

A Thesis on

# **ANALYSIS AND MITIGATION OF RISK IN REAL ESTATE CONSTRUCTION**

Submitted for partial fulfillment of award of

**MASTER OF TECHNOLOGY**

Degree in

**CONSTRUCTION TECHNOLOGY & MANAGEMENT**

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**2019-20**

## DECLARATION

I declare that the research thesis entitled “**ANALYSIS AND MITIGATION OF RISK IN REAL ESTATE CONSTRUCTION**” is the bonafide research work carried out by me, under the guidance of **Mr Rajiv Banerjee Associate Professor, Department of Civil Engineering, Integral University, and Lucknow**. Further I declare that this has not previously formed the basis of award of any degree, diploma, associate-ship or other similar degrees or diplomas, and has not been submitted anywhere else.

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## **CERTIFICATE**

Certified that the thesis entitled “**ANALYSIS AND MITIGATION OF RISK IN REAL ESTATE CONSTRUCTION**” is being submitted by **YASH SHUKLA (1801103016)** in partial fulfilment of the requirement for the award of degree of Master of Technology (CTM) of Integral University, Lucknow, is a record of candidate’s own work carried out by him/her under my supervision and guidance.

The results presented in this thesis have not been submitted to any other university or institute for the award of any other degree or diploma.

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## ACKNOWLEDGEMENT

It give me great pleasure to present my deep sense of gratitude to my guide **Mr. Rajiv Banerjee, Associate Professor, Department of Civil Engineering**. For his valuable support and increasing mentality throughout the project. I am highly obliged to him for providing this opportunity to carry out the ideas and work during my project period and helping me to gain the successful completion of my project.

I also highly obliged to **Dr. Syed Aqeel Ahmad (HOD of department of civil engineering)**. For providing me all the facilities in all activities and for his support.

I pay my respect and love to my parents and all other family members and friend for their help and their encouragement throughout this course of project work.

**Yash Shukla**

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## ABSTRACT

Risks have an important influence in housing, apartment, and real estate project in conceptualizing or pre-planning, planning and implementation of cost, time, and quality. In INDIA valley only, 2000000 housings and apartment units built every year. As the housing and apartment project's complexity is naturally increased, an ability to manage risks throughout the construction process has become a central element to prevent unwanted consequences.

The success rate of real estate project is decreasing as there is large scale of project and participation of entities. It is necessary to study the risk factors involved in the project. This paper focused on types of risks involved in the project, risk factors, risk management tools & techniques. Identification of risk of the project in terms of the total cost of the project has been divided under Technical, Financial, Sociopolitical and Statutory cost centers. Large real estate projects have to tackle the following issues: land acquisition, skilled labour shortage, non-availability of skilled project managers, and mechanization of the construction process to cater to the growing demands. Non- availability of supporting infrastructure, political issues like instability of the government leading to regulatory issues, social issues, marketing forms an important part in these projects as this is a onetime investment and the purchase cycle is long , long development period makes the same project be at different points in the real estate

The overall aim of this research was to explore, analyze, and mitigate the understanding of risk management in the housings, apartments, and real estate projects. Deeper understanding by means of detailed study in pre-planning and planning phase is expected to enhance more effective risk management and, therefore, a better productivity and better quality to be achieved, which creates the satisfactions to builder and buyer of the housing and apartments.

In this research, mixed methods with pragmatist philosophical worldview have been used, which covers ontological, epistemological, and methodological assumptions. Data were collected through in-depth interview as well as the quantitative survey and questionnaire. The quantitative study involved forty housings, apartment, and real estate construction projects running in INDIA and comprised a questionnaire survey and a series of interviews with them. The research participants included Engineer, contractors and consultants involved in these construction projects. Data collection techniques included qualitative survey of reputed developers company. In addition focus group discussions were conducted two times.

No developers were carrying out the systematic risk management during preplanning or planning phase. If they followed then it occurred only during implementation phase. The risk factors were external as well as internal. There were different risk factors in the projects

mainly legal problem, policy framework related problems, political problems, financial problems, economic related problems, technical problems, maintaining qualities problems, human resource problems, social problems, cultural problems and organizational or institutional problems. How risks are accepted, rejected, sheared or reduced between the project stakeholders is largely governed by the project management option and the content of the related contract documents.

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# **CHAPTER ONE**

## **INTRODUCTION**

This chapter focuses on the background of the research sites, global process of urbanization and trend in nutshell, urbanization in regional context, urbanization in Indian context, role of housing, apartment and real estate. Moreover, this chapter includes the role of housing apartment and real estate, housings and real estate in India, the statement of the problems, objectives of the research, delimitations of research, scope, assumptions of the key terms, significance of the study, conceptual framework of the research study, and structural organization of the thesis.

### **1.1 HISTORY OF REAL ESTATE**

In 1948, the United Nations General Assembly approved the universal declaration of human rights (UDHR) by 48 votes, with eight abstentions. The reworded Article 22, now Article 25 of the Declaration, adopted unanimously states (UN General Assembly, 1948): -Everyone has the right to a standard living adequate for the health and well-being of himself and of his family, including food, clothing, and housing. (Gleick, 1999).

Therefore, to acquire housing is his right including food and clothing as basic needs. In the world everyone have right to have his/her own house. Therefore, housing and apartments need to be constructed for each family. During construction of the housing apartment projects a lot of money is being wasted due to not being completed in time as well as not having the specified quality. Time, money and quality problems occur due to the uncertainty of the project, which is called risk that must be managed for productivity. Shelter is one of the basic needs for human beings not only for protection against unwanted environmental event with including hostile weather, but also for maintaining standard of living acceptable to family or even to elevate one's position in the society through enhanced living status. First housing and real estate play the role about to accelerate the economy of the country by getting employment opportunity by unskilled people. Housing and apartment provide shelter to the people.

The Risk in housings, apartments, and real estate are important factors in the Indian economy. A real estate development project starts with an opportunity to construct a new building in which people can live, work, or shop. This opportunity has to be developed from an idea into something real (Gehner, 2008).

Housing, apartment, and real estate sector, providing jobs for the people and real estate business investments contribute more than eight percent to the country's GDP. The real estate sector is one of the most globally recognized sectors. Real estate sector comprises four sub sectors - housing, retail, hospitality, and commercial.

The growth of this sector is well complemented by the growth of the corporate environment and the demand for office space as well as urban and semi-urban accommodations. The construction industry ranks third among the 14 major sectors in terms of direct, indirect and induced effects in all sectors of the economy. By 2040, real estate market to grow to Rs 65,000 crore (US\$ 9.30 billion) from Rs 12,000 crore (US\$ 1.72 billion) in 2019. Real estate sector in India is expected to reach a market size of US\$ 1 trillion by 2030 from US\$ 120 billion in 2017 and contribute 13 per cent of the country's GDP by 2025. Retail, hospitality and commercial real estate are also growing significantly, providing the much-needed infrastructure for India's growing needs. Indian real estate increased by 19.5 per cent CAGR from 2017 to 2028.

## **1.2. CONCEPT OF RISK MANAGEMENT**

Risk management in construction industry is an important part of the project planning and management. Various risks associated with construction projects such as financial risks, environmental risks, socio-economic and construction related risks are studied and dealt in risk management. The impulsiveness and variability of the environment in the construction industry was never hidden from anyone. It's easily influenced by external factors (technical, design, logistics, physical, operating, environmental, socio-political, which are capable of not only derailing projects but can also create an irreparable aberration. Risk management, therefore, becomes a pivotal instrument that helps us deal with the culling out of various risks, their analyses, and the remedial steps that could be taken to avert them in a particular project.

### **Types of Risks in Construction Project Management**

The major risks that usually crop up in front of a project manager while helming a construction project are: financial, socio-political, environmental, and construction related.

#### **1. Financial risks**

Vacillating exchange rates, material costs, market demand, improper estimation, inflation, payment delays, unmanaged cash flow and financial incompetence of the contractor pose a huge threat of financial risks in a project.

#### **2. Socio-Political risks**

Amendments in government laws and regulations, law and order, bribery, payment failure by the government, increase in taxes and change in government form this repertoire.

#### **3. Environmental risks**

Inclement weather conditions, natural disasters, accessibility to the site, pollution and safety norms constitute the environmental risks.

#### **4. Construction-related risks**

Failure of logistics, labor disputes, design changes, labor productivity, rush bidding, time-gap for revision of drawings, shoddy work quality due to time constraints et cetera comprise the construction-related risks.

### **1.3 RISK MANAGEMENT PROCESS IN CONSTRUCTION PROJECT**

Risk management process is nothing but a series of steps that help identify and migrate the risks for the successful closure of a project. If done correctly and sincerely, construction risk management will reduce not only the likelihood of an event occurring, but also the magnitude of its impact.

In the simplest terms, Risk management process is taking preemptive actions to avoid and minimize any kind of jeopardy to a project in future.

**This is how a typical Risk management planning progress**

#### **1. Risk Identification**

##### **Brainstorming**

All the relevant people associated with the project convene and discuss all the aspects of the project comprehensively and raise their ideas and thoughts foreseeing the risks in their perceptions. There is a facilitator who notes it all down and differentiates between the imperative and unnecessary ones.

##### **Delphi technique**

Questionnaires are answered in anonymity by a group of expert panelists in rounds followed with an aim of converging towards one mutual answer by improved judgments after consecutive rounds. The process is stopped after a predefined stop criterion (no. of rounds, stability).

##### **Interview/Expert Opinion**

Experienced personnel and relevant people are consulted for their opinions and advice to avoid factors affecting risk.

##### **Past Experience**

Similar projects are brought up and perused rigorously to identify the factors that could affect the project.

##### **Checklists**

A predetermined list of all the risks that could pose a threat to the project are delved, drawn and juxtaposed from the previously completed projects with analogous criterion.

## **2. Risk Assessment / Analysis**

After all the probable risks have been identified, their valuation is done based on qualitative and quantitative methods. With risk assessment method, available information is used to extricate the frequency of occurrence and the level of consequences in risk management.

### **Qualitative method**

It is usually used for small and medium-scaled projects and involves listing and collating the risks and prioritizing and deprioritizing them as per the opinions of relevant people. The risks are also rated as high, medium or low depending on the collected opinions and risk tolerance boundaries in the organization. Qualitative method is also used when there is not enough data available or when there is some stiff time constraint attached to the project.

### **Quantitative method**

Quantitative methods have to do with analyzing the effect of risks with crunching data and numbers and is used for large projects. Some major Quantitative assessment methods are: Decision tree analysis, expected monetary value, expert judgement, fault tree analysis, fuzzy logic, probability distribution, sensitivity analysis, Monte Carlo estimations etc. Quantitative analysis requires a greater effort as it demands oodles of data for getting a precise and accurate analysis.

## **3. Risk Response**

After identification and assessment of the risks are done, available options to avert the risks are marked and discussed in case they ever crop up in future. Besides opting the apt remedial measures for risks affecting the project, positive opportunities too are gleaned from the risks. Risk response is further subcategorized into Risk avoidance, Risk transfer, risk mitigation and risk acceptance depending upon the nature of the risks.

### **Risk avoidance**

Shunning away from the tasks that involve risks is risk avoidance. Though it's not always possible to avoid the risks this way, it is the simplest way to tackle the risks. In easier terms, steering clear of the parts of the project that may introduce new risks that may endanger the whole project is risk avoidance.

Risk avoidance is most likely to take place where the level of risk is at a level where the project is potentially feasible.

### **Risk transfer**

There are various ways through which one can transfer risks from their projects to the third parties. Purchasing insurance, outsourcing intricate and sophisticated work to an experienced organization, using a fixed price contract instead of unit price contract and the complete removal of warranty and guarantee terms.

### **Risk mitigation**

Reducing the impact of the risks that are inevitable and nontransferable in a project is termed as risk mitigation or risk reduction. Reviewing your project anew, alleviating complexities in procedure, providing additional testing et cetera are some ways through which one can mitigate risks.

### **Risk acceptance**

Every project carries risk in some form. Some risks have to be hauled and made a part of the project with the consensus of all the relevant parties associated with the project. Keeping cost and time factor in view, management authorities must be informed regarding the consequence in case the risk occurs.

### **4. Risk monitoring and control**

To keep a rigorous check on the implementation of Risk identification, Risk assessment and Risk response risk monitoring and control is essential. Along with ensuring the execution of risk plans, it monitors the trigger conditions for contingencies and the probabilities of new impending risks during project execution.

Team meetings and every singly checklist created during the initial stage get pored over by the monitoring authority and corrective actions are taken as per the requirement. Monitoring and control is done throughout the life of the project.

## **1.4 RESEARCH PROBLEM**

Since, awareness of risk and risk management in real estate development is of vital importance yet research on the topic is very limited. The importance of knowledge in of risk management principles in real estate has been pointed out by GRAASKAMP in 1977. While extensive literature exists on risk, and general risk management and a limited amount of empirical data on risk for real estate development projects, research specifically addressing risk management approaches in real estate development is relatively scarce.

An extensive survey conducted by various researchers have concluded that property and portfolio risk are considered as a most under-researched area. The gap between the theory and practice of risk analysis according to GIMPELEVICH (2011), HARGITAY / YU (1993) and SHUN (2000) is particularly wide in real estate development. Furthermore, there is limited research about how professional real estate developers manage with their risky business (GEHNER, 2008).

## **1.5. RISK MANAGEMENT FUNDAMENTALS**

Construction work being risky and complex by nature, there are chance for disputes. Developers are facing the risk due to unclear policy of government. It is observing that some projects are selling even before taking final approval from the authority. Political, social, environmental, technical are being as usual.

Risk is inherent in real estate due to its temporal nature: uncertainty is inherent in anything marked with the passage of time. Real estate risk is more complicated than other asset classes due to the:

- 1) Inefficiency, social nature and dual Space-Time, Money-Time dimensions of the market,
- 2) The capital-intensive, durable and vulnerable nature of individual assets to external forces.

These external forces make real estate vulnerable to unknown forces that can create windfalls (i.e., unexpectedly high returns) or wipeouts (i.e., erosion of capital and exposure to residual risks).

When developing, purchasing or making contractual commitments, decisions regarding commercial real estate are based on a -set of assumptions about the future rather than a set of facts about the current state. These assumptions deal with both the investment elements of the property as an asset as well as its physical or spatial elements as a resource. The asset assumptions operate at property and market levels. At the property level they include rent levels, changes in rents, vacancy rates, rent rolls, lease renewals and operating expenses. At the market level the assumptions include economic conditions, capital flows, investor demand, cap rates, mortgage rates and underwriting terms.

### **Causes of Risk**

Real estate risk exposures can be caused by so many factors that getting a handle on them can be an overwhelming task. To provide some structure to the exercise these factors can be grouped into several major categories

## **1.6 OBJECTIVES OF RISK MANAGEMENT**

The main objective of this research was to analyze the risks and rank them in housing and real estate projects which support the successful application of risk management in construction projects in India. The result of this study are expected to provide useful recommendation for forming and operating effective and in housing and real estate projects both in India and in other similar economies.

Real estate practices, like all businesses, expose themselves to risk just by existing. We live

in a litigious society; even an honest mistake can result in a business getting sued. Someone could be legally, financially, or physically hurt and the agent might be held responsible for it. A wise real estate agent acknowledges that something bad - legally or financially - is going to happen at some point given a long enough time frame. The following objectives were considered for the study:

- To identify, categorize the risk associated with construction projects.
- To validate the results with the help of survey to identify and evaluate the critical risks associated with construction projects.
- To evaluate the practical measures for mitigating these risks.

## **1.7 SCOPE OF STUDY**

Risk has become an integral part of businesses and real estate. However, life has eased out with technological advancement and now managing risks with the help of technology is now simpler than before.

Construction work being risky and complex by nature, there are chance for disputes. Developers are facing the risk due to unclear policy of government. It is observing that some projects are selling even before taking final approval from the authority. Political, social, environmental, technical and dispute risk are being as usual.

Risk Management is a new area of study in India. It is an extremely specialized area focusing on managing risks arising out, therefore following scope of this study are considered which are as follows:

- Identifying the limitation of risk management process in real estate construction which may help in future planning
- Develop a framework for the Risk Management system
- The scope of the study will give a better view on risk management in Real estate construction



## CHAPTER TWO

### LITERATURE REVIEW

**1. He Zhi (1995)**, this paper is based on a case study in china is done, the method used in study was to provide contractors with a supportive frame work for the risk management the implemented method should be supporting a systematic thoughtful process that classify risks, identify risk, assess risk & allocate risk.

**2. Anthony D. Songer (1997)**, Construction risk is generally observed as events that influence project objectives of cost, time, and quality. Risk analysis generally depends mainly on instinct, judgment and experience. The risk elements associated with construction projects influence the time, cost and quality performance of the project. Therefore it becomes a continuing activity in project development from beginning to life of project.

**3. Akintola S Akintoye (1997)**, the construction industry's perception of risk associated with its activities and the extent to which the industry uses risk analysis and management techniques. Therefore, te risk management is essential to construction activities in minimizing losses and enhancing profitability. Construction risk is generally perceived as events that influence project objectives of cost, time and quality. Formal risk analysis and management techniques are rarely used due to lack of knowledge and to doubts on the suitability of these techniques for construction industry activities.

**4. Craig Taylor (1998)**, the design changes and the level of information on functional, performance and output requirements for Private Finance Initiative schemes are major role to the parties involved in this procurement route, the most important factor associated in real estate are design, construction cost, performance, construction delay, cost overrun, commissioning, operation and maintenance, payment and tendering cost.

**5. Filion & Hammond (2003)**, a comparison of different land-use features identifies both the advantages and downsides of each neighborhood's morphology. It becomes difficult in this light to perceive the evolution of neighborhood planning as a linear progression towards improved land-use efficiency and quality of life.

**6. Shou Qing Wang (2004)**, proper identification and evaluation of risk and their effective mitigation measures to develop a risk management framework is very essential part of risk management system, some categorize risk into external and internal risk while other classify risk in more detailed categorize manner like political, financial, market, intellectual, property, social, safety risk, etc.

**7. Ismail, Abd & Chik (2006)**, the wide range of topics that are now representing the domain of construction management is more than emphasis on scheduling, cost control and resource management. They include, but are not limited to, engineering project management concepts, quality management system, environmental management system, and techniques for analysis of the potential success factors. This paper presents the results of a study carried out to identify some of the core issues in construction management which are mentioned above as a skeleton of integrated project management system for construction industry, to better equip middle and top level managers in the construction industry with the state-of-the-art tools, techniques and methodologies of project management.

**8. Mauro Macini (2007)**, a model makes it possible to identify and classify project major risks. The model allows allocating the corresponding risk load to each project element. A transparent allocation of risk to the various project stakeholders represents a correct approach to contract definition during project early phase. The assessment of risk allocation for each project element has a relevant impact from a managerial and contractual point of view, in particular it allows for the identification of project elements affected by possible risk overload and for the identification of project elements affected by possible risk overload and for an effective definition of a suitable set of mitigation actions.

**9. Junying Liu (2007)**, cultural considerations inhibit proper implementation of risk management in construction industry, the perception and attitude of contractors play an important role in developing risk management. The low perception of risk can only be improved by changing enterprise culture, improvement in their competitiveness is to convert the advanced knowledge through organizational learning.

**10. Gifford (2007)**, The consequences of living in high-rise buildings are many. A few may be caused by the building form itself, but many are moderated by non-architectural factors. Chief among these moderating factors are socio-economic status, building location, parenting young children or not, gender, and stage of life. Although they have not been studied empirically in high-rises, whether one has a choice about housing form and indoor population density probably are also important. Irrefutable conclusions about the consequences of living in high rises cannot be drawn, because true experiments are virtually impossible in housing research and because outcomes are determined by multiple factors. Nevertheless, progress can be made through careful studies that use good research methods, and by aggregating studies either qualitatively, as in this review, or quantitatively through meta-analyses, and by more and better theory construction and testing. Unfortunately, research on this topic appears to have slowed considerably.

**11. Dariusz Skorupka (2008)** , the risk analysis consist of verbal and quantitative description,

the specification of risk indicators is directly linked to the construction market , fluctuation in the prices or interest rate also affect the stakeholders to ear proper profit through project, therefore proper structuring of risk is necessary.

**12. Diewert (2009)**, Housing and real estate projects are unique with identical features. The reasons being as follows; various projects are located at various locations (but all projects are unique even though they are located at the same location or the same site) Cost of various projects differs from each other. Group of people who are gathered to carry out the project differ from each project. Housing is the primary example of a unique asset. In addition to the problems outlined in this section, there are other major problems associated with this particular form of unique asset.

**13. Marta Gangolells (2010)**, quantitative methodology that supports designers by providing a way to evaluate the safety-related performance of residential construction design using a risk analysis-based approach this helps us to reduce safety risks effect. Designers can compare construction techniques and system during the design phase and determine the corresponding level of safety without their creative talents being restricted.

**14. Patrick X. W. Zou (2010)**, risk management maturity model (RM3) consists of five attributes-management, culture, risk identification, risk analysis, and systematic risk management and these are measured in a four-level scale, regular reviews on processes and techniques to ensure the quality of risk management application and practice.

**15. Saman Aminbakhsh (2012)**, A safety risk assessment framework is presented based on the theory of cost of safety (COS) model and the analytical hierarchy process (AHP). The framework provides a decision tool for the decision makers to determine the adequate accident prevention investment while considering the funding limits. In the framework, the AHP served as a tool for checking and reducing the inconsistencies of safety risk assigned by the expert. The framework decomposed the decision problem into a hierarchy of more easily comprehended sub-problems that enhanced assignments of weights to the criteria and sub-criteria.

**16. Hariharan Subramanyan (2012)**, In India construction sector, the problem start with the inception of the projects. The preconstruction, execution, and post construction planning in many cases are found to be unrealistic where project suffer from schedule related risk and associated risk of cost escalation leading to dispute. There is no unified construction law in India and all contracts in India are governed by Indian Contract Act 1872.

**17. Yang Chang-Richards (2013)**, It is very essential to understand the relationship between project organization and risk management. It is very essential that project managers always plan for the uncertainties involved in a project. In relation with this, he needs to write a risk plan,

obtain consensus from the team members on how to handle these risks and other unexpected events that might happen that can hinder the project.

**18. Kinnaresh Patel (2013)**, In this study, Time and cost management need to be fully integrated with identification process. Time constraints and project managers with sufficient experience are critical when identifying the level of risk for large and complex project. The brainstorming technique is most efficient method of risk identification in the Indian construction industry.

**19. Sun Qiyo (2014)**, The major risk associated in the real estate in aspect of Indian scenario are financial risk, construction risk and demand/product risk, these risk lead to delay in the completion of project. Project risk management is not just developing the plan, recording these risk strategies on file and sharing it occasionally. Risk management is an undertaking wherein it is important that members know how to deal with them when they happen.

**20. Samuel Taylor (2014)**, the contractual risk plays a crucial role in risk management, transfers are agreements between cooperating entities defining who should shoulder responsibility in the case that losses are incurred because of the deal. This can be done through: Having one party compensate for losses taken by another party. Restricting the amount of damages that can be pursued.

**21. Dariusz Skorupka (2014)**, this paper is based on the study of identification and quantification of construction risks based on the Polish market .The risk analysis consists of verbal and quantitative description. Risk indicators are dependent on the type of project and its environment, several indicators could repeat in construction project, therefore fully mitigation of risk cannot be achieved.

**22. Athony D. Songer (2014)**, As per recent trends alternative procurement methods such as design-build, construction management and privatization increased the use of evolving methods which produces higher level of uncertainty with respect to long term performance. Risk Analysis tools provide improved information for pre-project decision making and performance outcome.

**23. Shen Jian-fei (2014)**, Engineering projects are large-scale, technically complex, object-oriented, long-period, risky and susceptible to construction time and fund which lead projects to be quite possibly influenced by natural and social environment and other factors. In this paper a case study is done on residential construction project and the data was collected and after that it was utilized the expert investigation method and fault tree analysis method is used for mitigation of risk.

**24. Tsz-Ying Chan (2014)**, This paper describes the development process of a Web-based RM3

(risk management maturity model), including its application. The RM3 model has five attributes namely, management, risk culture, ability to identify risk, ability to analyze risk, and its application of standardized risk management process.

**25. Kumar Neeraj Jha (2014)**, Interpretive structural modeling (ISM) has been used to present hierarchical model showing the interrelationship between the risk factors Fourteen important risk factors have been identified through literature survey and interaction with industry experts.

**26. Hariharan Subramanyan (2014)**, This paper has made an attempt to analyze the risk condition in the construction industry by meeting experts in the field to collect first-hand information as a first step towards risk assessment by a questionnaire survey and to further for AHP (Analytical Hierarchy Process).

**27. Kimberly Wylie (2016)**, The different methodology of risk identification techniques in the construction industry. The construction industry was specialized into industrial construction, infrastructure and heavy construction. The research carried out through questionnaires survey within the construction industry. Risk significant index method, they had analyzed the collected data. A three-point rating scale was chosen to differentiate the risks. Finally, it was identified the current used methods for risk assessments were Brainstorming, checklist, flowchart, Delphi method, Risk significant index method.

**28. Jaroslaw Konior (2017)**, The risks which were identified in two ways for better decision making. Using the work break down structure the level of risk was determined. Through questionnaires survey they collected necessary data. With the help of the brainstorming session questionnaire was prepared. SPSS software was used to analyze the risk. They investigated that financial risks and construction risk were most influenced risk in Indian construction.

**29. Satish Kumar Vishwanathan (2018)**, This research describes risk assessment and management in construction projects and their methodology is to study depend largely on the survey questionnaire from contractors and project manager by email or personnel meeting. The research seek out the risk factors that affect the performance of bridge project and analyze by using appropriate tools and technique like bar charts were subjected to the software of SPSS, time and finance management factors analysis of t-test and ANOVA were calculated and tabulated to develop a risk management framework.

**30. Tae Soo Kimb (2019)**, The key factors of risk in construction industry through mock reviews. many factors influenced risks in construction were analyzed through pilot study, which include experts of academicians, government sectors and construction industry were interviewed, and interviewed experts obtained twenty two evaluation criteria as the key factor. This approach

provides a more effective, accurate and organized decision support tool.

**31. Satish Kumar Vishwanathan (2019)**, the application of factor analysis to identify correlated risk mitigation measures extracted three mitigation risk factors , namely pre-project planning, local participation and contract selection. Therefore the success of construction firms carrying projects significantly depends on how the risk stem from country condition are managed.

**32. Nicola Miglietta (2019)**, the structuring intertextual coherence process specifically, the synthesized coherence tactical approach. It draws heavily on theoretical evidence published, mainly, in the corporate finance and the business management literature.

**33. Yang Deng (2020)**, the collapse of real estate prices has historically jeopardized banking stability and triggered systemic banking crises. Modelling the real estate-related asset as a common exposure of banks to the real estate market, a theoretical framework will be useful for revealing the mechanism that triggers systemic banking crises after a real estate price shock.

**34. Nitya Rao (2020)**, The study leveraged technology to study the brand discovery behavior of real estate website users in India. The authors looked at essentially modified processes such as the brand experience journey, specifically, the sources and antecedents of brand awareness for real estate websites. Considering the fact that direct and indirect traffic to a website is indicative of the brand awareness metrics, the authors analyze the metric as a basis of the comparison.

**35. Mousa (2020)**, The risks that use to appear in construction projects during housing conceptual, planning and implementation phases in project life cycle is dealing in best manner. Risk is defined as an exposure to the consequences of uncertainty. Risk can be defined as an uncertain event or condition that, if it occurs, has a positive or a negative effect on a project objective.

# CHAPTER THREE

## METHODOLOGY

### 3.1 INTRODUCTION

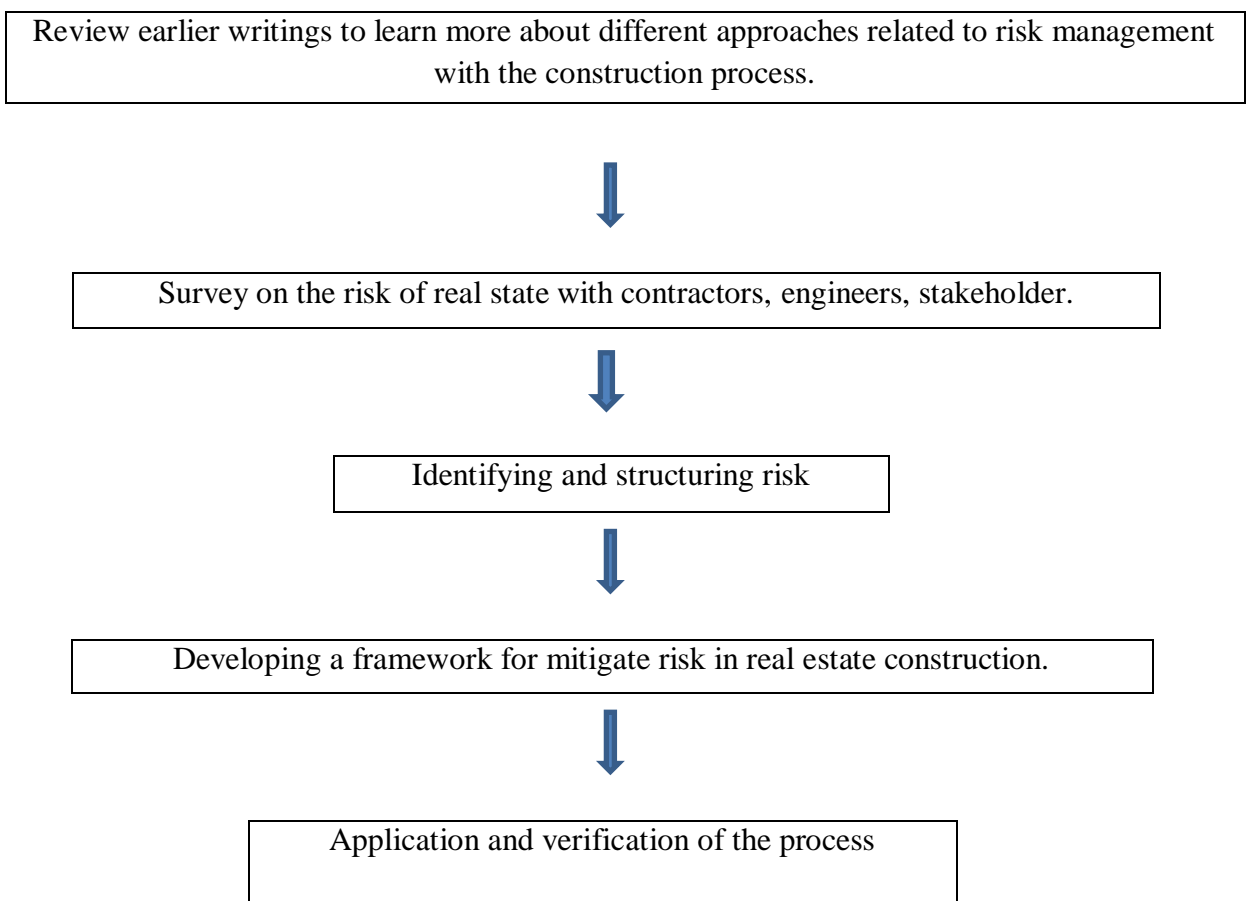
This chapter deals with the research methodology of my study. The research's purpose for this study was to explore the risks in housings, apartments, and real estate, analyzing the risks, mitigation and develop the recommendation for Risk Response Plan of my research methodology. It includes the philosophical consideration of mixed methods, nature of research and research design. Moreover, the general characteristics of paradigms, nature and source of data, area of the study, rationale for selection, population and sampling are covered in this chapter. This chapter also contains the data collection techniques, tools used for data collection data processing and data analysis and interpretation techniques, validity and reliability of data and ethics in my research.

Real estate development is considered to be the most risk taking enterprise in the construction industry. This research presents the results of an explorative survey of the top representatives of the Indian real estate development sector on the usage of risk management. The survey is based on in-depth interviews to gain insight of the real estate development process, the risks involved, and the risk analysis and control methods used. With regard to risk analysis, it was found that real estate developers do not make use of probabilistic techniques; scenario analyses are thought of as most applicable because of the complexity of real estate development; several methods to assess the total risk exposure are used; and intuition and experience are necessary for decision-making. The characteristics of the real estate development process and the best practices concerning risk management will be used to develop an improved risk management method for real estate development.

Engineering projects are large-scale, technically complex, object-oriented, long-period, risky and susceptible to construction time and fund, which lead engineering projects to be quite possibly influenced by natural and social environment and other factors. The result is that parties involved in these projects are inevitably facing several sorts of risks. A construction project is a risky procedure, and if parties involved don't guard against these risks, it is likely to affect the progress of construction and even bring about serious consequences. In recent years, housing prices rise over fluctuation and there tends to be more housing supplies and less land reserves. Coupled with stricter estate tax and credit policies, the risk degree of real estate industry is greatly increased compared to the previous. Parties involved in real estate are eager to learn that

what the hell the risks and its influence are and how to analyze and control these risks. Based on this demand, we conducted a questioner survey on the risk management of real estate's development and construction projects. Overviews of project risks Project risks refer to the ones occur during the project's whole life, that is, all the uncertainties creating loss. Risks can be divided into different types from different perspectives. They can be separated as basic risks and specific risks according to the scope involved. Or they can be divided into natural, social, political or economic risks in basis of the reasons risks occurring. In addition, risks can be split into property, personal and liability risks. Identification of project risks the essential task of project risk identification is to shift the uncertainties to understandable risk descriptions. As a systematic process, risk identification has its own activities. The process is generally divided into five steps, that is, determine the target, define the most important parties, collect data, estimate risk situation and identify the potential risks reflected by direct or indirect symptoms.

These are steps to apply for methodology of risk management in construction industry i.e. real estate.





### **3.1.1 Literature review**

In this phase of literature review, I have gone through various general, books, website to get the idea related the risk management in construction industry which further help me to complete my work. It is provide the knowledge that the analysis and mitigation of risk is done in real estate construction.

### **3.1.2. Questionnaire Design**

The survey questionnaire is a measurement tool to find out the views and opinions of specific group about certain subject. The need for accurate and quick flow of information has become very critical and the surveys are used to collect information from the sample of individuals. The questionnaire provides the major source of knowledge. In this study, two questioner were formed one for the analysis of factors which effect the real estate sector and the other one for mitigation purpose in which various association and department of real estate are considered.

### **3.1.3. Data analysis/ result**

So further going to ahead my project with analysis work with the help Statistical Package for the Social Sciences (SPSS) is determine the relative importance of the factors that affected project success of Real estate projects. So, therefore a questioner was formed to study factors that affect most on the real estate construction

## QUESTIONAREY FORMAT

Dear Respondent,

This questionnaire has been designed to analyze and mitigate of risk in real estate. The study is being conducted by the student pursuing an M.Tech program at Integral University. This study is done only for academic purposes and your response will not be used for any other purpose. Participation in the survey is voluntary. Each question is having choices and you have to tick only one choice. There is no right or wrong answer; you have to pick the choice you agree the most with. Kindly ensure that none of the questions is missed and you answer them to the best of your knowledge.

Your participation is highly appreciated.

Thanks and Regards

Yash Shukla

Q-1: What do you represent?

- 1) Government agency
- 2) Building contractor
- 3) Civil engineering contractor
- 4) Consulting engineering
- 5) General contracting
- 6) Property developer
- 7) Project management consultancy
- 8) Investment company

Q-2: What is your Designation?

- 1) Construction Manager
- 2) Managing Director
- 3) Resident Engineer
- 4) Manager
- 5) Technical supervisor
- 6) Project Chairman
- 7) Other

Q-3: Would you mention age group (in yrs)

- 1) Less than 35
- 2) 35-45

3) 45 or above

Q-4: Would you mention your years of experience in construction industry/business?

1) Less than 5

2) 5 to 10

3) 10 or above

Q-5: May I know your education status?

1) Less than diploma certificate level

2) Diploma certificate level

3) Bachelor level

4) Master level

5) Ph. D level

**Table no 1**

	Practically ignored(1)	Seldom used(2)	Moderately used(3)	Highly used(4)	Extensively used(5)
Q1) Does improper time management affect the real estate industry?					
Q2) It is a common belief that some hidden payment helps expediting the planning approval process?					
Q3) Does improper Influence in real estate lead to risk?					
Q-4 Does HR strategies impact on performance and productivity of the real estate?					
Q-5 Does the improper Human resource management affect the real estate industry?					
Q-6 Does financial Risks have impact affect the real estate?					

	Practically ignored(1)	Seldom used(2)	Moderately used(3)	Highly used(4)	Extensively used(5)
Q-7 Does Political risk is considered in real estate?					
Q-8 Available and use of Modern/New technology have impact of technological Risk in real estate?					
Q-9 Does construction risks have impact on the real estate?					
Q-10 Are the risk in real estate construction play major role in construction?					

## QUESTIONAERY SURVEY -2

Dear Respondent,

This questionnaire has been designed to analyze and mitigate of risk in real estate. The study is being conducted by the student pursuing an M.Tech program at Integral University. This study is done only for academic purposes and your response will not be used for any other purpose. Participation in the survey is voluntary. Each question is having choices and you have to tick only one choice. There is no right or wrong answer; you have to pick the choice you agree the most with. Kindly ensure that none of the questions is missed and you answer them to the best of your knowledge.

Your participation is highly appreciated.

Thanks and Regards

Yash Shukla

Q-1 Which of the following authorities take more time to get permission for executes the Joint apartment, Housing and Real Estate Project?

- (A) Lucknow Development Authority
- (B) Town Development Committee
- (C) EIA/IEE Authority
- (D) Air traffic Control Authority
- (E) Department of building

Q-2 Which of the following according to you influence make in term of risks?

- (A) Lack of Regular meeting of Board of Director
- (B) Periodic review of Board of decision
- (C) Undefined or ad-hoc Organizational structure HRM
- (D) Lack of Job Description
- (E) Lack of Budgeting & Cash flow Management

Q-4 Which of the following HR strategies impact most on performance and productivity of the projects

- (A) Acquisition the manpower
- (B) Develop the manpower
- (C) Retain for better manpower

Q-5 Which of the following factors pose more financial Risks?

- (A) Frequent changes in Government's Financial policy
- (B) Lack of Promoter's Cash flow management
- (C) Response of the clients to the Project more the Supply/Demand

Q-6 Following activities have impact of housing and real estate in minimizing Socio-Political risk?

- (A) Non-implementing of rule and regulation
- (B) Local people put unnecessary demands when project is under constructing
- (C) Un due pressure from sister organizations, cadres of the political parties including donations
- (D) Political influence of trade union strike, luck out
- (E) Strike called by different political parties
- (F) To grow industries political stability is needed which is raising an agenda by National land and Housing Association of India

Q-7 Available and use of Modern/New technology have impact of technological Risk?

- (A) Lack of Technical Knowledge to operate it
- (B) High cost of project because of New technology
- (C) High operating cost
- (D) Inadequate analysis of Geo-technical strata
- (E) Inadequate or unrealistic rate analysis

Q-8 Which of the following factors contribute to the construction risk?

- (A) Absence of weak feasibility report
- (B) High cost of project because of new technology
- (C) High operating cost
- (D) Inadequate analysis of Geo-technical strata
- (E) Inadequate or unrealistic rate analysis
- (F) Absence or weak feasibility study
- (G) Suitable or effective Design
- (H) Unsuitable of defective Planning
- (I) Unavailability of Skilled/Trained manpower
- (J) Non availability of Construction Equipment
- (K) Non adherence to proper safety measures
- (L) Cadastral survey risks

Q-9 Which of the following tools are you using to assess the risk in your project?

- (A) Check list
- (B) Physical inspection
- (C) Analysis of available records
- (D) Brainstorming
- (E) Delphi technique
- (F) Expert interviews
- (G) Risk Breakdown Structure
- (H) Root cause identification and analysis
- (I) PERT technique
- (J) SWOT analysis

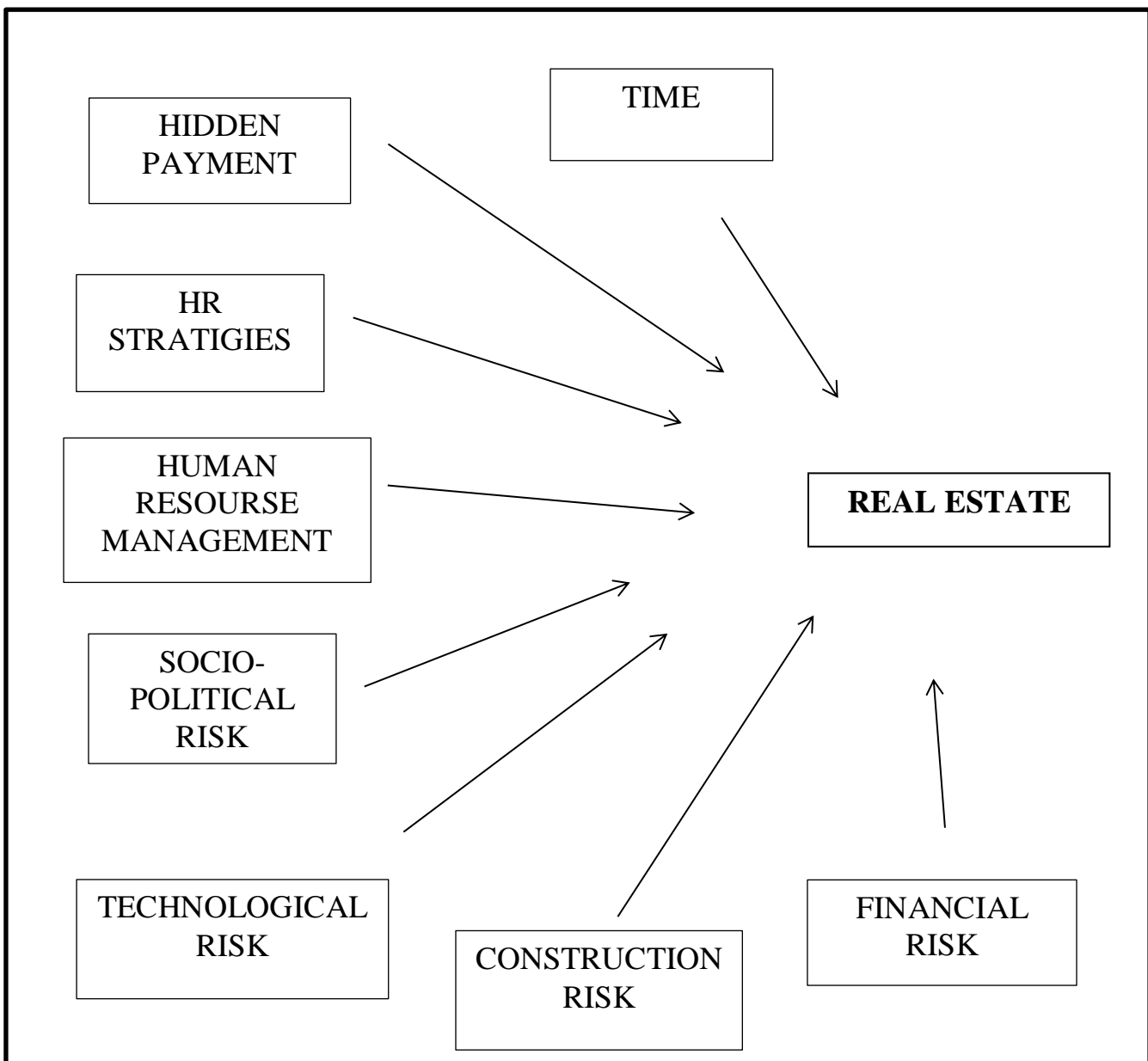


**Quantitative Analysis** - It is defined as investigation of phenomenon by collecting quantifiable data and performing statistical and mathematical operation on that data.

**Survey questionnaires**

Developing a questionnaire which includes questions like how the real estate is affected by various factors like time, hidden payment for approval, HR strategies, construction risk, Financial Risk, Socio-Political risk, technological risk, etc.

**FIG 1- Research model**



# CHAPTER FOUR

## DATA ANALYSIS

### 4.1 INTRODUCTION

In this thesis work the Statistical Package for the Social Sciences (SPSS) software was used to analyze the statistical data which was collected by the questionnaire survey other than that complete statistical tests can also perform in this software. The collected data from the questionnaire survey will be analyzed by using Statistical Package for the Social Sciences (SPSS) software so as to carry out the data analysis in this research. SPSS is used by market researchers, health researchers, survey companies, government entities, education researchers, marketing organizations, data miners, and many more for the processing and analyzing of survey data.

### 4.2 STATISTICAL PACKAGE FOR THE SOCIAL SCIENCES (SPSS)

It is the set of software programs that are combined together in a single package. The basic application of this program is to analyze scientific data related with the social science. It is revolutionary software mainly used by researcher, students which help them process critical data in simple steps. Working on data is a complex and time consuming process, but this software can easily handle and operate information with the help of some techniques. These techniques are used to analyze, transform, and produce a characteristic pattern between different data variables. In addition to it, the output can be obtained through graphical representation so that a user can easily understand the result. Read below to understand the factors that are responsible in the process of data handling and its execution.

Following process have been done in the study which are as follows:

**1. Data Transformation:** This technique is used to convert the format of the data. After changing the data type, it integrates same type of data in one place and it becomes easy to manage it. You can insert the different kind of data into SPSS and it will change its structure as per the system specification and requirement. It means that even if you change the operating system, SPSS can still work on old data.

**2. Regression Analysis:** It is used to understand the relation between dependent and interdependent variables that are stored in a data file. It also explains how a change in the value of an interdependent variable can affect the dependent data. The primary need of regression analysis is to understand the type of relationship between different variables.

## **Benefits of Using SPSS for Survey Data Analysis**

The advantages of using SPSS as a software package compared to other are:

- SPSS is comprehensive statistical software.
- Many complex statistical tests are available as a built in feature.
- Interpretation of results is relatively easy.
- Easily and quickly displays data tables.
- Can be expanded.

### **4.3 TESTING THE DATA**

Constructs – an idea or theory containing various conceptual elements, typically one considered to be subjective and not based on empirical evidence is known as construct in this study the construct are time., hidden payment for approval, HR strategies, construction risk, Financial Risk, Socio-Political risk, technological risk

In the study the independent variable is are time., hidden payment for approval, HR strategies, construction risk, Financial Risk, Socio-Political risk, technological risk –and the dependent variable is Real estate

**Questionnaire Design:** Survey

**Sampling Technique** – Convenience Sampling

**Sample Size:** 60 Respondents in Questionary-1 and 42 Respondents in Questionary-2

**Population** – Mixed population of all ages and demographics.

**Non-Probability Sample.**

**Sampling Unit:** Individuals

## **Regression**

Regression discusses the impact of one or more variables on other variables. It is an advanced technique as compared to Correlation. Regression follows three assumptions:

Correlation is an Interdependence technique. Regression is a dependent technique.

Regression Analysis – Widely used for Prediction and Forecasting.

- Dependent – Real estate
- Independent – time., hidden payment for approval, HR strategies, construction risk, Financial Risk, Socio-Political risk, technological risk

## **4.4 WEIGHTED AVERAGE METHOD –**

- Data of all these tables were analyzed by a weighted average was calculated for each type of claims as follows;
- Weighted Average Index =  $(W_i \times X_i) / N$ ;
- Where, W is the weight assigned to the  $i^{\text{th}}$  option;
- X is the number of respondents who selected the  $i^{\text{th}}$  option

## **4.5 RII INDEX METHOD-**

- Data of all these tables were analyzed by a RII Index was calculated for each type of claims as follows;
- RII Index =  $\sum W / (A \times N)$
- Where, W = weight given to each factor by the respondents, ranges from 1 to 5,
- A = highest weight (i.e. 5 in this case)

	Practically ignored (1)	Seldom used(2)	Moderately used(3)	Highly used(4)	Extensively used(5)	TOTAL	weighting	RII index	rank
Q1) Does improper time management affect the real estate industry?	2	8	18	24	8	60	208	0.693	6
Q2) It is a common belief that some hidden payment helps expediting the planning approval process?	1	8	12	23	16	60	226	0.753	1
Q3) Does improper Influence in real estate lead to risk?	1	6	24	19	10	60	211	0.703	5
Q-4 Does HR strategies impact on performance and productivity of the realestate?	2	2	22	22	12	60	220	0.733	3

	Practical ly ignored( 1)	Seldo m used( 2)	Moderate ly used(3)	Highl y used( 4)	Extensive ly used(5)	TOTA L	weighti ng	RII inde x	ran k
Q-5 Does the improper Human resource management affect the real estate industry?	0	7	21	23	9	60	214	0.713	4
Q-6 Does financial Risks have impact affect the real estate?	2	8	21	24	5	60	202	0.673	8
Q-7 Does Political risk is considered in real estate?	1	4	14	30	11	60	226	0.753	1*
Q-8 Available and use of Modern/New technology have impact of technological Risk in real estate?	1	7	24	19	9	60	208	0.693	7

	Practical ly ignored	Seldo m used( 2)	Moderate ly used(3)	Highl y used( 4)	Extensive ly used(5)	TOTA L	weighti ng	RII inde x	ran k
Q-9 Does constructio n risk have impact on the real estate?	1	6	18	21	14	60	221	0.73 6	2
Q-10 Are the risk in real estate constructio n play major role in constructio n?	1	7	19	23	10	60	214	0.71 3	4*

**TABLE NO – 2 (RII INDEX TABLE)**

**TABLE NO-3(RANKING TABLE)**

FACTORS	RANK
Improper time management affect the real estate industry	6
It is a common belief that some hidden payment helps expediting the planning approval process	1
Improper Influence in real estate lead to risk	5
HR strategies impact on performance and productivity of the real estate	3
Improper Human resource management affect the real estate industry	4
Financial Risks have impact affect the real estate	8
Political risk is considered in real estate	1*
Available and use of Modern/New technology have impact of technological Risk in real estate	7
Construction risk have impact on the real estate?	2
Are the risk in real estate construction play major role in construction	4*



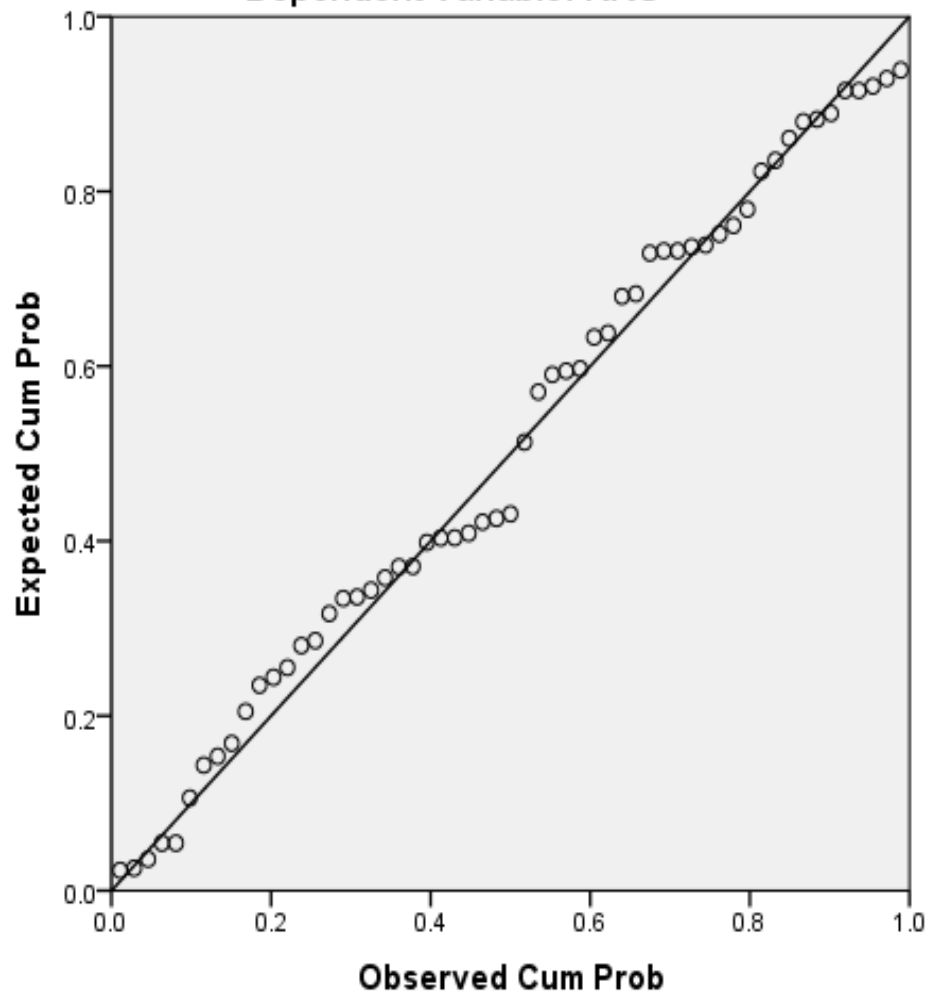
**TABLE NO-4(SPSS REGRESSION TABLE)**

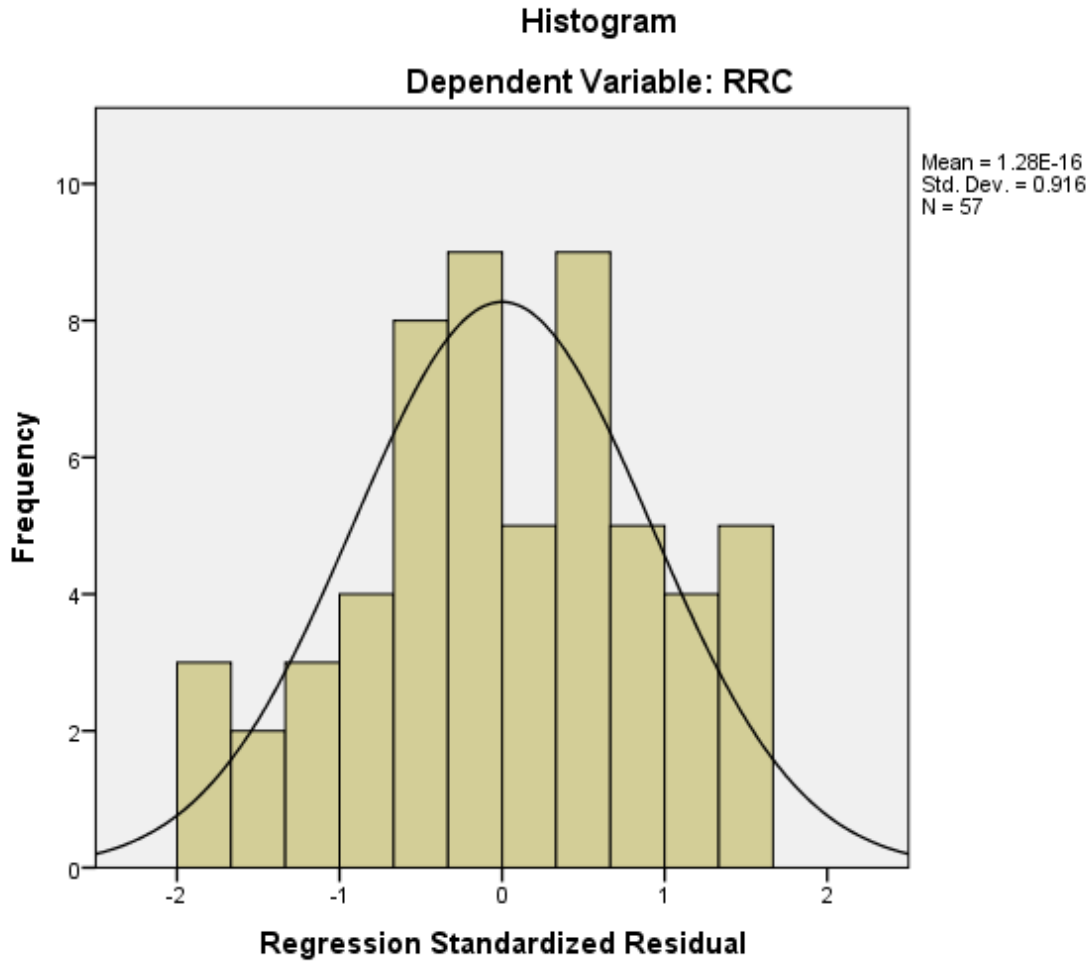
Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	1.540	.841		1.830	.074		
T	-.143	.140	-.151	-1.017	.314	.739	1.353
HP	-.023	.120	-.026	-.189	.851	.870	1.150
R	.142	.155	.143	.918	.364	.674	1.484
HRS	-.038	.154	-.039	-.249	.804	.649	1.540
W	.013	.149	.013	.090	.929	.796	1.257
FR	.019	.157	.019	.122	.903	.652	1.534
P	.213	.183	.201	1.167	.249	.549	1.823
TR	.158	.142	.162	1.111	.272	.770	1.298
CR	.212	.144	.228	1.470	.148	.674	1.483

a. Dependent Variable: RRC

### Normal P-P Plot of Regression Standardized Residual

Dependent Variable: RRC





**Where;**

**T** : TIME

**HP** : HIDDEN PAYEMENT

**R** : SAFETY RISK

**HRS:** HR STRATIGIES

**W** : HUMAN RESOURCE MANAGEMENT

**FR** : FINANCIAL RISK

**P** : SOCIO-POLITICAL RISK

**TR** : TECHNOLOGICAL RISK

**CR** : CONSRUCTION RISK

**Interpretation –**

- $RS = 0.005 < 0.05$ , hence we reject the null hypothesis.
- $P = 0.066 > 0.05$ , hence we accept the null hypothesis.
- $U = 0.351 > 0.05$ , hence we accept the null hypothesis.
- $CVP = 0.639 > 0.05$ , hence we accept the null hypothesis. .

## **RESULTS AFTER RUNNING SPSS**

- From the analysis, we conclude that TIME, HIDDEN PAYEMENT, SAFETY RISK, HR STRATIGIES, HUMAN RESOURSE MANAGEMENT, FINANCIAL RISK, SOCIO-POLITICAL RISK, TECHNOLOGICAL RISK, CONSTRUCTION RISK has impact on real estate.
- The CRM software which provides improved data capture, real-time reporting and fast issue resolution improved business.

## **RECOMMENDATION FOR MITIGATION OF RISK THAT OCCUR IN REAL ESTATE**

Majority of contractors and construction managers in construction industry are unaware of formal risk management techniques. In light of this finding, it is imperative to educate these professionals about risk management, and thus a formal and informal system of risk management training needs to be developed. Graduate level education in construction project management should be used to provide formal education on the topic. Informal education could be provided by career development programs and trainings, like risk management awareness programs. Such trainings can be organized by academic institutions or professional organizations such as Engineering Council, Institute of Engineers, public sector organizations and engineering universities. Providing such education will yield long term benefits and will be considered as a step in the right direction

**1- ) TIME:** The Indian real estate sector has been hit hard due to the COVID-19 pandemic and the subsequent lockdown that was enforced to curb the spread of this virus. It has brought the construction of real estate projects to a grinding halt with uncertainty looming over completion of projects, supply chains, labour availability and liquidity.

Recently, real estate projects have got a six months extension in the completion dates under RERA, and another three months can be given if the project needs it for completion. The government has given this extension to de-stress real estate developers and help them in the completion of projects.

Since time plays a vital role in real estate therefore delay lead it to various losses to the industry/Firm, according to study done in my second questioner survey most of the people responded on the department of building. The department of building can be understood that the work done before the execution work which consists of various components like surveying, planning, design work, acquisition & purchasing of land, etc.

- ❖ It will not take more than one week by an engineer even manually to give the planning permit. However, they are taking not less than 3-month, which is affecting in completing the project on time
- ❖ Authorities should remove such time consuming work as soon as possible. Particularly, planning permit work need to be easy, transparent and less time consuming.

**2- ) HIDDEN PAYEMENT :** When buy a house we look forward to affordable home prices, good housing loans and lower mortgage rates, etc. However, you miss out on many other pinches that are involved in this complicated process of buying a house. These hidden costs raise the quoted price of the property, and the buyer ends up shelling out a lot more money than planned. Many times buyers jump into a deal considering only the base price quoted by the builder or the seller without thinking about various hidden home charges like stamp duty and registration charges, maintenance deposit, brokerage, parking space fee, interiors, service tax and preferential locality charge.

Besides, a crackdown on black money has made the cost of capital costlier in the black economy with the lending rates having risen to as high as 34%, from about 24% a year ago, as per the study by Ambit Capital Research. It said the size of the India's black economy expanded rapidly over the 1970s and 1980s, but since then had been contracting at a gradual pace and is now estimated at dollar around 20% of the country's GDP.

Builders continue to ask for a hefty cash pay-out in property and land purchases forcing customers to either drop plans or raise cash from other sources. And all this is happening when large property markets with established realty developers are moving towards cheque payment in a big way. Smaller cities like Ahmedabad, Ranchi, Patna, Bangalore Chandigarh, Jaipur, Noida, Lucknow, Aurangabad, Kochi, Indore, etc. There are still witnessing large-scale usage of cash in property sales

Therefore, a strict action should be taken on this scenario by the GOI and state governments like If a owner is found guilty then he/she should be fined with a certain amount like paying about 20-40% value of the project to the government as penalty this will create a fear in developer to take hidden payment and the revenue will increase leading to increasing in the GDP.

- ❖ A strict action should be taken on this scenario by the GOI and state governments like If a owner is found guilty then he/she should be fined with a certain amount like paying about 20-40% value of the project to the government as penalty this will create a fear in developer, government staff to take hidden payment and the revenue will increase leading to increasing in the GDP.
- ❖ Various hidden home charges like stamp duty and registration charges, maintenance deposit, brokerage, parking space fee, interiors, service tax and preferential locality charge.
- ❖ Change in the law will also help to reduce the hidden payment in the real estate sector like making punishment of about 10-15 years if found guilty under the court.
- ❖ Creating e-portal will also help to reduce this factor up to certain limit.
- ❖ E-Tendering will be very usefull.

**3- ) HR STRATIGIES:** The HR has various responsibility for a firm which include recruitment, learning & development, performance appraisal, compensation, and succession planning.

Knowing that an employer is open to flexible working is great for employee morale and engagement, and is a sign that your organization understands that employees have lives outside of work, and that you trust them to manage their time and workloads appropriately. As well as potentially cutting down on time spent commuting, and financial and environmental costs, the ability to work from home (or other locations) also gives employees the opportunity to do the deeper work that they might struggle to complete in a busy office environment.

- ❖ In a recent study by researchers at the University of Warwick, a boost in employee happiness led to a 12% increase in productivity, while unhappy employees were found to be 10% less productive. Commenting on the findings, we find that human happiness has large and positive causal effects on productivity. Positive emotions appear to invigorate human beings. Skilled worker should be hired in the association to increase the quality of work.
- ❖ Sign that your organization understands that employees have lives outside of work, and that you trust them to manage their time and workloads appropriately.
- ❖ Human happiness has large and positive causal effects on productivity, In a study it stated that employee happiness led to a 12% increase in productivity,. Positive emotions appear to invigorate human beings.

**4- ) FINANCIAL RISK:** The Indian real estate sector is collapsing due to increasing costs of financing Real estate projects in India take a long time to complete due to a complicated regulatory mechanism. Several of India's publicly traded real estate firms are in debt. The inventory of unsold real estate assets is growing and it is expected the market will undergo price corrections. According to the Mumbai-based market research agency, Liases Foras, 30% of the transactions in the real estate sector are done with black money. There is no doubt that properly planned and executed real estate leverage strategies will result in profits for investors. The trick is to be sure that your behaviors are all the right ones, and the research is sound. These risk reduction strategies will help the real estate investor to minimize the chances of a losing investment. Look for a Property that You Can Improve Profitably Increasing the value of a property via improvements increases equity and results in greater profits upon liquidation of the asset.

Out of the total capital available for investment, assign amounts in different class of investment such as debt, equity or mix of both depending on growth requirements of capital. In case an individual starts investment at an early age, then investing in equities offering higher returns over long duration of investment would mitigate volatility and inflation risk.

- ❖ Foreign direct investment (FDI) in India has long been recognized to be instrumental in the economic development of the country. India's FDI has increased exponentially with gradual liberalization of the economy post-1991, culminating in a boom post-2000. With the paradigm shift in its foreign investment policy, India has become one of the most attractive FDI destinations in the world, drawing nearly \$99 billion in investment from 1991 to 2008, therefore more improvement in FDI will also help to improve current scenario in the real estate in India Change in the rates of the material effect the budget of the project therefore some comprises are done in the quality
- ❖ Increase in the interest rates lead to financial risk therefore a fix rate or decrease in the interest percentage done by government should be helpful for developer.
- ❖ Delay in the approval of project also lead to the increase in the cost of the project therefore the delays by government employee should be reduced.

**5- ) SOCIO-POLITICAL RISK :** In recent years, with the rapid development of national economy, real estate industry also begins to develop rapidly and presents a good momentum of development. However, at the same time, the risk of the real estate investment increases higher and higher. Therefore, decisions about the real estate project investment should not only consider the benefits, but also predict the risk accurately. The benefits and risks exist at the same time, the greater the benefit, the greater the corresponding risk. Many domestic and foreign scholars and economists are very concerned about this problem

- ❖ Absence of political stability, creating the security condition, the law and order is questionable, therefore a stable government helps completion of the project
- ❖ Developers were suffered from political reasons. Almost all the political parties, their sister organizations, their cadres threatened and tortured physically and mentally to the business organizations and housing companies. So they had to donate or support financially in the name of their program, therefore this lead to increase in the cost of the project

**6- ) TECHNOLOGICAL RISK:** It's no surprise to say that technology is having a significant impact on the workplace and the use of corporate real estate. The fast pace of change has seen technology impact all aspects of business, government and culture, as well as personal life, with a constant flow of new innovations and solutions helping us to do things more quickly and efficiently. Equally, technology also provides a challenge to business and, more specifically, corporate operations, with a whole array of disruptive technologies.

Technology thus defined, influences real estate through three different routes. First, by affecting the production function for the inputs to the production of real estate product. Examples of such "upstream" inputs include piping and insulation, specialized construction labor, and financial capital. In each case the net result is increased efficiency of the factors of production, which in return lowers the cost of production. Second, by altering the production function for the real estate product. This means that some amount of the land, labor, and capital are combined in new ways 3 that allow a higher level of production at equal or lower cost. This shift in the production function reflects the application of technology to the construction and operation of real estate. An example is the development in the 1960's of construction management techniques that allowed for the more efficient development of commercial buildings. Third, by affecting the production functions of tenants and unrelated firms.

The long operational life of real estate means that new technologies are slow to replace the old. The car fleet, for example, has been entirely replaced with new cars in just one or two decades. For real estate with its operational life of sometimes over 100 years, this process is a lot slower. The addition of new technologies to an existing building is also costly. Although this sometimes does happen, upgrading the total stock is slower than for other goods. When making improvements to leased real estate, for instance making this more sustainable, there is also a problem of 'split incentive'. If it's mainly the tenant who profits from the sustainability investments, the incentive for landlords to invest in this is low

- ❖ Long operational life of real estate means that new technologies are slow to replace the old therefore developer avoid for purchasing of the new equipment or machinery
- ❖ Less people have knowledge to operate heavy machinery, therefore the cost of there operation is also affect the construction work, so skill enhancing program should be



organized by developers

- ❖ The cost of the equipment's are very high therefore small developers take that for rent purpose and sometimes that are unavailable therefore it leads to the delay in construction work.

**7- ) HUMAN RESOURCE MANAGEMENT:** Construction is physically dangerous work. Unsafe conditions on a job site regularly lead to serious injury, even death. According to OSHA, fatalities on construction sites accounted for a full 20.7% of total workplace deaths in 2017.

Beyond the cost of human life, any serious injury on the job site can be costly for developers. Work on a project will likely halt for a day at minimum, putting the project behind schedule and leading to costly rescheduling and delays. Then, lawsuits seeking compensation for injury or death could result in costly settlements and the need for crisis management. What if there was a way to drastically reduce the number of deaths and injuries that occur on the job site? Despite the safety precautions and regulations already in place, 42% of all construction worker fatalities are the result of falling. In many cases, that risk can be cut drastically by technology. For example, construction drones can document and inspect structural elements in dangerous or precarious places, limiting the amount of time workers spend in unsafe situations.

Small changes to standard operating procedure can make a big difference, too. Take Multivista's 3D image technology, which comprehensively captures construction progress with measurable images that are accessible from the cloud. Something as simple as having precise in-image measurements on hand of in-slab or in-wall systems before they were covered, for instance, prevents the need for destructive verification (thereby limiting risk and project delays).

Placing fine on worker on not wearing safety equipment's will help to reduce the serious injury, even death of the worker. Construction is physically dangerous work. Unsafe conditions on a job site regularly lead to serious injury, even death. According to OSHA, fatalities on construction sites accounted for a full 20.7% of total workplace deaths in 2017.

- ❖ Our human resources are not involved for research and development work. They are not able to make cost effective project by optimizing the construction materials.
- ❖ Construction drones can document and inspect structural elements in dangerous or precarious places, limiting the amount of time workers spend in unsafe situations.
- ❖ Placing fine on worker on not wearing safety equipment's will help to reduce the serious injury, even death of the worker.
- ❖ 3D image technology will help to identify critical points in the site.

## CHAPTER FIVE

### CONCLUSION

#### 5.1. INTRODUCTION

This chapter concludes provides insights into the major findings of the research. It further provides recommendation in Risk Management in real estate. I have included the major findings of the research on risk in housing and real estate in India. Housings and apartments give shelter to the citizens. Shelter is the basic need after the foods and clothes. Thus, housings and apartment units are important commodities developers need to construct the housing units and supply in the market. Before supplying market, constructors are facing various problems associated to cost, time and quality. Thus, this research is concerned with inquiring the uncertain event in housing and real estate during pre-planning, planning, and implementation phases in Nepal. Due to various risk factors housing, apartment projects are being stagnated in India. Different research scholars expose that risk factors create constraint the productivity of investors as well as in the economy of the country that affects the socio-economic status of its people of Nepal. The housing market is made up of the production, buying, selling, leasing, and renting of homes, and the financing for all such purposes. The value of homes and neighborhoods when they are initially built attracts some kinds of residents more than others, thereby influencing the demographic and socio-economic character of particular neighborhoods.

Housing sector is providing employment opportunity to the citizens as well as contributing in national GDP. Therefore, if housing sector can survive they will contribute their skill, knowledge, and revenue, if not no contribution. Every business leads loss, profit, and every activity deal with positive and negative aspects. Developers are not doing any research and development work for their professional enhancement. Government's authorities are not cooperative with developers and they are taking long time for the approval. On the other side the government does not endorse the related acts and related policies to make transparent, responsible, and competitive to the regulation procedure. Buyers are not enquiring the housing and apartments about its quality, safety, and reliability. But they are running wherever the housing and apartments units are cheaper. Stakeholders, government, developers, and buyers all are from vicious circle and food, clothes and housing are the primarily basic need to everyone.

## **5.2. CONCLUSIONS**

Our culture is very different from east to west and north to south. Environment from south to north is cold to hot. Migration from rural to urban and urban to developed countries is the characteristics of the world. India is not far from that principle. According to Central Bureau of Statistics 2001, with an average annual urban growth rate of 6.65% and as per national population censuses survey 2011,

India's population is 135.26 crores (2018). An official Indian audit report in 2014 said that the annual rate of construction for the five years under the Congress-led government was 1.65 million homes. But under the current BJP government that figure had improved to 1.86 million houses a year for the period from 2016 to 2018. Thus, government, developers and buyers all need to be cooperative, transparent and responsible to meet the challenge.

The research survey pointed out that the real estate companies faced rising complexity in risk management and risk access when cloud computing was not adopted. It was seen that there was complexity in the customer relationship management when there was lack of technology adoption. There was reduction in the pace of the business development for real estate companies that had not adopted the cloud computing technology.

Lack of effective technology diffusion in real estate sector is found to cause several limitations in logistic operations such as difficulties in handling the construction material. It also reduces the operational efficiency in the sector

Analysis of primary data also showed that the lack of effective technology adoption increased the complexity involved in managing data related to the operations. It is also found from the data analysis that the lack of technology adoption

Pace of development in the sector is also found to be declined due to the lack of risk Management. It is conclusive that the organizations in the real estate sector need to embrace technological development in order to improve the organizational growth in the real estate sector.

## **5.3 IMPLICATIONS**

In reality, everyone believes the truth that housing is a basic need of all people weather it is affordable or not. If not affordable then rent the small room and fulfill our basic need, which is dependent on the accessible of resources. Our population is growing and migration is taking place from rural to urban and urban to developed countries. Housing and apartment units provide for shelter to people, employment to unemployed and contributes in national GDP.

## **For Government**

Of course, government is the responsible body to provide shelter to its entire people. In developed countries, shelter is people's human right. In our country, the government need to responsible to provide the houses and apartment unit for each family. Government need to make the policy framework to provide the housing by means of providing employment or cooperative model. Economically high level of income group and medium level of income group they can afford themselves. Normally during construction period electricity and fuel need to be provided to the industries in the case of shortage. Reward for good work and penalty for carelessness enhance economic growth. There is also need of transparent act and policies related to housing and apartment. The Joint Apartment Act, 1997, building by-laws must be restructured. The policies need to be formulated and implemented with the help of developers and private sectors like consultants, contractors, investors and suppliers. For the low level of income group and marginalized level of income group, government can subsidize tax and land could be provided freely. Local materials, cost effective and purpose for fitness might make up these types of houses. Political consumes is needed for this work. Some of the representatives who gave the approval were taking hidden (covert) money from the developers for such work who violets the rule of law, need to be punished.

## **For Developers and Experts**

Naturally, Housing, apartment and real estate business are more risky compared with other business. Risk management need to carry out properly during the pre-planning and planning phases, which enhance in project implementation. Indian housing apartment and real estate projects are changing on existing work plan and priorities cause the loss of the productivity. Tight project schedule creates risk because of uncertainty of implementation. The output of cheaper technical team cannot expect sound risk management so developers are advised experienced, skilled and hardworking technical team to assign the projects. It is said that this time is for quality work so carefully quality need to be achieved. Developers invest their skill and experience with necessary equity. They must be responsible, accountable, and transparent with their client. Organization of the project should be effective and should haves decision-making capacity for overcoming the risk. Inadequate specification creates terrible risk in the project. During survey in projects, developers were taking advance money with their clients and did not hand over the housing units on time. Such works is not fair and does not maintain reputation.

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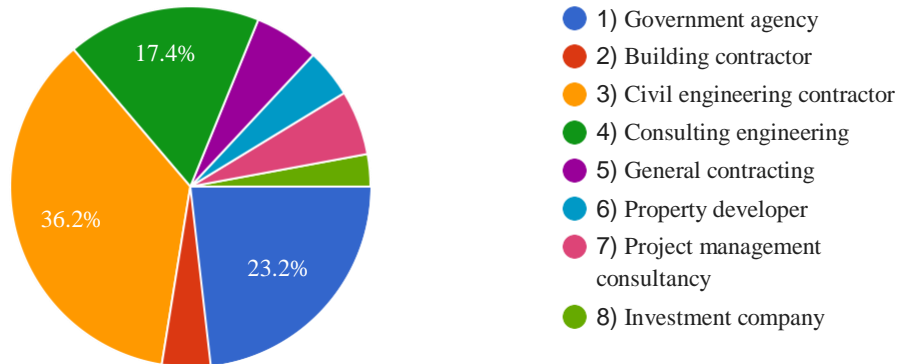
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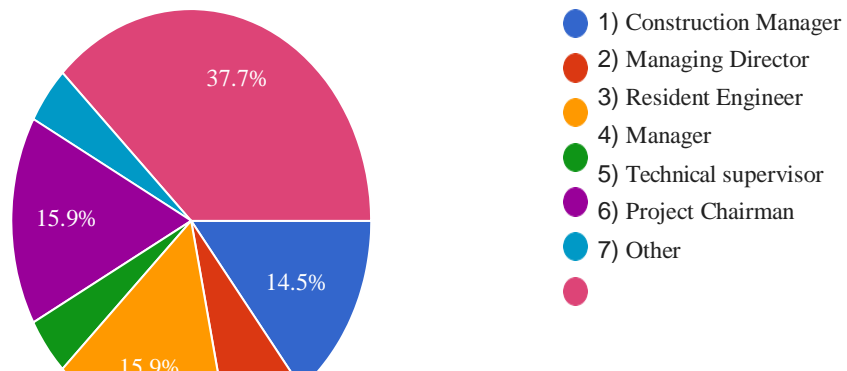
## APPENDIX-1

### DATA OF QUESTIONARY FORM 1

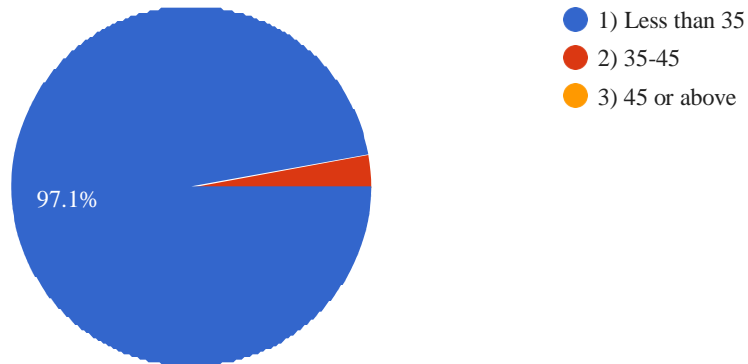
Q-1: What Do you represent?



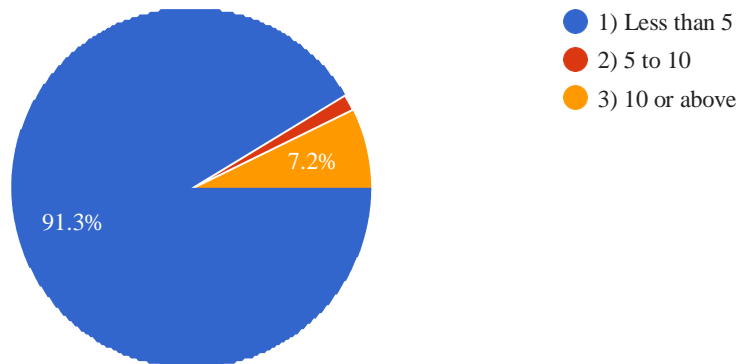
Q-2: What is your Designation?



Q-3: Would you mention the age group (in yrs)

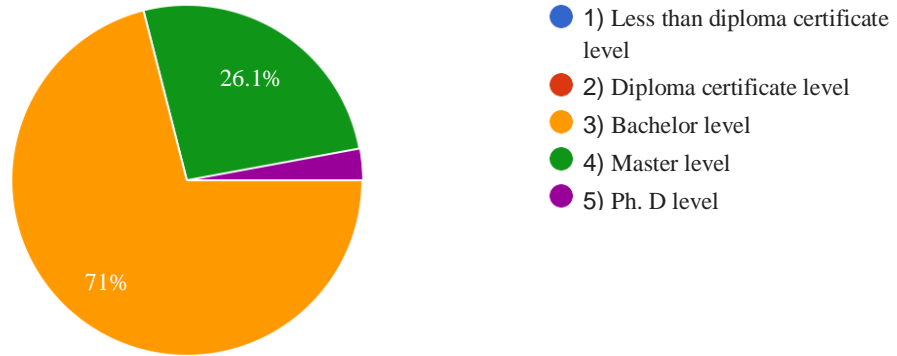


Q-4: Would you mention your years of experience in the construction industry/business?



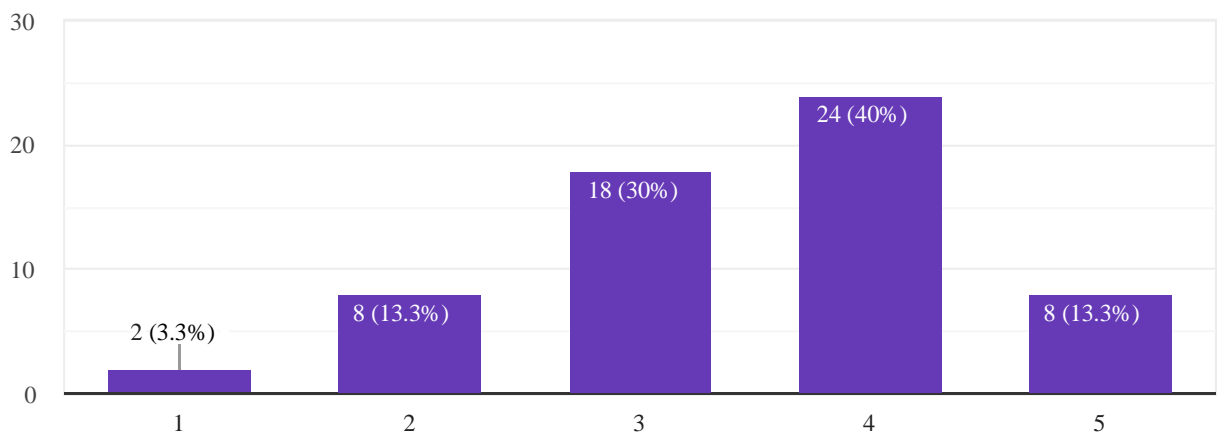


Q-5: May I know your education status?



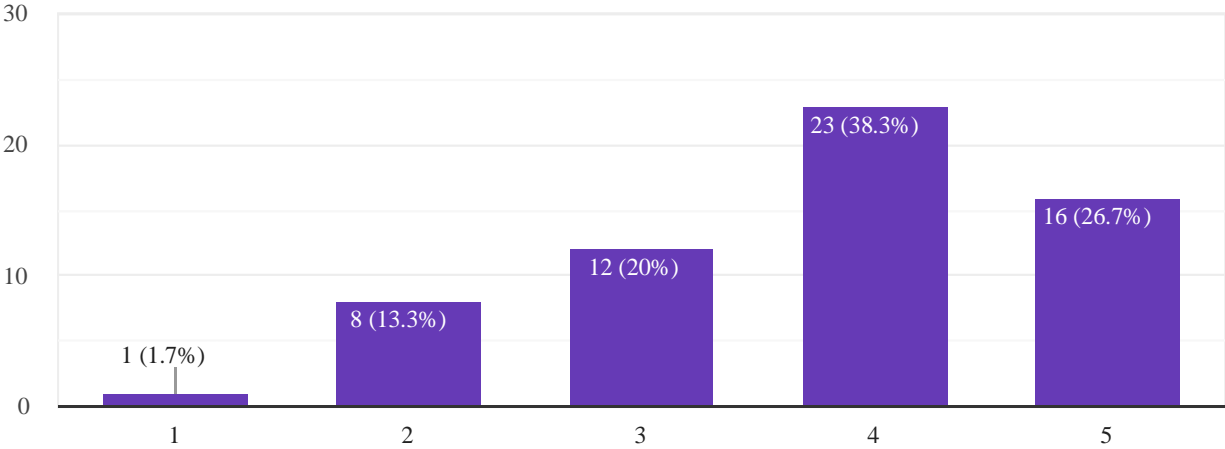
Q1) Does improper time management affect the real estate industry?

60 responses



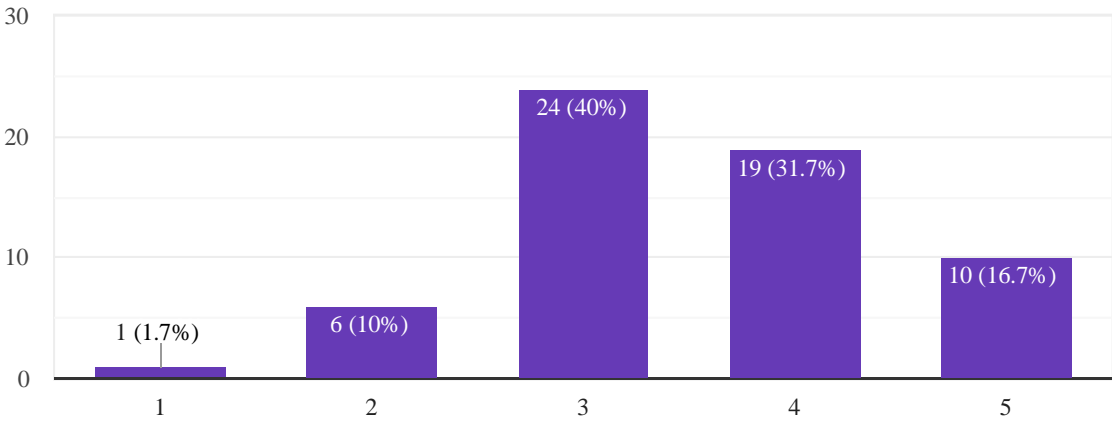
Q 2 ) It is a common belief that some hidden payment help expediting the planning approval process?

60 responses



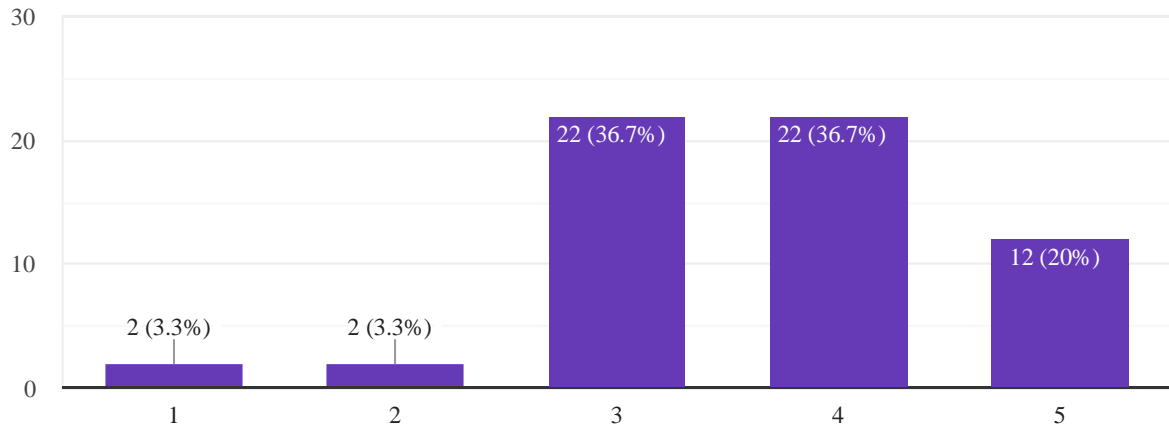
Q3) Do you improper influence in real estate lead to risk?

60 responses



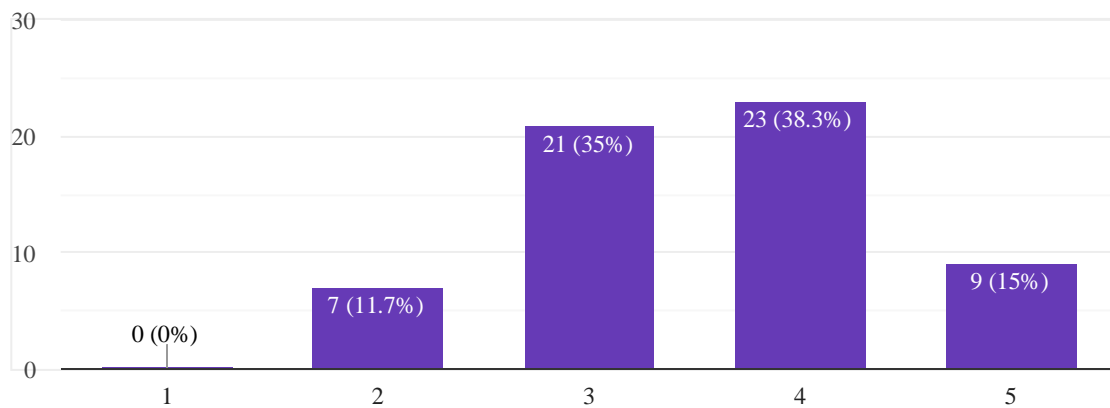
Q-4 Does HR strategies impact on performance and productivity of the real estate?

60 responses



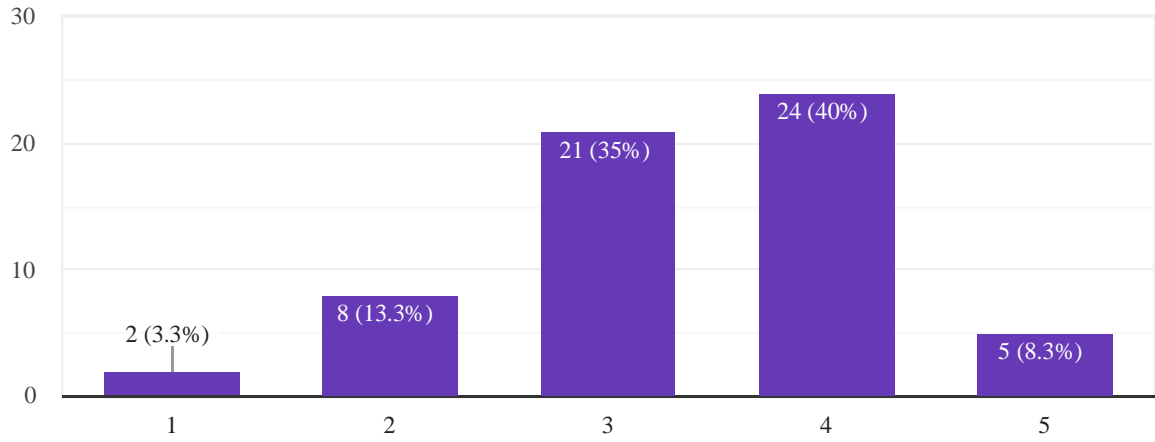
Q-5 Does the improper Human resource management affect the real estate industry?

60 responses



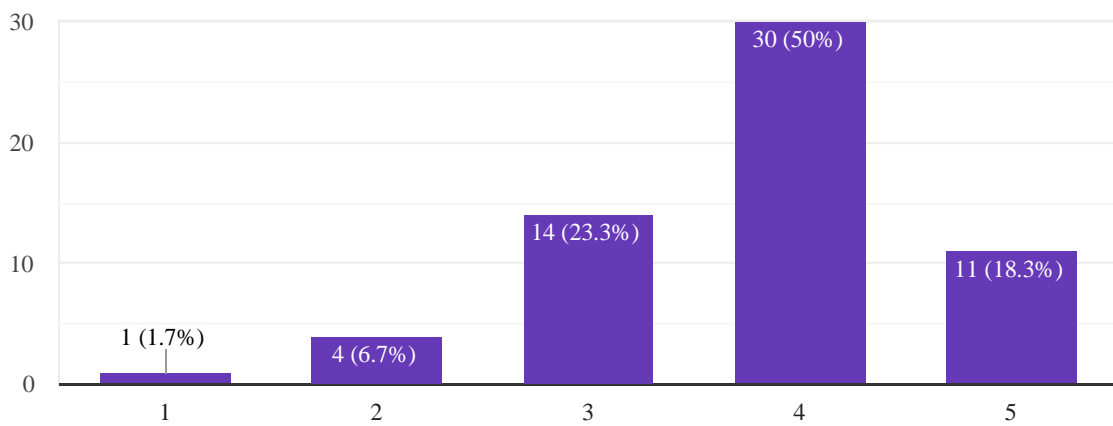
Q-6 Does financial Risks have impact affect the real estate ?

60 responses



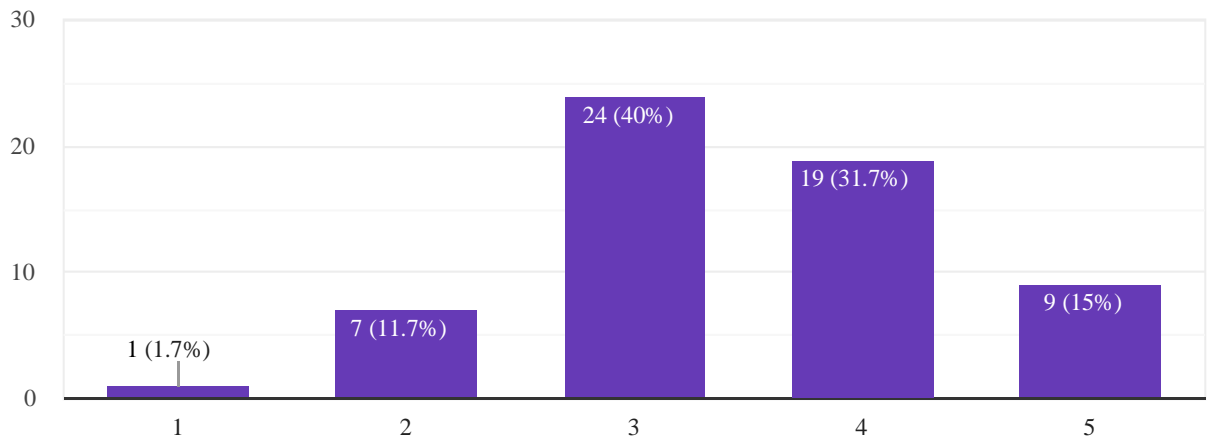
Q-7 Does Political risk is considered in real estate?

60 responses



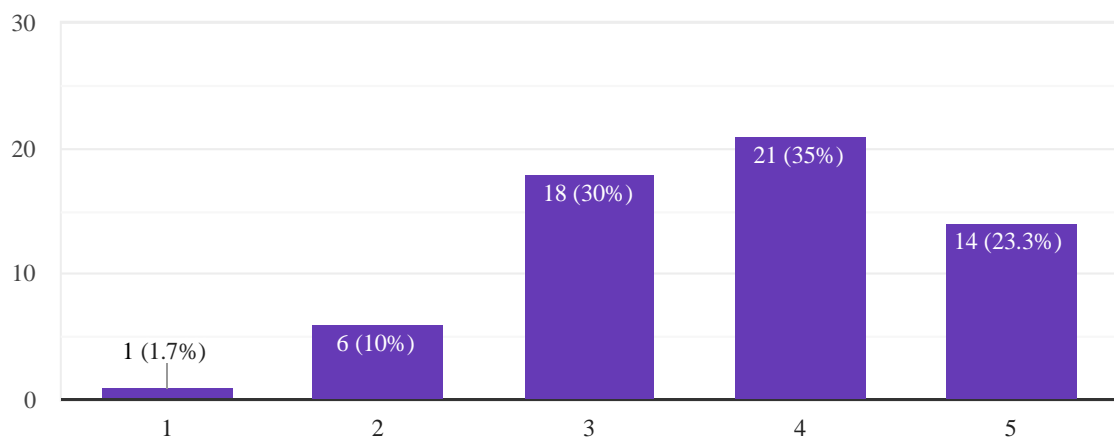
Q-8 Available and use of Modern/New technology have impact of technological Risk in real estate?

60 responses



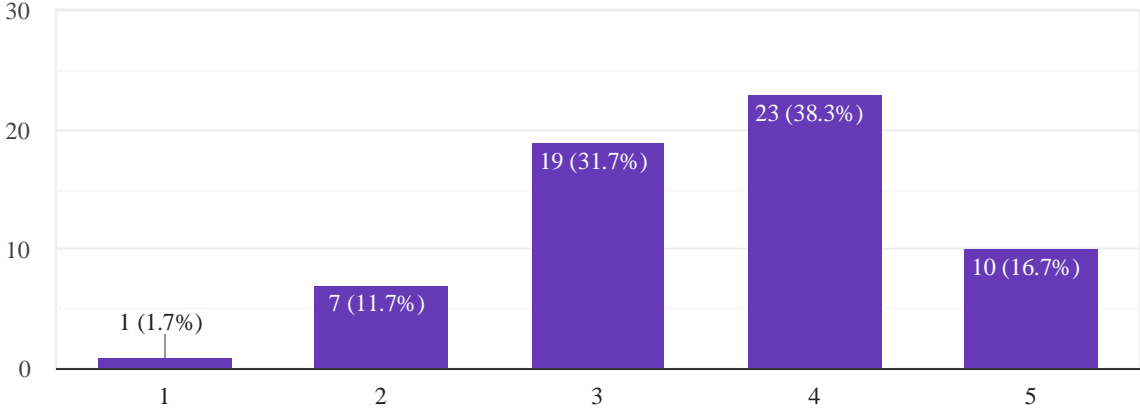
Q-9 Does construction risks have impact on the real estate?

60 responses



Q-10 Are the risk in real estate construction play major role in construction?

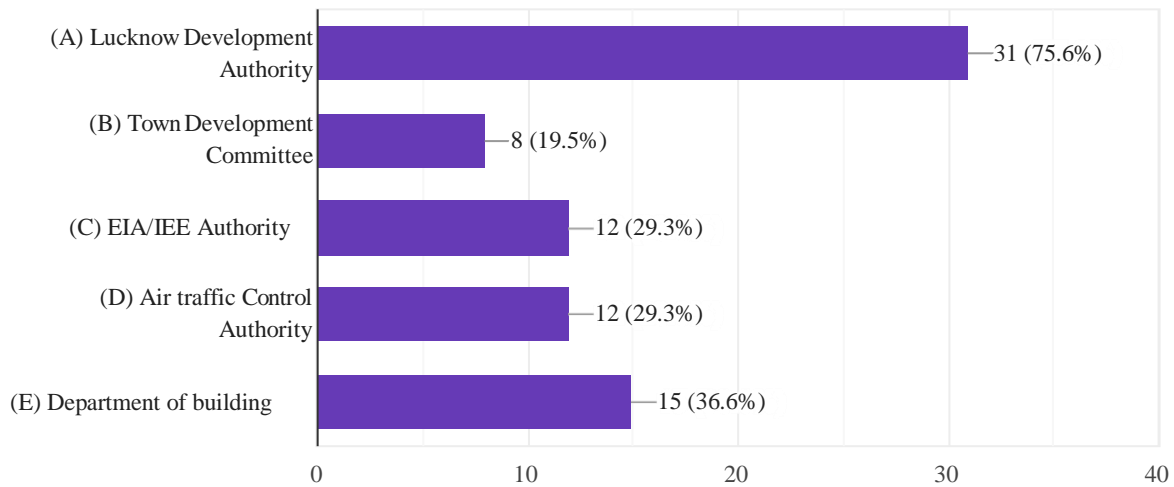
60 responses



## QUESTIONARY SURVEY-2

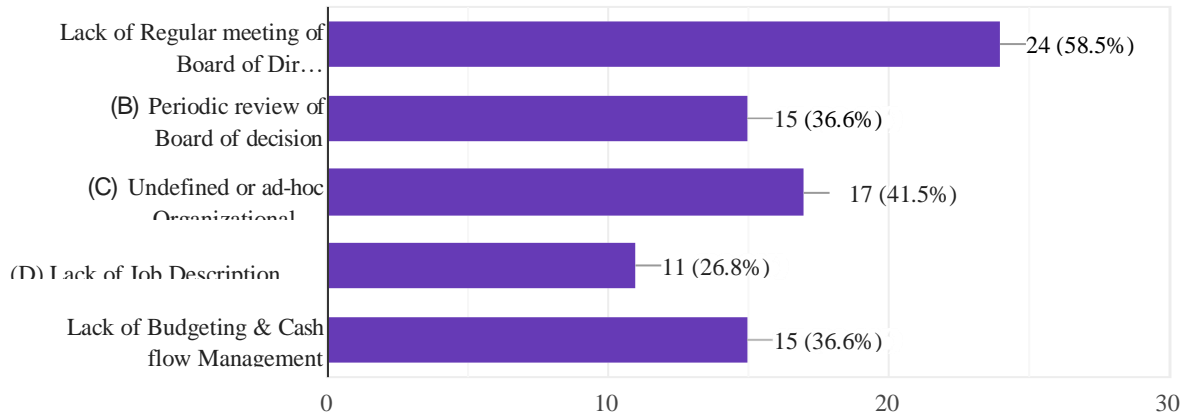
### Analysis and Mitigation of Risk in Real Estate - 42 responses

Q-1 Which of the following authorities take more time to get permission for executes the Joint apartment, Housing and Real Estate Project?

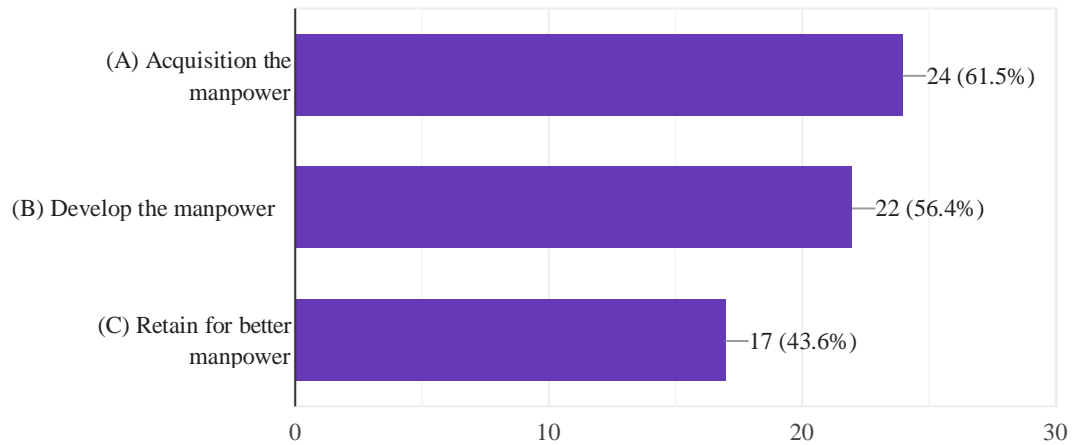


2 Which of the following according to you influence make in term of risks?

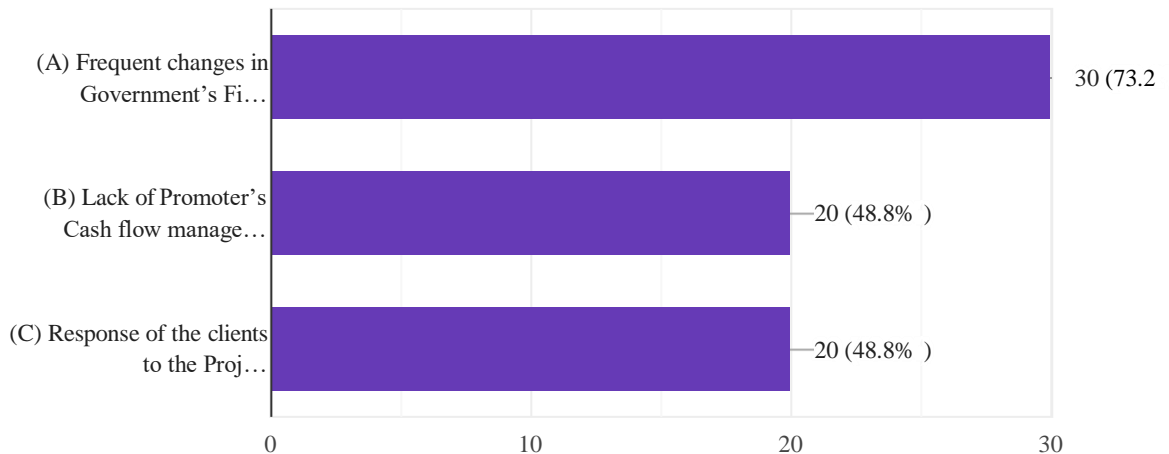
41 responses



Q3-Which of the following HR strategies impact most on performance and productivity of the projects?

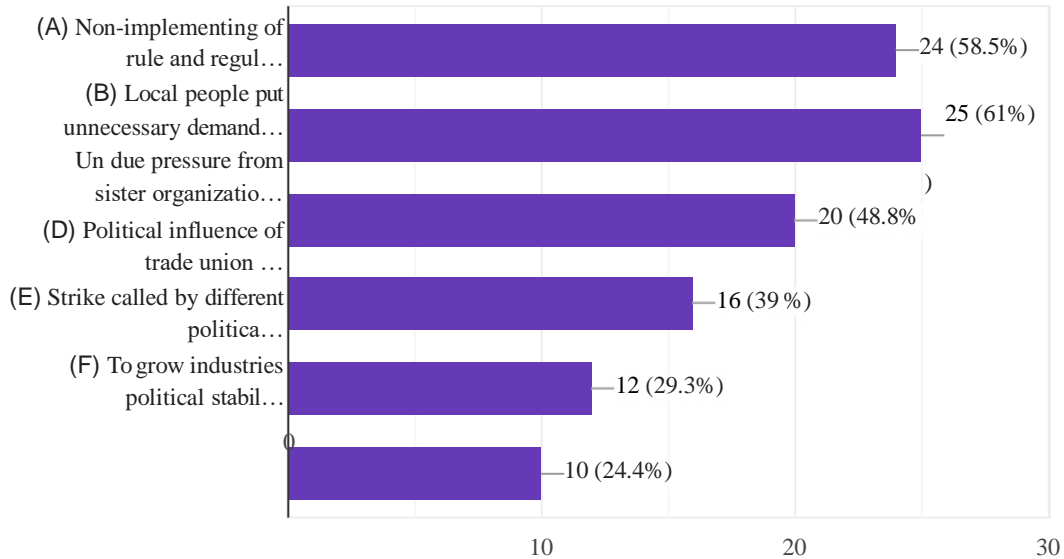


Q4-Which of the following factors pose more financial Risks?

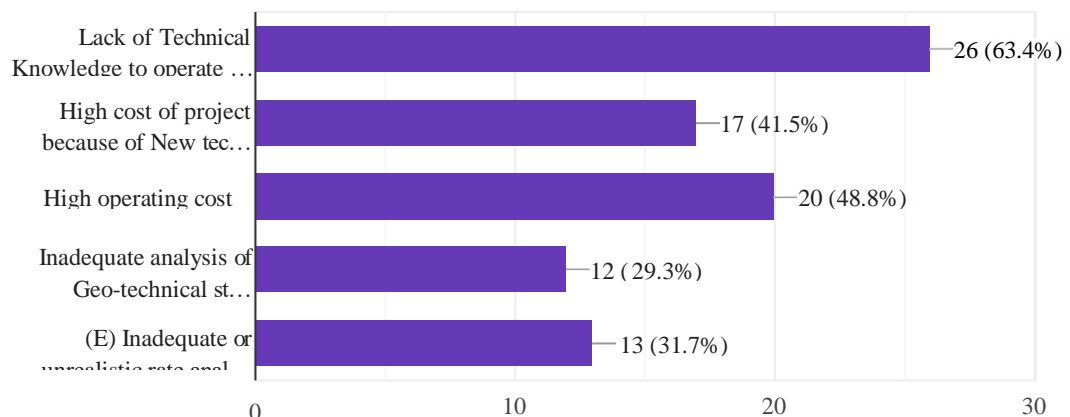




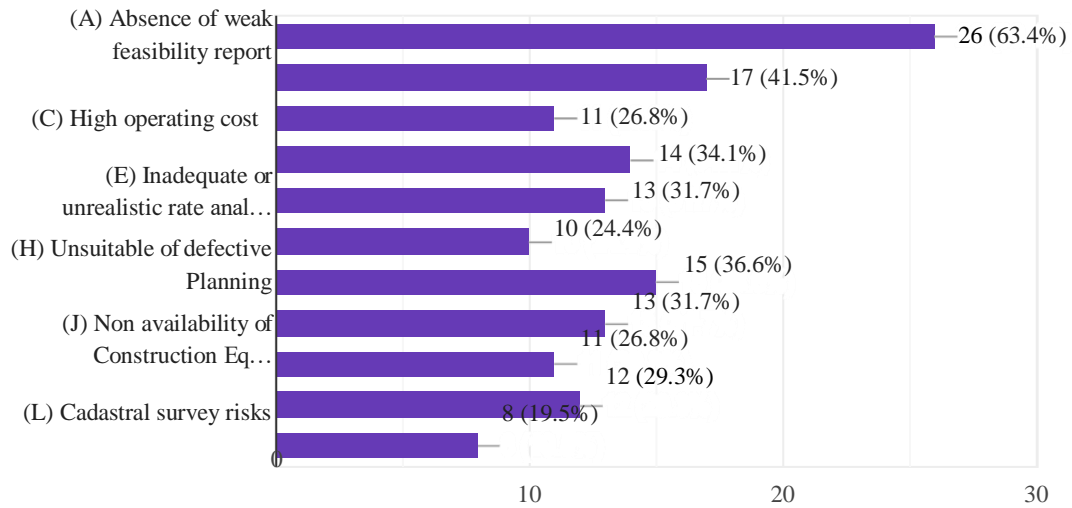
Q-5 Following activities have impact of housing and real estate in minimizing Socio-Political risk?



Q6-Available and use of Modern/New technology have impact of technological Risk?



Q7-Which of the following factors contribute to the construction risk?



Q8-Which of the following tools are you using to assess the risk in your project?

