrastructure project for future and risk factors involved because of it, defective procurement policy, inadequacy of necessary government's policies, vision of leader of thinking globally and acting locally, human resource not being good, the poor performance of contactor and consultant, project manager is not professional and allocated budget is not enough, defective coordination with within inter-government authority since one authority build immediately while other authority hinders the project immediately afterwards. If government started integrated urban infrastructure projects, it would be better for future and proper risk management plan needs to be established. While Nepalese Engineers are building good infrastructure elsewhere in the world, we have not been able to attract the same resources for our infrastructure development, as our incentive system is flawed.

References

- [1] Bhattarai, K., Conway, D., (2010). Urban Vulnerabilities in the Kathmandu Valley, Nepal: Visualizations of Human/Hazard Interactions, *Journal of Geographic Information System*, 2010, 2, 63-84, doi:10.4236/jgis.2010.22012, <http://www.SciRP.org/journal/jgis>
- [2] Cohen, B. (2004). Urban Growth in Developing Countries: A Review of Current Trends and a Caution Regarding Existing Forecasts, *World Development* Vol. 32, No. 1, pp. 23–51, 2004, doi:10.1016/j.worlddev.2003.04.008, www.elsevier.com/locate/worlddev
- [3] Cohen, B. (2006). Urbanization in developing countries: Current trends, future projections, and key challenges for sustainability, *Technology in Society* 28 (2006) 63–80, www.elsevier.com/locate/techsoc, doi: 10.1016/j.techsoc.2005.10.005
- [4] Datta, A (2015) New urban utopias of postcolonial India: 'Entrepreneurial urbanization' in Dholera smart city, Gujarat. *Dialogues in Human Geography*, 5 (1). 3 - 22. ISSN 2043-8206, <https://doi.org/10.1177/2043820614565748>
- [5] Davis, I. (2010). Cities of Chaos international seminar on Urban Risks, Management in South Asia, Launch of Global Campaign on Making Cities Resilient in New Delhi, (8-9 June 2010)
- [6] Espinoza, D.J., Lopez E.C., Hernandez, J.R., Jordanac, J.C.C. (2014). A review of application of multi-criteria decision making methods in construction, *Automation in Construction*, Volume 45, September 2014, Pages 151-162, <https://doi.org/10.1016/j.autcon.2014.05.013>
- [7] Geerlings, H., Stead, D. (2003). The integration of land use planning, transport and environment in European policy and research, *Transport Policy* 10 (2003) 187–196, doi:10.1016/S0967-070X(03)00020-9, www.elsevier.com/locate/tranpol
- [8] Koirala, M.P., (2017). Contribution of Risk Factors for Infrastructure Development of Nepal, *American Journal of Civil Engineering*, Vol. 5, No. 3, 2017, pp. 124-131, <http://www.sciencepublishinggroup.com/j/ajce>, doi: 10.11648/j.ajce.20170503.1,
- [9] Li, B. & Piachaud, D., (2006). Urbanization and social policy in china, *Asia-Pacific Development Journal* Vol. 13, No. 1, June 2006
- [10] Li, H.Q., Parriaux, A., Thalmann, P., Li, X.Z., (2013). An integrated planning concept for the emerging underground urbanism: Deep City Method Part 1 concept, process and application, *Tunnelling and Underground Space Technology*, <http://dx.doi.org/10.1016/j.tust.2013.04.010>, www.elsevier.com/locate/tust,
- [11] Malalgoda, C., Amaratunga, D., & Haigh, R., (2013) Creating a disaster resilient built environment in urban cities The role of local governments in Sri Lanka, *International Journal of Disaster Resilience in the Built Environment*, Vol. 4 No. 1, 2013, pp. 72-94, Emerald Group Publishing Limited, DOI 10.1108/17595901311299017

- [12] Ministry for the Environment, (2010). Building competitive cities: Reform of the urban and infrastructure planning system. Technical working paper. Wellington: Ministry for the Environment. www.mfe.govt.nz
- [13] Thapa, R.B., Murayama, Y., Ale, S., (2008). City profile Kathmandu, issue-1, volume 25, Elsevier Ltd., <http://hdl.handle.net/2241/102252>, doi: 10.1016/j.citie
- [14] Zhi, H., (1995). Risk management for overseas construction projects, International Journal of Project Management Vol. 13, No. 4, pp. 231-237, 1995, Elsevier Science Ltd

*Corresponding author.

E-mail address: [mpkoirala@ pu.edu.np](mailto:mpkoirala@pu.edu.np)/[m.koirala@ unitedtechnicalcollege.edu.np](mailto:m.koirala@unitedtechnicalcollege.edu.np)