



Research paper

Comparing the risk management standpoint between the project participants for the urban road transport projects in Hanoi

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Abstract: The transport system is considered the “backbone” of the urban development. Along with the rapid economic development, the urban road transport system is being paid attention and invested by Hanoi city. By the year 2050, The Hanoi municipal government is expected to complete and hand over for use about 317 urban road transport projects. Due to the high demands of social and economic efficiency, the urban road transport projects in Hanoi face many risks. In which, there are 13 high dangerous risks for the urban road transport project in Hanoi. These risks have the high probability and severity impacted on the outcome of the projects. The project participant’s risk management standpoint will determine the solutions to respond the respective risks, thereby affecting the results of the project. In this paper, the authors compare the risk management standpoint of three main project participants, including owner/project management board, consultant and main contractor/subcontractor. The difference of the risk management standpoint is shown clearly by the project participants’ assessments of 13 high dangerous risks.

Keywords: projects, project participants, risk management, urban road transport

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1. Introduction

According to the develop plan of the urban transport system, Hanoi will implement and complete 393 of the transportation projects by 2050, including road, railway, waterway, and airway. Of which, the road transport projects accounts for the highest proportion (accounting for 81%, 317 projects), the railway projects accounts for 11% (45 projects), the waterway projects accounts for 8% (30 projects) and only 01 air transport project [1].

The implementation time of the urban road transport projects is planned to be implemented from 2016 to 2050. However, considering the project implementation period from 2016 to 2030, the urban road transport projects are implemented the most powerful. Up to now, 29.6% of the projects have been completed, 55.8% of the projects is in progress and 14.6% of the projects is being prepared for implementation. Along with the rapid economic development, the road transport system is cared and invested by Hanoi local government. Completing the road transport system is the top goal in Hanoi.

It can be seen the road transport projects which have been completed and handed over for use concentrating in new urban zones. These projects have contributed greatly to solving transport jam in Hanoi. The Hanoi local government focuses the capital on implementing on-going projects by 2030. A large proportion of these projects (accounting for 78.7%) is delayed because of the slow clearance construction site, adjusting the capital sources, Some projects are delayed the schedule such as the 2.5 Ring Road Project, Nga tu So – Nga Tu Vong project, An Duong – Thanh Nien project, O Dong Mac – Nguyen Khoai project, It causes a great impact on the lives of urban residents around the project. Beside, there are some urban road transport projects which are prepared to implement such as Nguyen Phong Sac Expansion Project, Nguyen Dong Chi Project, Dang Thai Mai Project, Ngu Hiep Street Project.

2. Literature reviews

Scientists agree that risk is an inevitable part of the construction projects in general and the urban road transport projects in particular. There are risks that are objective, but there are risks posed by the project participants. The results from related researches show that the risks happen in all project implementation activities. Some foreign researches include: Perrenoud and his associates [2] reviewed over 229 projects that recorded 1229 risks. Other researches have also found the risks appearing in the contracting phase [3], risks in cost calculation, finance [4, 5], risks in foundation construction [6], risks occur in the design phase and can extend sequentially into the construction phase [7], labor risks, tax risks, financial risks, export risks, etc.

In Vietnam, risks are discovered through some researches such as: Trinh Thuy Anh [8] studies risks for the transport construction projects in Vietnam; Nguyen Van Chau [9] identifies 23 technical risks for the road transport projects in Vietnam; Than Thanh Son [10] identifies 51 risks for the form of public-private partnership in the development of road transport infrastructure in Vietnam. Along with that, Huynh Thi Thuy Giang [11], Nguyen

Thi Ngoc Huyen [12] continue to study the road transport projects applying public-private partnership form and discover some risks. Pham Thi Trang [13] identifies 20 risks for the construction investment projects. Nguyen The Chung, Le Van Long et al. [14] focus on financial risks. Pham Van Thu [15] continues to study engineering risks.

The research results also show that the construction phase is the most risks. The risks for the construction phase are recorded through the related researches shown in Table 2. The risk management standpoint of the project participants is different. Some researches pay attention to this, such as: Trinh Thuy Anh [8] studies the risks from the perspective of state management; To Nam Toan [19] considers the risks from the perspective of owner and the state; Than Thanh Son [10], the risks are allocated to the State and the private sector participating in the project on the view that “the risk should be managed by the participant with the best ability to manage that risks”; Nguyen Van Chau [9] focuses on the risks from the contractor’s perspective.

3. Research methodology

(1) Research process.

- Step 1: Collection the risks from the related researches.
- Step 2: Surveying and collecting data.
- Step 3: Grouping the risks according to the risk dangerous level of probability and severity.
- Step 4: Comparing the risk management standpoint between the project participants for the urban road transport projects in Hanoi.

(2) Survey.

The direct survey is preferred. However, in many cases it is difficult for respondents to meet face-to-face, the authors send questionnaire via email, before calling and explaining the survey purposes. The sample size is taken according to Abachnick and Fidell (1996), for multivariable regression analysis, the minimum sample size is calculated by the formula below:

$$(3.1) \quad n = 50 + 8 \cdot m$$

where: n – minimum sample size, m – number of independent variables.

13 high dangerous risks are considered. Each risk is considered on the probability and the severity. Therefore 13 risks correspond to 26 independent variables. Thus, the minimum sample size is calculated as follows:

$$(3.2) \quad n = 50 + 8 \cdot 53 = 474$$

The survey are conducted on 3 main groups of the urban road transport project in Hanoi, including: Owner/Project Management Board; Consultantce; Main contractor/subcontractor.

(3) Probability.

Severity matrix analysis method: Risk always includes two aspects: Probability and severity. These components of risk can be combined together in one chart, the probability

– severity matrix. An event’s probability measure is represented on the vertical axis. It is usually represented by the reported probability levels. A measure of the severity of an event is represented on the horizontal axis. It shows the different levels of severity. Risks are showed by different colors. If risks in the upper right corner are the red risk zone, which is the high danger zone. Risks are showed in the yellow middle zone which is the medium danger zone. Risks are showed in the lower left corner which is called the blue risk zone, the low danger zone.

The questionnaire is formed basing on 53 identified risks. The authors process the surveyed data and show risks to the probability – severity matrix. Risks are assessed according to two criteria: Probability and severity level with convention on a scale from 1 to 5. There are five probability levels: Improbable, remote, occasional, probable, frequent. The severity levels are also showed according to 5 levels, including: Negligible, marginal, critical, catastrophic, serious. The score convention and color zoning are done according to Table 1.

Table 1. Score convention for risk assessment criteria

Match Point	1	2	3	4	5
Probability	Improbable	Remote	Occasional	Probable	Frequent
Severity	Negligible	marginal,	critical	catastrophic	serious
Showned on the matrix	Blue zone: Less dangerous zone value range $> 0 \div \leq 2$		Yellow zone: Medium dangerous zone value range $> 2 \div \leq 3$	Red zone: High dangerous zone value range $> 3 \div \leq 5$	

The score calculation is based on the survey data and the following formula is applied:

$$(3.3) \quad R = \frac{\sum_{i=1}^5 W_i \times X_i}{\sum_{i=1}^5 X_i}$$

where: R – probability or severity, W_i – probability or severity on the scale from 1 to 5, X_i – number of surveyors who chose the i scale, i – the scale from 1 to 5.

(4) Statistical probability method.

This paper compares the project participant’s risk management standpoint for the urban road transport system in Hanoi. Therefore, the authors will use hypothesis tests of group correlation. It aims to determine whether or not the risk management standpoints of the three selected groups are similar or different. There are 13 risks which belong to the high dangerous zone, are considered the group correlation test. The test has three-sample, the samples are independent, the measurement ratio is balanced.

The paper uses the technique “one-way ANOVA” to test for the hypothesis “the three selected groups are similar to each other the risk assessment”. SPSS software is selected to run the verification function.

Measuring the reliability of the scale by Cronbach's alpha coefficient. The results of Cronbach's Alpha coefficient: From 0.8 to 1: The scale is very good; From 0.7 to 0.8: Good usable scale; From 0.6 and cup: Qualifying scale.

The result of the one-way ANOVA, the project participant's risk management standpoint is the same or not. At the same time, it is possible to compare each variable correlated with the other variables or not through the Sig index. This index is significant at 5% and acceptable at 10%. When this index is significant, it can conclude that the variables are not correlated with each other. It means the project participants who have their risk assessment different. In this paper, comparing the correlation with a level of 10% (0.1).

4. The project participant's risk management standpoint for the urban road transport project in Hanoi

4.1. Survey results and risk grouping by dangerous level

(1) Survey results.

Finishing the survey, the authors obtain 476 valid answer sheets, including 158 answer sheets of the owner/project management board, 158 answer sheets of the consultantce and 160 answer sheets of the contractor/subcontractor. The respondents to the questionnaire account for the most engineers (55.12%), followed by managers (34.60%) and a small percentage is supporters, advisors (10.28%). Most of the respondents have 5-10 years of working experience (47%), 15% of the respondents with more than 20 years of working experience, 38% of the respondents with 10–20 years of working experience.

(2) Risk grouping by dangerous level.

Result of risk assessment is showed in Table 2.

Table 2. Score for risk assessment

No.	Risk	Probability	Severity
R1	Bad coordination among the project participants on site [8, 10–12, 16, 17]	3,17	2,38
R2	Conflicts between the project participants [8, 11, 16, 17]	2,80	2,34
R3	The departure of key manager [6, 16, 17]	2,79	1,06
R4	Contractor has a shortage of human resources on construction site [8, 16, 17]	3,47	3,67
R5	Bad management capacity of Owner/Project management board [9, 16, 17]	3,06	4,58
R6	The weak capacity of consultant [8, 9, 16, 17]	2,93	3,55
R7	Contractor's construction capacity is not suitable for the type of project [8–10, 16, 17]	2,74	3,59
R8	Strikes, protests of workers [16, 17]	1,14	1,13

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Table 2 – Continued from previous page

No.	Risk	Probability	Severity
R9	Changing the design many times [2, 6, 8, 9, 14, 16, 17]	3,37	2,25
R10	Delaying the design approval [8, 9, 16, 17]	3,28	2,36
R11	Design has many flaws [6, 9, 14, 16, 17]	3,36	3,83
R12	Construction does not comply with the design [2, 9, 16, 17]	2,76	3,58
R13	Unreasonable requirements for the quality [5, 8, 16, 17]	2,59	2,28
R14	The quality management process has many flaws [2, 9, 10, 16, 17]	3,06	2,45
R15	Construction measure is not suitable for actual conditionals [3, 9, 16, 17]	2,96	2,45
R16	Error in testing [9, 16, 17]	2,54	2,15
R17	The construction process has many problems [5, 7–9, 16, 17]	3,06	3,70
R18	The project funding is difficult [14, 16, 17]	3,70	2,27
R19	Payment is delayed as committed [8, 14, 16, 17]	4,66	3,40
R20	Error in cost calculation [14, 16, 17]	3,01	2,23
R21	The high schedule requirements make the project progress difficult [7–9, 16, 17]	2,63	2,21
R22	Delay in handing over the construction site [16, 17]	3,53	3,65
R23	Delay in implementing the working tasks on site [6, 16, 17]	2,85	2,33
R24	Unreasonable coordination and management of the schedule [8, 9, 16, 17]	3,08	3,45
R25	Errors in the volume calculation compare to the actual construction [16–18]	3,03	2,33
R26	The volume estimate is not correct [8, 14, 16–18]	2,91	2,41
R27	Waste, loss in volume during the construction process [8, 16–18]	2,94	3,53
R28	High requirements on occupational safety on the construction site [16, 17]	2,60	2,45
R29	There is an accident on the construction site during the construction process [16, 17]	3,24	3,79
R30	Unreasonable occupational safety measures [16, 17]	3,20	2,31
R31	High requirements on the built environment on the construction site [8, 16, 17]	2,55	2,85
R32	Environmental pollution occurred during the construction process [8, 16, 17]	3,18	2,27
R33	Environment measure is not reasonable [16, 17]	2,93	2,22
R34	The contract payment term is not suitable with the actual construction [14, 16, 17]	2,86	2,29

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Table 2 – Continued from previous page

No.	Risk	Probability	Severity
R35	Violation, cancellation of the contract of the project participants [8, 16, 17]	2,66	2,31
R36	The contract form is not suitable for the project type [16, 17]	2,34	2,20
R37	The change of legal policies in the construction [14, 16, 17, 19]	3,07	3,05
R38	Administrative procedures are complicated [14, 16, 17, 19]	3,58	3,48
R39	Changes in tax mechanisms and policies [14, 16, 17]	2,81	3,00
R40	Not understanding legal documents in the construction [14, 16, 17, 19]	3,01	2,26
R41	Market price volatility [8, 16, 17]	3,56	3,64
R42	Scarcity of materials used for the project [6, 8, 9, 16, 17]	2,90	2,24
R43	Unfavorable economic problems [14, 16, 17]	2,91	2,15
R44	To be difficult to access the project finance sources [14, 16, 17]	3,10	3,41
R45	Payment problems with third parties [8, 16, 17]	2,82	3,08
R46	Loan interest rate adjustment [14, 16, 17]	2,84	3,25
R47	Third-party changes to the project [14, 16, 17]	2,63	2,98
R48	Unfavorable weather [6, 8, 16, 17]	2,97	2,32
R49	Unusual ground conditions [3, 6, 9, 16, 17]	2,64	2,20
R50	Opposition, disagreement of the residential community [8, 16, 17]	3,11	3,33
R51	Social problems are not favorable for the project [16, 17]	1,70	2,13
R52	Strikes, strikes in society [16, 17]	1,09	1,01
R53	Difficulties due to political institutions [8, 14, 16, 17]	1,07	2,94

The risks are grouped by dangerous level and showed on the matrix (Fig. 1 and Fig. 2). It can be seen that all the surveyed risks are likely to appear and affect the urban road transport project in Hanoi. 05 risks (accounting for 9%) are located in the less dangerous zone. In which, there are 02 risks related to the coordination between the project participants; 02 social risks and 01 political risk. The most are the risks belong to the medium dangerous zone (66%, 35 risks). It can be seen that all 03 risks related to volume, 03 risks related to the construction environment, 03 risks related to the third parties, 02 risks of natural conditions and 03 risks of the contract are of the medium dangerous zone. In addition to the medium dangerous zone, there are 04 other risks related to coordination of the project participants; 03 risks of design; 04 risks of quality; 02 risks of cost; 02 risks of progress; 02 construction safety risks; 02 risks related to law enforcement; 02 risks of market, economic and financial. 13 Risks (accounting for 25%) belong to the high dangerous zone.

13 risks belong the high dangerous zone, the authors conducts ANOVA test to compare the risk management standpoint between the project participants for the urban road transport projects in Hanoi. Result of high dangerous risk assessment from the project participants is showed in Table 3.

Table 3. Score of high dangerous risk assessment from the project participants

No	Risk	Owner/project management board		Consultant		Main contractor/subcontractor	
		Probability	Severity	Probability	Severity	Probability	Severity
R4	Contractor has a shortage of human resources on construction site	3,88	3,82	3,21	3,48	3,26	3,56
R5	Bad management capacity of Owner/Project Management Board	2,88	4,03	3,55	4,18	3,38	4,15
R11	Design has many flaws	3,70	4,42	2,06	3,70	3,56	3,82
R17	The construction process has many problems	3,58	4,12	1,97	3,48	3,53	3,79
R19	Payment is delayed as committed	3,58	3,73	4,09	3,48	4,44	3,82
R22	Delay in handing over the construction site	3,61	4,03	3,30	3,42	3,94	3,62
R24	Unreasonable coordination and management of the schedule	3,48	3,55	2,42	3,24	3,18	3,44
R29	There is an accident on the construction site during the construction process	3,18	3,91	3,30	3,61	3,26	3,53
R37	The change of legal policies in the construction	3,36	3,58	2,09	3,18	3,56	3,18
R38	Administrative procedures are complicated	3,55	3,73	3,45	3,39	4,00	3,82
R41	Market price volatility	3,58	4,00	3,48	3,61	3,76	4,06
R44	To be difficult to access the project finance sources	3,06	3,58	3,12	3,36	3,18	3,44
R50	Opposition, disagreement of the residential community	3,30	3,61	3,18	3,15	2,62	3,12

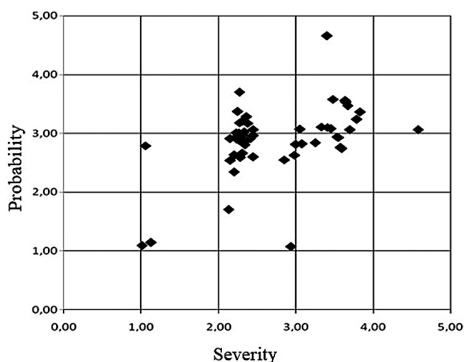


Fig. 1. The risk distribution on the probability – severity matrix

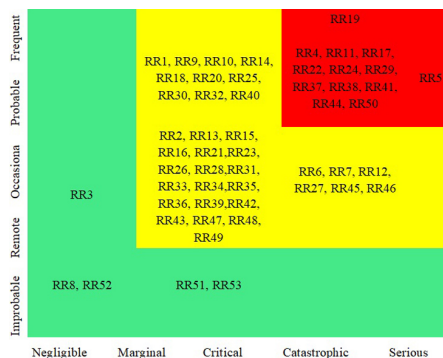


Fig. 2. Risks on the probability – severity matrix according to the total assessment

4.2. Owner/project management board’s standpoint

Owner/project management board’s high dangerous risk assessment is shown on the matrix (Fig. 3 and Fig. 4). Considering 13 high dangerous risks, owner/project management board’s standpoint has great similarities. 12/13 risks are considered the similar assessment, only R5 “Bad management capacity of Owner/ Project Management Board” is different. Owner/project management board assesses that risk of “Contractor has a shortage of human resources on construction site” with its highest probability. The survey result shows that accounting for 80% of the urban road transport projects which faces R17. The main reasons for the shortage of workers are agricultural crops. Construction workers are often mobilized from the countryside. All most of them consider their construction tasks which are their full-time job. Some of them consider their construction tasks which are their part-time job

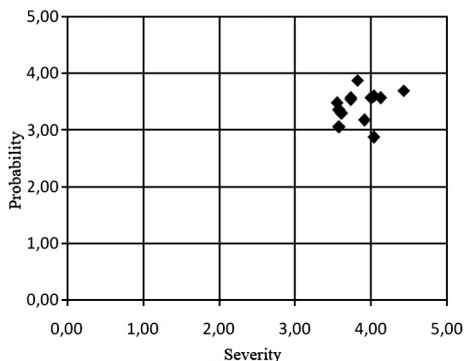


Fig. 3. The risk distribution on the probability – severity matrix according to standpoint of owner/project management board

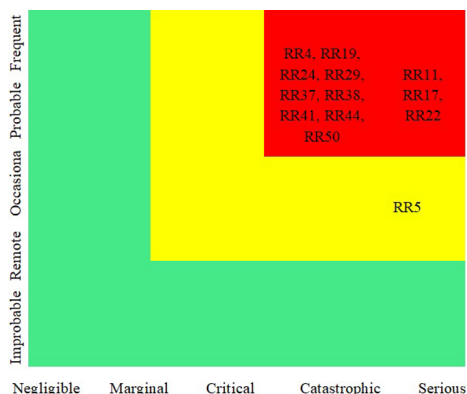


Fig. 4. Risks on the probability – severity matrix according to standpoint of owner/project management board

between seasons. When the harvesting crop is being, workers will focus on harvesting. Their construction tasks do not take over their crops. Thus, managers always have to pay attention to the harvesting time and make a suitable human plan. Besides, the living habits also cause risks. It can be seen that the time after Tet holiday, there are some festivals in the countryside during January, the workers always have the mentality of having fun and rest after hard working. It is difficult to mobilize human resources at this time. In fact, the workers from the Northern provinces, who have a hard working attitude but they take a lot of rest for reasons such as death anniversary, meeting, meeting with friends. While workers from the southern provinces work enthusiastically but they are willing to quit halfway and quit if they are not satisfied with a certain problem at work.

According to owner/project management board, R5 has the medium danger level and the lowest probability among 13 risks surveyed. The question is owner/project management board that assesses their capacity highly or Bad management capacity of owner/project management board causes severity the urban road transport projects, but it has been overlooked. According to the survey result, there are many reasons for weak management capacity of the owner/project management board, but it is possible to focus on the following contents:

- Owner/project management board proves staffs that have weak qualifications, not in the right profession. It is difficult for them to make a good, timely decision for inspecting and handing of the site issues.
- The organization of owner/project management board is not able to promote their management capacity. The key manager has no expertise or weak expertise. Meanwhile, staffs with the good expertise do not have their right to make decisions. It makes the organization less effective and there are conflicts within the organization.

About severity of risk, 13 high dangerous risks are considered carefully. There are 03 risks with superior evaluation points, including: Design has many flaws, the construction process has many problems, delay in handing over the construction site. These risks are explained by the owner/ project management board as follows:

- With R11 “Design has many flaws”: Design of the urban road transport projects in Hanoi always undergoes the long-term approval. The design drawings are always guaranteed but some details are often omitted. This causes a lack of information for implementing the construction site. Designers often make confusion in the drawings such as the confusion about the used materials, the confusion about dimension. . . This is only discovered during the construction process.
- R17 “The construction process has many problems”: The contractor implements their tasks sloppily, mistakenly, skips the stage. Some managers of the contractor are often subjective or intentionally skip the construction phase. This always faces heavy consequences for the project. Owner/project management board is very concerned about the problem of ignoring construction stages.
- R22 “Delay in handing over the construction site”: Owner/project management board delays handing over the construction site to contractor or the main contractor delays handing over the site to the subcontractor. The cause of delaying is due to the incomplete administrative procedures. Another important cause that is mentioned is

the delay in the construction site clearance, the inadequate compensation. The figures obtained from the survey showing that almost 100% of the urban road transport projects in Hanoi which have been delayed the clearance or have problems of the site clearance. There are projects that can take up to 5 years, 10 years.

It is possible to summarize owner/project management board's standpoint as follows:

- Owner/project management board has the risk assessment which is quite similar to the results of the general assessment.
- Owner/project management board has their assessment of 04 the greater severity risks. It shows that owner/project management board be interest in all 3 success factors of the project: Cost, progress, and quality.
- Although risks are more or less probability, owner/ project management board will consider them to have a dangerous impact on the project.

4.3. Consultant's standpoint

Consultant's high dangerous risk assessment is showed on the matrix (Fig. 5 and Fig. 6). Among 3 surveyed groups, the consultant can have the risk assessment the most different comparing with the results of the general assessment. In which, 9/13 risks are similar, 4/13 risk are not similar. Especially, 01 risk is a completely different, R17 "The construction process has many problems". Explaining this assessment as follows:

- The construction process is always supervised closely by consultant. Any construction task is also inspected by the owner/project management board, the consultant and the contractor. During the construction process. If the contractor makes problems, the consultant responds and corrects it afterwards. So R17 is assessed the severity for the urban road transport project in Hanoi, but it is low probability. The consultant shows R17 belonged to the less dangerous zone.

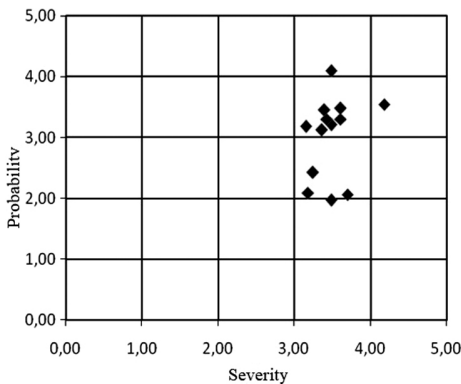


Fig. 5. The risk distribution on the probability – severity matrix according to standpoint of consultant

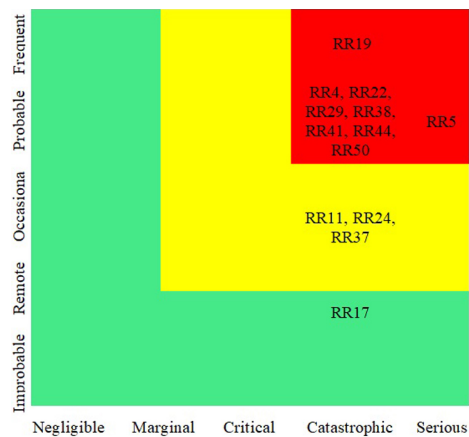


Fig. 6. Risks on the probability – severity matrix according to standpoint of consultant

- The contractor provides materials, materials, manpower, machinery, equipment that are not in line with the schedule, the owner/project management board, the consultant do not have their construction supervision or supervise loosely. These are unlikely to happen. The consultant confirms that they always perform their functions and duties in the projects. Therefore, risk “Unreasonable coordination and management of the schedule” is reduced significantly. This risk is only considered as the low level.

In addition, 03 risks are assessed by the consultant the less dangerous zone, including R11 “Design has many flaws”, R24 “Unreasonable coordination and management of the schedule”, R37 “The change of legal policies in the construction”. The consultant thinks that some mistakes design such as Errors of used materials; wrong dimension and this variation are also very small. When using materials, especially main materials which are inspected for acceptance by the project participants. Therefore, if there is a mistake of materials that will always be replaced or accepted with the conditions. This means that R11 happened with its medium dangerous level. According to the consultant, the current legal system of Vietnam is not complete. The change of mechanism, legal policy in the construction field is inevitable. Decree no 59/2015/ND-CP dated June 18, 2015 on construction project management, circular no 16/2016/TT-BXD dated June 30, 2016 guidance on application of a number of articles of the Government’s Decree no 59/2015/ND-CP. However, it is not long after that, Decree 42/2017/ND-CP dated April 5, 2017 on amendments to the Government’s decree no 59/2015/ND-CP. The change of decree causes difficult for the project participants for applying legal provisions to the project, especially the stretching urban road transport projects in Hanoi. However, the application of regulations is been discussed by the project participants and taking into account the change.

Considering for 9/13 risks at the high dangerous zone, the consultant assesses the scope of probability and severity is quite equal. R19 “Payment is delayed as committed” has the highest frequent. R5 “Bad management capacity of Owner/ Project Management Board” has the highest impact.

Considering of R19 “Payment is delayed as committed”, the cause of R19 comes from the contractor. The contractor does not complete the payment procedures following the request of the owner/project management board. The working inspection record is an important component of the payment procedures. It is issued when the contractor completes their tasks well. However, some construction tasks are completed and accepted by the internal supervision staff, but not be accepted the consultant and the owner/project management board. Some projects in Hanoi, the owner/project management board intentionally prolongs the payment period in order to benefit from the bank basing on the money which to be paid to the contractor.

Considering of R5 “Bad management capacity of Owner/Project Management Board”, the consultant confirms that R5 makes decision inconsequential and it causes the owner/project management board interferes unreasonably in the consultant’s work scope. Some projects, the consultant had many difficulties from the owner/project management board who always kept their wrong opinions handling the problems on the construction site, such as changing construction methods for a group of work; change of equivalent materials or the color adjustment of the same.

Through the assessment from the consultant, it can be summarized as follows:

- The consultant’s assessment of risk is the most different. The risk assessment score is quite equal.
- The risk assessment score from the consultant is lower than the risk assessment score from the contractor and the owner/project management board.
- The consultant assesses the most dangerous risk which related to the management capacity of the owner/project management board.
- The less dangerous risks related to the design, the site coordination, and supervision of the construction process which fall under the consultant’s scope of work.

4.4. Assessment of correlation between the project participants main contractor/subcontractor’s standpoint

Main contractor/subcontractor’s high dangerous risk assessment is showed on the matrix (Fig. 7 and Fig. 8). Considering 13 surveyed risks, main contractor/subcontractor’s standpoint has similarities with the general results. 11/13 risks are similarity and 2/13 risk are not similarity (R41, R50). These risks are considered objective to the management of the contractor/subcontractor.

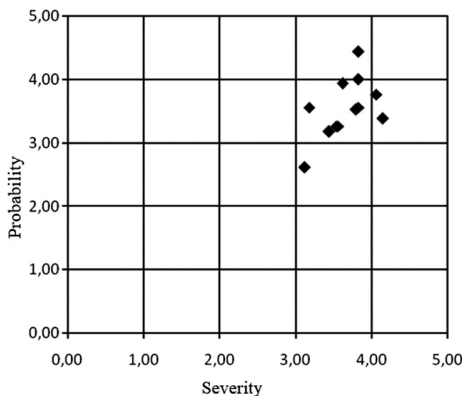


Fig. 7. The risk distribution on the probability – severity matrix to standpoint of main contractor/subcontractor

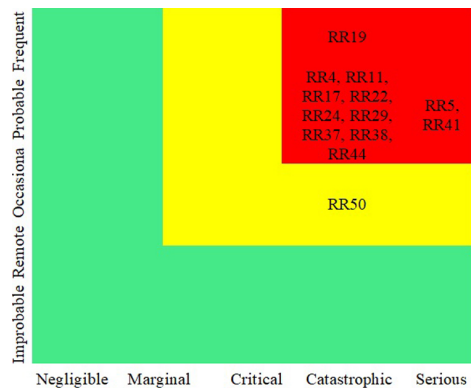


Fig. 8. Risks on the probability – severity matrix according to standpoint of main contractor/subcontractor

R50 “Opposition, disagreement of the residential community” often happens in the urban road transport projects. During the project process, there are some the causes of R50 such as: The environmental pollution from the construction site make human’s life badly; the construction site makes difficulties for the residential communities (travelling, encroachment of sidewalks, ...). These causes are often resolved well if the contractor/subcontractor pays more attention to the construction measure.

Considering 11 similarity risks, there are 2 risks outstanding of the probability, including R19 “Payment is delayed as committed” and R38 “Administrative procedures are

complicated”. The contractor/subcontractor understands that the cost is the important factor affecting their operations. This cost is spent to procure of materials, machinery, make payment for labor, organize the working apparatus of the contractor/subcontractor. The owner’s payment phases will directly affect the project progress. The contractor/subcontractor confirms that there are some owners who make payment latterly.

Currently, the owner/project management board often requests the scope of work of the contractor/subcontractor including the implementation of administrative procedures. It aims to support the owner/project management board to complete the necessary procedures quickly. The contractor/subcontractor has to prepare a dossier set which obtains many different procedures to submit to some different regulatory agencies. Then the agencies get approval the administrative procedures.

Considering severity of risks, R5 “Bad management capacity of Owner/ Project Management Board” and R41 “Market price volatility” have the assessment score biggest. It shows that the contractor/subcontractor is very concerned with the price volatility. Because it directly affects the profitability of the contractor/subcontractor. The price volatility of materials is an objective factor outside the contractor/subcontractor’ control. So the contractor/subcontractor is only acceptable and deals the price volatility risk. Nowadays that price volatility is quite common, the main contractor/subcontractor can estimates the risk in bill of quantity. However, it is difficult to estimates the bill of quantity exactly and suitable for the contractor/subcontractor and the owner/ project management board. Thus the contractor/subcontractor still has to bear certain risks.

Collecting the results of the risk assessment which is obtained by the contractor/subcontractor as follows:

- The main contractor/subcontractor’s standpoint is quite similar to the general assessment. The risks which are belonging to the high dangerous zone are relatively uniform.
- Considering the risks, the prominence is focused on the cost risks and the objective risks outside the project. This also shows the contractor/subcontractor paying attention to the costs and the profit ultimately.

5. Assessment of correlation between the project participants

The reliability of the scale is measured by Cronbach’s alpha coefficient (α). Results is in Table 4.

Table 4. Reliability Statistics

Cronbach’s Alpha	No of Items
0.833	26

Cronbach's Alpha coefficient of 0.833 shows the risk assessment scale for the urban road transport projects in Hanoi is good. The correlation assessment between the projects participants use ANOVA test (Table 5 and Table 6).

Table 5. ANOVA test result

		Sum of Squares	df	Mean Square	F	Sig.
KNXH_RR4	Between Groups	9.102	2	4.551	4.924	0.009
	Within Groups	89.648	97	0.924		
	Total	98.750	99			
KNXH_RR5	Between Groups	7.984	2	3.992	7.486	0.001
	Within Groups	51.726	97	0.533		
	Total	59.710	99			
KNXH_RR11	Between Groups	54.559	2	27.280	34.262	0.000
	Within Groups	77.231	97	0.796		
	Total	131.790	99			
KNXH_RR17	Between Groups	55.409	2	27.705	36.562	0.000
	Within Groups	73.501	97	0.758		
	Total	128.910	99			
KNXH_RR19	Between Groups	12.670	2	6.335	11.138	0.000
	Within Groups	55.170	97	0.569		
	Total	67.840	99			
KNXH_RR22	Between Groups	6.829	2	3.415	3.355	0.039
	Within Groups	98.731	97	1.018		
	Total	105.560	99			
KNXH_RR24	Between Groups	19.666	2	9.833	17.914	0.000
	Within Groups	53.244	97	0.549		
	Total	72.910	99			
KNXH_RR29	Between Groups	0.254	2	0.127	0.127	0.880
	Within Groups	96.496	97	0.995		
	Total	96.750	99			
KNXH_RR37	Between Groups	42.244	2	21.122	26.696	0.000
	Within Groups	76.746	97	0.791		
	Total	118.990	99			
KNXH_RR38	Between Groups	5.746	2	2.873	2.355	0.100
	Within Groups	118.364	97	1.220		
	Total	124.110	99			

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Table 5 – Continued from previous page

		Sum of Squares	df	Mean Square	F	Sig.
KNXH_RR4	Between Groups	1.369	2	0.685	0.734	0.482
	Within Groups	90.421	97	0.932		
	Total	91.790	99			
KNXH_RR50	Between Groups	0.225	2	0.112	0.129	0.879
	Within Groups	84.335	97	0.869		
	Total	84.560	99			
KNXH_RR50	Between Groups	9.002	2	4.501	5.752	0.004
	Within Groups	75.908	97	0.783		
	Total	84.910	99			
MĐTĐ_RR4	Between Groups	2.026	2	1.013	0.836	0.437
	Within Groups	117.534	97	1.212		
	Total	119.560	99			
MĐTĐ_RR5	Between Groups	0.417	2	0.208	0.670	0.514
	Within Groups	30.143	97	0.311		
	Total	30.560	99			
MĐTĐ_RR11	Between Groups	9.989	2	4.994	5.507	0.005
	Within Groups	87.971	97	0.907		
	Total	97.960	99			
MĐTĐ_RR17	Between Groups	6.684	2	3.342	3.799	0.026
	Within Groups	85.316	97	0.880		
	Total	92.000	99			
MĐTĐ_RR19	Between Groups	2.031	2	1.015	1.649	0.198
	Within Groups	59.729	97	0.616		
	Total	61.760	99			
MĐTĐ_RR22	Between Groups	6.330	2	3.165	3.696	0.028
	Within Groups	83.060	97	0.856		
	Total	89.390	99			
MĐTĐ_RR24	Between Groups	1.565	2	0.783	0.942	0.394
	Within Groups	80.625	97	0.831		
	Total	82.190	99			
MĐTĐ_RR29	Between Groups	2.683	2	1.342	0.936	0.396
	Within Groups	139.077	97	1.434		
	Total	141.760	99			

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Table 5 – Continued from previous page

		Sum of Squares	df	Mean Square	F	Sig.
MĐTD_RR37	Between Groups	3.479	2	1.740	1.723	0.184
	Within Groups	97.911	97	1.009		
	Total	101.390	99			
MĐTD_RR38	Between Groups	3.385	2	1.692	1.879	0.158
	Within Groups	87.365	97	0.901		
	Total	90.750	99			
MĐTD_RR41	Between Groups	4.029	2	2.014	2.390	0.097
	Within Groups	81.761	97	0.843		
	Total	85.790	99			
MĐTD_RR44	Between Groups	0.761	2	0.380	0.449	0.639
	Within Groups	82.079	97	0.846		
	Total	82.840	99			
MĐTD_RR50	Between Groups	4.939	2	2.470	2.225	0.114
	Within Groups	107.651	97	1.110		
	Total	112.590	99			

Table 6. Result of the correlation assessment between the projects participants

No	Variables	Sign	Sig.	Result
1	Probability of R4: Contractor has a shortage of human resources on construction site	KNXH_R1	0.009	No correlation
2	Probability of R5: Bad management capacity of Owner/ Project Management Board	KNXH_R2	0.001	No correlation
3	Probability of R11: Design has many flaws	KNXH_R3	0.000	No correlation
4	Probability of R17: The construction process has many problems	KNXH_R4	0.000	No correlation
5	Probability of R19: Payment is delayed as committed	KNXH_R5	0.000	No correlation
6	Probability of R22: Delay in handing over the construction site	KNXH_R6	0.039	No correlation
7	Probability of R24: Unreasonable coordination and management of the schedule	KNXH_R7	0.000	No correlation
8	Probability of R29: There is an accident on the construction site during the construction process	KNXH_R8	0.88	Correlation

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Table 6 – Continued from previous page

No	Variables	Sign	Sig.	Result
9	Probability of R37: The change of legal policies in the construction	KNXH_R9	0.000	No correlation
10	Probability of R38: Administrative procedures are complicated	KNXH_R10	0.1	No correlation
11	Probability of R41: Market price volatility	KNXH_R11	0.482	Correlation
12	Probability of R44: To be difficult to access the project finance sources	KNXH_R12	0.879	Correlation
13	Probability of R50: Opposition, disagreement of the residential community	KNXH_R13	0.004	No correlation
14	Severity of R4: Contractor has a shortage of human resources on construction site	MĐTĐ_R1	0.437	Correlation
15	Severity of R5: Bad management capacity of Owner/Project Management Board	MĐTĐ_R2	0.514	Correlation
16	Severity of R11: Design has many flaws	MĐTĐ_R3	0.005	No correlation
17	Severity of R17: The construction process has many problems	MĐTĐ_R4	0.026	No correlation
18	Severity of R19: Payment is delayed as committed	MĐTĐ_R5	0.198	Correlation
19	Severity of R22: Delay in handing over the construction site	MĐTĐ_R6	0.028	No correlation
20	Severity of R24: Unreasonable coordination and management of the schedule	MĐTĐ_R7	0.394	Correlation
21	Severity of R29: There is an accident on the construction site during the construction process	MĐTĐ_R8	0.396	Correlation
22	Severity of R37: The change of legal policies in the construction	MĐTĐ_R9	0.184	Correlation
23	Severity of R38: Administrative procedures are complicated	MĐTĐ_R10	0.158	Correlation
24	Severity of R41: Market price volatility	MĐTĐ_R11	0.097	No correlation
25	Severity of R44: To be difficult to access the project finance sources	MĐTĐ_R12	0.639	Correlation
26	Severity of R50: Opposition, disagreement of the residential community	MĐTĐ_R13	0.114	Correlation

It is possible to compare each variable correlated with the other variables or not through the Sig index. This index is significant at 5% and acceptable at 10%. When this index is significant, it can conclude that the variables are not correlated with each other. It means the

project participants of the urban road transport project in Hanoi have different in the risk management standpoint. In this paper, comparing the correlation with a level of 10% (0.1).

Analysis results are as follows:

- The attention of risks, the owner/project management board and the consultants are the same. But the contractor is different with the other participants. Risks always happen for the urban development investment projects. Thus, the contractor is used to taking the risks. They don't care the risks during the project process. Meanwhile, the owner/project management board and the consultants desire to achieve the project goals. They are highly concerned about risk.
- Considering probability of risks, all the project participants agree that the urban road transport project in Hanoi which faces many risks. This is a true reflection of the projects when the risks occur beyond the interest of the project participants.
- Considering about R5 "Bad management capacity of Owner/Project Management Board", the owner/project management board and the consultants have the same consideration of probability and severity. They believe that R5 is not dangerous. Meanwhile, the contractor considers R5 which is the high dangerous risk for the project. The owner/project management board and the consultants think that the owner/project management board only makes momentary decisions and impacts of the owner is only indirect on the project. So the impact of R5 is low on the project. However, the contractors often do their tasks basing on the owner's decisions. This R5 one of the main factors affecting the urban road transport project in Hanoi.
- R19 "Payment is delayed as committed" is considered the similarity by all project participants. The payment is considered the basic factor to maintain the operation of the project. So this is the cause R19 has a similarity of highly dangerous assessments to the project.
- Noticing a problem from research results: The contractor does not care risks but due to the great effect of risks, the really wants to manage the risks well. The contractor's wishes conflict their own management practices. This is considered a problem to be solved in the urban road transport project management in Hanoi.
- Although only 13 high dangerous risks are reviewed, a clear difference can be seen in the perception and assessment of risks between the project participants. The assessment of risk dangerous level determines the corresponding response to risk. This also supports to explain why the project participants of the urban road transport projects in Hanoi often respond to the risks differently. It also finds that the owner/project board management and the consultant have more in common in the risk management standpoint than the contractor's standpoint.
- 13 high dangerous risks also cover the contents of project management in terms of: schedule, cost, quality, human resources, design, construction site, labour safety, mechanism legal policies, price fluctuations, community. This shows that the risk management is very important for the urban road transport project in Hanoi. When managing the risks, it is necessary to carefully consider the risk perspective of each project participant.

6. Conclusions

Risks are inevitable in the urban road transport projects in Hanoi. Recording 53 risks during the project construction process. In which, there are 5 risks belonged to the less dangerous zone, 35 risks belonged to the medium dangerous zone, 13 risks belonged to high dangerous zone. These 13 high dangerous risks cover all aspects of the project management. It can see differences in risk assessment between the project participants. the owner/project board management and the consultant have more in common in the risk management standpoint than the contractor's standpoint. The risk management standpoint of the project participants in the assessment of the risk severity has more consensus when assessing the risk probability. This paper focuses on 13 high dangerous risks. However, to get a more comprehensive the risk management standpoint of the project participants, need to do an extensive study covering all 53 identified risks for the urban road transport projects in Hanoi.

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