FACTORS AFFECTING TIME AND COST OVERRUN IN ROAD CONSTRUCTION PROJECTS IN ALBANIA

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Approval sheet of the Thesis

This is to certify that we have read this thesis entitled **"Factors affecting time and cost overrun in road construction projects in Albania"** and that in our opinion it is fully adequate, in scope and quality, as a thesis for the degree of Master of Science.

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ABSTRACT

FACTORS AFFECTING TIME AND COST OVERRUN IN ROAD CONSTRUCTION PROJECTS IN ALBANIA

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The construction industry, in Albania, is one of the main sectors that contributes in the economic and social development of the country. Recently it has become more and more difficult to complete the projects within the estimated time and budget, affecting in this way the economy of the country. As a result, time and cost overrun are considered as major problems in road construction sector in Albania.

The scope of this study is to define factors affecting time and cost overrun in road projects. The objectives of the thesis are carried out by using qualitative and quantitative research, as well as calculating risk of two case studies using Monte Carlo simulation method.

As a result it was found that the main factor causing time overrun from contractor's perspective is unforeseen ground conditions. The same result is from consultant's perspective. On the other hand, based on results obtained, the main factor causing cost overrun from contractor's perspective is design and documentation issues. The main factor causing cost overrun from consultant's perspective is said to be high inflation of prices.

Keywords: *cost, time, risk, factors, roads.*

ABSTRAKT

FAKTORËT QË NDIKOJNË NË TEJKALIMIN E KOHËS DHE KOSTOS SË PROJEKTEVE RRUGORE NË SHQIPËRI

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Udhëheqësi: Dr. Julinda Keçi

Në Shqipëri, industria e ndërtimit është një nga sektorët më të rëndësishëm në zhvillimin ekonomik dhe social të vendit. Kohët e fundit, është bërë mjaft e vështirë që projektet e ndërtimit të mbarojnë në kohën dhe me koston e përcaktuar që në fillim, duke ndikuar kështu në ekonominë e vendit. Si rezultat, tejkalimi i kohës dhe kostos po konsiderohen si problem madhor në ndërtimin e projekteve rrugore në Shqipëri.

Qëllimi i këtij studimi është identifikimi i faktorëve që ndikojnë në tejkalimin e kohës dhe kostos së projekteve rrugore, sipas këndvështrimit të kontraktorëve dhe konsulentëve. Objektivat e këtij studimi janë realizuar duke përdorur metodën e kërkimit cilësor dhe atë sasior, si dhe duke analizuar riskun e dy projekte rrugore me anë të metodës Monte Carlo.

Si rezultat, është përcaktuar që faktorët kryesorë që ndikon në tejkalimin e kohës sipas këndvështrimit të kontraktorit janë kushtet e paparashikueshme të tokës. I njëjti rezultat është sipas këndvështrimit të konsulentit. Nga ana tjetër, bazuar në rezultatet e marra, faktorët kryesorë në tejkalimin e kostos sipas këndvështrimit të kontraktorit janë çështjet e dizenjimit dhe dokumentacionit. Faktori kryesor që ndikon në tejkalimin e kohës sipas këndvështrimit të konsulentit, është inflacioni i lartë i çmimeve.

Fjalët kyçe: *kosto, kohë, risk, faktorë, rrugë.*

Dedicated to my family

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CHAPTER 1

INTRODUCTION

1.1 A background to construction industry

The “construction industry“ term, is generally defined as an activity for the creation of the civil engineers works, such as superstructure and infrastructure (dams, power plants, roads, railways, highways). It also includes all types of civil works, including building works, such as housing, as well as the repair and maintenance of old or existing buildings, J.Wells, [1].

G.Ofori, [2], describes the construction industry as a sector which plans, transforms, designs, constructs, and maintains different kinds of civil engineers buildings, mechanical works, electrical works and other similar works. Moreover, he defines construction as having different sectors which produce fixed, costly, durable and complex products.

D.Plessis, [3], gave another definition for construction. He defined construction as a large process for the creation of infrastructure, in order to support development of countries, and also as a broad mechanism for the realization of human residences. This includes the profit of raw materials, the production of construction components and materials and also the management of the building environment.

Construction industry, especially road infrastructure sector, is the base for the social and economic development between countries. It has an important impact for trade exchange and communication between national and international parties. Road infrastructure projects are said to be successful when they delivered in accordance with technical specification and on the estimated time, without any overrun. Unfortunately, many road construction projects suffer from time and cost overrun, which is a worldwide phenomenon to the damages of economic development, B.Flyvbjerg, [4].

1.2 Historical Road Construction Development of Albania

During Roman occupation, the most important road was Egnatia, who connected East with West . It was rebuild from roman consul Gnatius and coincides with the year 120 BC road. This passage way starts from Rome in Apia Road, and continues with Adriatic sea with two entrances into Illyrian territory. The first one was from sea port of Dyrrah (nowadays Durres port), the second one was from antic Apolloni and both of them merged in the end of Klodiana old city (nowadays Peqin), and then followed the road of Illyria (nowadays Albania), and finished in Kostandinopoja (nowadays Istanbul).

1882-1925

In 1882, there was a need for the Osmans to pass in Albania, and for that reason Ahmet Ejup Pasha built the road Manastir-Korca and Janine-Preveze. Until 1913, new roads were built in the function of this empire. These roads included the segment Durres-Tirane, Jorgucat-Sarande, Shkoder-Shengjin. The period from 1913-1925 was distinguished by the constructions of new roads, as well as continuation of construction for sections that didn't started previously.

In 1920, constructions of the road segment from Permet - Tri Urat and Elbasan-Korce were finished. The construction of road Shkoder- Vlore and Fier-Vlore were completed in 1921.

1925-1945

During 1925-1945, great efforts were made in order to create a national road network. The most investments were made in the period that Albania was monarchy, and those investments were up to 50 million francs, borrowed from Italian government. The constructed segments until 1945, were a sum of 2700 km. During this period, it were constructed some canalization and bridges. For the first time, it was invested in north of Albania. In these investments were included the construction of segment Shkoder-Puke, Kruje-Burrel, Burrel-Diber etc. Meanwhile, in the center of

Albania started the asphalting of main roads such as Tirane-Durres, Tirane -Elbasan. These constructions were made from qualified engineers in that period.

1945-1990

During first years, the communist regime made some extensions in road network, especially the areas with industrial importance. It was constructed a rural network that linked residential areas in south and north. The most important segments were Berat-Corovode, who was constructed in 1945, Kukes- Peshkopi in 1946, Milot-Burrel in 1952, Fier-Tepelene, Leskovik- Permet in 1970. Based on the facts, this was the period with more efforts to construct a better communication between all the provinces of Albania.

1990-2012

After 1991, Albania changed dramatically in all fields, including road networks. The emigration of a considered number of persons, brought a rapid population of roads with personal vehicles and the construction of hundred businesses, in a short time, who encouraged the need for restoration of roads, for easy transport of commodity. In few years, the urban areas returned to most coveted centers, because of the high concentration of population.

This dynamic development could not be coped without the collaboration of international partners for two reasons:

1. The construction of road network in Albania had lack of personal experience

2. The funding opportunities

The modern history of infrastructure of Albania, starts with the country involvement in the "Phare" program, funded by European Union, which started in 1994. This program served as incentive for the construction of important axes who would merged Albania with neighboring countries. The majority of the investments went on duty of

reconstructions of segments that connected East with West, and North with South. This project investment had a budget of 520 million €, for 194 km road, realized within 8 years. This investment not only created the first examples of modern roads in Albania, but also created the mentality of collaboration with foreign companies.

In 1994, the state created the first professional institutions, such as "General directorate of Roads", who started to be responsible for the ideas of road construction, where in collaboration with international partners created the foundations for road development in Albania. In September 2004, the French company Luis Berger, completed a master plan for Albanian transport. This plan has for the purpose the restoration of road network in Albania.

In 1993, it was created the "Albanian Development Fund", which was intended to invest in road projects in Albania. Over the past 19 years, has invested for 1170 road segments, to build a considered number of bridges and objects, for a total length of 3200 km, with a total budget of 550 million €.

During 2004-2008 period, the total investment of road projects has a value 8 times greater than in 2004.

2012- Present

During this period, the priority projects were : Shkozetit's by-pass (5km), Highways Sarande to Konispol (40km), Tre Urat to Permet (33 km), Dames to Tepelene (32 km), Lin to Pogradec (18 km), Shkoder to Han i Hotit (31 km), Kardhiq to Delvine (35km). These projects are a mutual financing of Albanian Government with European Bank for Reconstruction and Development, European Bank Investment, Italian Government and EU.

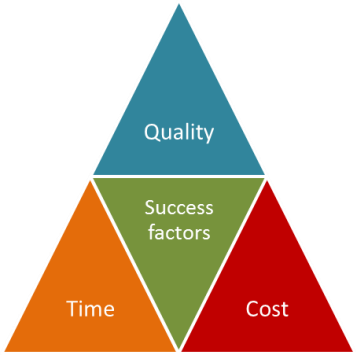
The largest segment ever built in Albania, is the road to Durres-Kukes- Morine, which connects Albania with Kosovo, with a total length of 117 km.

The second project, with a great importance for the Albanian Government, is Arbri Road, with a total length of 72, 6 km; which starts from Tirana until Macedonia.

Fig 1. Map of road network in Albania

1.3 Research problems

The main important factor of a successful project is the completion of construction projects in the estimated time duration and initially cost estimation. These factors help to decrease problems for all parties involved in the project. It is also helpful in the development of construction industry in Albania. According to the data from Albanian Road Authority, a considered number of construction projects in Albania suffer from delay problems, which can cause the inflation of cost, management problems between parties and also the loss of project's income.



Another big problem, related to construction, is cost overrun. Cost overruns lead to prevention of project's progress, because it decreases the income of contractors. This is a result of poor management skills, poor labor productivity, and inflation of material prices, environment and many other factors.

Based on these problems, it is important to make this research study to investigate the weakness point and give recommendations to prevent or minimize time and cost overruns at road construction projects.

1.4 Research objectives

This research study has these main objectives:

1. To identify whether time and cost overrun exist or not in road construction projects in Albania,

2. To determine which are the factor, that affect time overrun in road construction projects in Albania,

3. To determine which are the factor, that affect cost overrun in road construction projects in Albania,

4. To make recommendations based on the study results.

1.5 Research questions

1. Which are the factors that influence in time overrun of road construction projects in Albania?

2. Which are the factors that influence in cost overrun of road construction projects in Albania?

3. What is the current extend of the cost and time overruns in Albanian construction road projects?

1.6 Methodology

The methodology used for this thesis is mixed, which combines qualitative and quantitative methods. A Monte Carlo Simulation method is used, as well, to analyze the risk factors of two different case studies.

First of all, before identifying the factors that causes time and cost overrun, it has to be provided if there are cases in Albania, whether time and cost overrun exist or not. Based on this, some road projects are listed and evaluated their estimated completion cost and actual completion cost, and then calculated the rate of cost overrun. This procedure is also done for time delays.

Based on the literature review, where have been discussed factors that influence time and cost overrun in different countries, it was selected and choose the most common factors, which were helpful to complete and format the structure of the questionnaire. A section with 27 factors, related to time overrun, was designed from literature review of road construction projects in different countries. Meanwhile, a section with 18 factors was designed for cost overrun factors. These two sections, in concern with the section of general organization information, were the content of the questionnaire, which has been sent to 40 number of contractors and consultants. The procedure used in analyzing the results, is by using Relative Index Method RII.

Another questionnaire survey was also developed, which was distributed to about 260 people who are qualified in this field, such as; engineers, field specialists, etc. The survey was structured based on papers and researches done by different authors of the field.

The findings from both applied methods were combined to draw relevant conclusions and recommendations.

Also, the same factors derived from the above surveys, were used to get results of two road projects, which will be later analyzed with Monte Carlo method.

1.7 Significance of the study

The outcomes of this research will serve as a directive to construction project parties of Albania, such as contractors and consultants. In addition, the parties of

construction project will be informed how to avoid or minimize them. Moreover, the study will serve as a support for future researches, who wish to further investigate or make researches related to construction delays and overruns.

1.8 Limitations of the study

1) This study is limited to infrastructure projects, such as road projects, located in different parts of Albania, with different consultants and contractors.

2) The validity of the study is based on self-reported responses (In the sincerity of persons).

3) The data are collected in a period of time, not in different periods.

4) Analysis of two case studies.

1.9 Structure of the thesis

This thesis is divided into five main chapters.

1.9.1 Chapter 1

This chapter outlines an introduction to construction industry, historical road construction development in Albania, research problems, research objectives, research questions, methodology, and finally significance and limitations of the study.

1.9.2 Chapter 2

This chapter outlines definition of time and cost overrun, and their respective classification. Also it brings out the main factors causing cost overrun and delays in construction projects in different countries.

1.9.3 Chapter 3

This chapter describes the methodology used to pilot the research study. Accurately questionnaire survey and case studies, with their respective data collection and analysis.

1.9.4 Chapter 4

In this chapter are discussed the data analysis and results of the questionnaire survey and case studies obtained from the study. It also contains specific discussion on the major causes contributing to time and cost variance.

1.9.5 Chapter 5

This chapter gives conclusions and recommendations for future works.

CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

The construction industry is one of the significant industries, which contribute in the economic development of Albania. The size of the planning, scheduling and budgeting problems continues to grow, as the construction industry grows too. The incompetence to complete the projects in the estimated time and cost is a constant problem, in all over the world. Professionals, policy makers and people that deal with construction industry, had often debates related to the ways of eliminating or minimizing cost and time overruns. This is because nowadays, it is common to complete the projects not in the estimated time and not in the estimated cost.

The presence of different interest groups such as the project contractors, clients, consultants, material, contractual relations, scheduling and controlling techniques, environment, financial and political environment are the main complexity factors that make the projects hardly to complete in the estimated time and within the budget. The magnitude of rate of overruns changes from project to project.

In order to minimize the project delays, it is important to point out the actual factors that affect the cost and time of the projects in Albania. This chapter includes a background of general definition of time and cost overrun, with their respective classifications and types. Then, it review literatures concerning the factors causing construction project delays and factors causing cost overrun in different countries, in order to define the main factors dealing with cost and time in construction industry of Albania. This chapter also includes a case study of factors that affect time and cost overrun in Albania, by previous authors. In the end of this chapter, is given a review on main road projects with time and cost overrun in Albania.

2.2 Definition of time and cost overrun

2.2.1 Cost overrun

In general terms, cost overrun is defined as the term when the amount budget of the work is smaller than the total cost of the entire project. According to S.Jackson, [5], defined the cost overrun as the difference between final contract amount and initial contract amount, divided with the last one. For ease of comparison, it can be converted to a percentage value:

$$\text{Cost Overrun} = \frac{\text{Final contract amount-Initial contract amount}}{\text{Initial contract amount}} * 100$$

I.Avots, [6], defined cost overrun as the difference between the estimated cost and actual cost when the project is completely done.

R.M.Wideman, [7], defined cost overrun as the amount by which actual costs exceed the baseline of the initial agreed cost.

2.2.2 Time overrun

In general terms, project delays occur because of the inability to complete the project in the estimated time and within the budget. Sometimes the cost of delay can be as high as can't be absorbed by the client. This can result in the drop out of the project. So, it is significant to identify problems and causes in early stages of project examination, and predict best solutions to prevent the negatives influence of delay.

Related to construction, delay can be defined as the time excess of agreed date specified between parties for the delivery of the project. Delay is a usual problem in construction and is considered as a project sliding over its planned program. Despite several studies of the time overrun, it is evidently that there are different definitions, which are mostly used.

O'Brien, [8], defined the time overrun, as the delay in time to complete the project as in the agreed contract deadline or the delay in time to complete the project in the assigned date between parties, for the delivery of the project. In the perspective of

owner, the delays mean loss of income, through the dependence on actual facilities. In the perspective of contractor, delays mean larger costs because of inflation of material cost and due to increases of labor and equipment cost.

P.Kaming, [9], defined time overruns as the extension of time beyond agreed completion dates related to the contractors. Delays are responsible for postpone of project execution and progress. In general, project delays occur as a result of project activities that have both external and internal cause and effect relationship.

Another definition was proposed by G.R.Stumpf, [10], the event or act that stretch the time required to fulfill the tasks under a contract was the definition of G.R.Stumpf, [10], for the delay. It usually display as a delayed start of an activity or as extra days of work. In his article, he pointed out that diverse methods and techniques of analyzing the schedule of delay, lead to diverse results for the contractor and the owner. According to him, construction delay will always be a part of construction projects, even with the advance of technology and improvement of project management techniques.

2.3 Classification of construction projects delay

The different types of delay have importance in determining the critical activities which need much more detailed analysis to predict whether additional time extension is guarantee or not. T.William, [11], classified the delays in three basic categories: Excusable or non-excusable delay, Compensable or non-compensable, and Concurrent or non-concurrent delays.

All these types of delays have internal or external origins on project system. The causes that come from the contractors, owners, designers and consultants are said to be internal causes of delay. On the other hand, the causes that come from subcontractors, labor, equipment, environment, etc, are said to be external causes of delay.

2.3.1 Excusable or non-excusable delay

An excusable delay is a delay that occurs beyond subcontractor's or contractor's control, and that is caused due to an unpredictable event. In the cases that the delay is considered compensable, the contractor has the right to take extra project time, as well as financial compensation. On the other hand, when the delay is considered non-compensable delay, the contractor has the right to receive extra project time, but not financial compensation for the additional work. [12] Excusable delays are represented in three major elements as described on (Table *1*) below:

Table 1. Elements of excusable delays, M.T.Callahan, [12].

Unforeseen events	Events beyond the contractor's control	Events without fault or responsibility
This category refers to unpredictable causes of future events	This category refers to cases in which the work on the project is impossible.	This category refers to cases when the contractor is not implicated, such as acts of god or late delivery of material.

The opposite is for non-excusable delays. Non excusable delays are predictable and within the control of the contractor or subcontractor. They can result from the action or inactions of contractors. In the table below (*Table 2*), are shown some examples of excusable and non-excusable delays:

Table 2. Examples of excusable and non-excusable delays

Excusable delays	Non excusable delays, S.Mohan, [13]
▪ Acts of God ▪ Unusually severe weather ▪ Delay from client ▪ Unusual delay in deliveries ▪ Fire, flood, earthquakes ▪ Labor crises and conflicts ▪ Changes initiated by the owner	▪ Late performance of subcontractors ▪ Overall late execution ▪ Delayed mobilization ▪ Late performance of suppliers ▪ Faulty workmanship by the contractor or subcontractor

2.3.2 Compensable or non-compensable delays

A compensable delay is a delay where the contractor has the right to get additional project time and financial compensation. Related to excusable and non-excusable delays, only excusable ones can be compensable delays. On the other hand, the non-compensable delays mean that even if an excusable delay may happen, the contractor hasn't the right to get any financial compensation.

In order to define if a delay is compensable or not, it depends on the terms of the contract. Generally, in contracts are defined the kind of delays that are non-compensable. In these cases, the contractor can only be allowed for an additional time, but he doesn't receive extra money.

2.3.3 Concurrent or non-concurrent delays

Concurrent delay is the type of delay that happens when more than one single factor delays the project, at the same time. Unlike the excusable delays, for the concurrent delays, contractors and owners are liable and responsible for the delay. According to D.Rubin, [14], concurrent delays can be classified as:

1. Excusable delay and no excusable delay,
2. Excusable delay and compensable delay,
3. Excusable delay, no excusable and compensable delay,
4. No excusable delay and compensable delay.

2.4 Review on cost and time overruns comparison between countries

In 2011, V.Alexeeva, C.Queiroz and S.Ishihara, [15], made an article titled "Monitoring Road Works Contracts and Unit Cost for Enhanced Governance in Europe and Central Asia ". It includes the data collection of road projects in 14 countries: Albania, Armenia, Azerbaijan, Bosnia and Herzegovina, Bulgaria, Croatia, Estonia, Georgia, Kazakhstan, Macedonia, Poland, Romania, Serbia and Ukraine. For this study are covered 200 road work contracts.

2.4.1 Cost overrun averages

According to cost overruns rate, the largest contract increases are founded in Albania, Azerbaijan and Kazakhstan. In Albania, the average cost increase was 23%, in Azerbaijan the average cost increase is 31%, and in Kazakhstan the average of cost overrun was 47%. Meanwhile, in some countries such as Georgia, Estonia, Armenia and Serbia, the average of cost overrun is lower than 15%. The comparison averages between countries is given in (*Figure 2*) below:

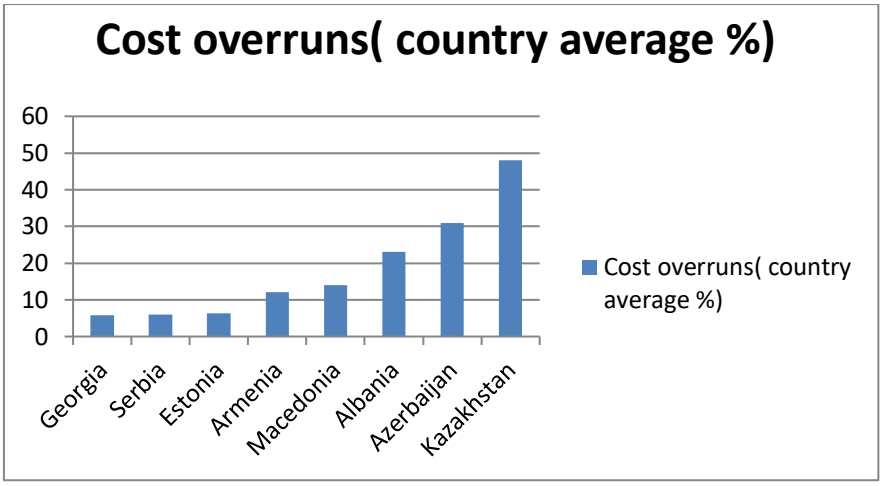


Figure 2. Cost overruns comparison %, 2011

2.4.2 Time overrun averages

According to the analysis of road construction documents, Romania and Azerbaijan are the countries with longest extensions of time. According to land expropriation issues and the diversion of public utilities factors, in Romania , the projects extensions goes to one and half year . In Azerbaijan, as a result of late commencement of road works observed in the implementation processes, the time extensions of the projects goes by almost a year. Albania, Serbia and Macedonia has an average about four months delays for road projects. In the (*Figure 3*) below, are shown the time comparison averages between countries:

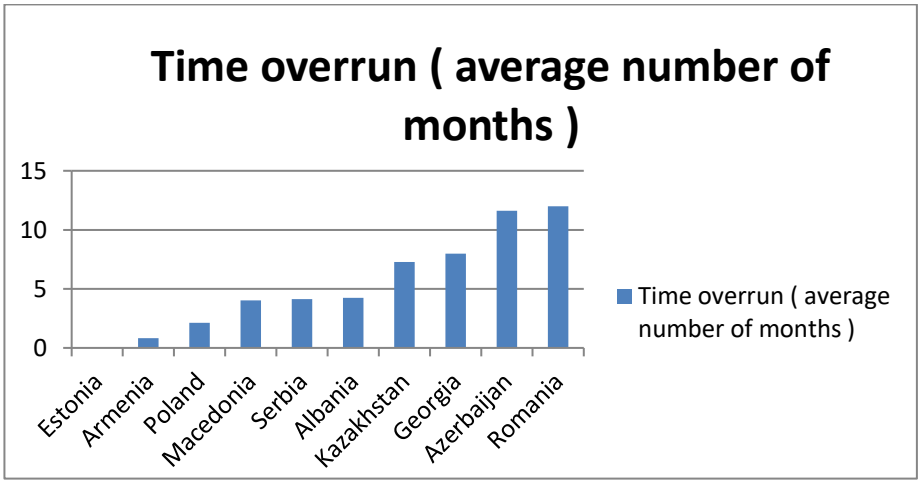


Figure 3. Time overruns comparison (%), 2011

2.4.3 Review on factors causing cost and time overruns

According to the main reasons that extend costs and time of the road projects in the above mentioned countries, V.Alexeeva, C.Queiroz and S.Ishihara, [15], pointed out that the most common factors were:

- Additional works, which relates to new quantities, items or unforeseen works, as variation orders during execution of the project.
- Weather conditions, which relates to the periods when is snowing or falling heavy rain, that exceeds normal levels.
- Delays in delivery of material, which relates to the cases when there is no sufficient quantities of the required material in the country, and should be import, which takes a few days.
- Inadequate design, which relates to design changes, because often the engineer's design does not contain the necessary details and actual parameters and conditions of the road, in order to be executed.
- Inadequate contractors, which related to poor performance of contractors because of lack of competence, experience, equipment and work techniques.

2.5 Literature review on factors causing cost overrun worldwide

In order to investigate the causes of cost overrun of construction projects, a considered number of academic researchers have carried out results over the years. Some of these were:

I.Mahamid, [16], in his research study of the identification of risk factors leading to cost overrun in from consultant’s perspective in West Bank in Palestine, pointed out that major factors influencing cost overrun are : political situation, economic

instability, level of competitors, unexpected inflation of prices of materials and currency exchange.

A.Memon, I.Rahman, A.Azis,[17], in their research study assessed cost and time performance of construction projects in Penisular Malaysia, by using questionnaire. Based on their findings, a considered percentage of responders mentioned that their projects suffer from cost overrun with average overrun at 5 to 10 %. Design and documentation issues, financial resource management, project management and contract administration, contractor's site management, delay of material and machinery resources were identified as major factors leading to cost overrun.

R.Apolot, D.Tindiwensi and H.Alinaitwe, [18], on their research study have done an investigation of the main causes of cost overrun and time delay in Uganda's public construction projects. The identified causes and factors, were ranked according to their frequency, severity and importance. Based on the investigation results, the major important causes of cost overrun in construction projects were found to be: changes in work scope, unexpected inflation of prices, poor management and monitoring, fuel shortage and delayed payment to the contractors.

M.Ramabodu and J.Verster, [19], on their research study, attempted to identify the factors contributing to cost overruns of construction projects in Free State Province of South Africa. Their study was based on a literature review analyzing factors which affect cost overruns, and based on these factors; a questionnaire was conducted to professionals of construction industry. Results of the questionnaire pointed out that the most critical factors of cost overrun are: changes in scope of work on site, incomplete design at time of tender, contractual claims, lack of cost planning and monitoring of funds and delays in costing variations and additional works.

V.Katre and D.Ghaitidak, [20], on their research study of identification of elements of cost and schedule overrun in construction projects in India, examined the reasons for overruns through personal questionnaires or interviews from Consultants, Contractors and Architects. The study pointed out that the most important factor that affects the cost overrun was the delay in preliminary handing over the site. It is followed by delays of material delivery and equipment by the contractor and highly inflation of prices, that contributes to cost overrun.

A.C.Rajakumar, [21], on his research study of analyzing cost overruns in road construction activities, has collected the most common factors of cost overrun from literature study and then sorted in a questionnaire format. The questionnaires were distributed to a sample of 50 people, that includes contractors, site engineers, supervisors and subcontractors, of which 30 questionnaires were received. The responders showed that increase in land cost, highly inflation of prices, delays in payments, force majeure and design changes during construction phase, were the most critical factors that influence in cost overrun of construction projects in India.

S.Wijekoon, [22], on his research study on finding the prime factors of cost overruns in road construction projects in Eastern and Northern Provinces in Sri Lanka, highlighted delays in payments, cost escalation, changes of design during construction, problems in land acquisition and delays in shifting existing utilities, as the key points of over-runs issues.

E.Bentil, R.Addy, E.Asare and A.Kusi, [23], on their research attempt to identify the level of existence, impact, causes and relative effects of cost and time overrun on the construction industry of Ghana. The study pointed out 34 factors, contributing in cost overrun of building construction projects in Ghana. The main highlighted factors, contributing to cost overrun were: changes in work scope, price escalation, lack of

cost planning during pre-contract and post-contract stages, contractual claims, poor project management and economic instability.

M.Mumuka and W.Thwala, [24], on their research study of the causes and effects of construction project schedule and cost overrun, summarized a literature review and survey of the main causes of schedule and cost overrun. The research study is conducted with reference to published, unpublished research and existing theoretical literature. Based on the related findings from the study, a considered number of factors which cause cost overrun were identified. They can be listed as below: fluctuation of prices of material, financial issues faced by the contractor, poor management and lack of experience.

G.Niazi and N.Painting, [25], on their research study of finding significant factors that deal with cost overrun in construction industry of Afghanistan, identified the key factors that can potentially affect the overruns in construction projects. Based on the data result of their research, they highlighted the most key critical factors, such as: corruption, poor management of contractors, delays in payments by the owner, change order by the owner, material inflation, and security.

2.6 Literature review on factors causing construction project delay worldwide

In order to investigate the causes of time overrun of construction projects, a considered number of academic researchers have carried out results over the years. Some of these were:

R.Sweis, A.Hammad and A.Shboul, [26], on their research study, pointed out the delays in construction projects and a case study of Jordan was analyzed. The methodology used, was as similar as the above research studies, but respondents were from different categories; consultant, contractors and owners. The factors causing the

delays according to consultants were: poor planning and scheduling of the project covered by the contractor, financial problems covered by the contractor and too many change orders covered by the owner. The factors causing the delays according to contractors were: financial problems covered by the contractor, too many change orders by the owner, shortage of manpower and unskilled labor. Meanwhile, according to the client, the factors that cause delays were: poor planning and scheduling of the project by the contractor, financial problems covered by the contractor and unskilled technical staff assigned to the project.

M.Mohamed, [27], related his research study on a case study project delay in Sudan. He based his research study on questionnaire results collected from consultants, contractors and clients. The respondents were asked to rank the list of overrun causing factors according to the five point liker scale. This was done by using SPSS program. The results figured out that the most critical factors causing delays in Sudan, in consultants' perspective were like: poor planning, inaccurate time estimation, design changes and inaccurate cost estimation. On the other hand, in contractors' perspective, the factors that affect delays in Sudan were: Errors during construction, old technology, late delivery of material, unskilled contractors, and poor management of staff.

F.Fugar and A.Agyakwah-Baah, [28], on their research study, investigated the most significant causes of time overrun according to the main project participants: contractors, clients and consultants. The list of main delay causes was obtained from the literature review. There were identified 32 possible causes of delays, which were subjected to a questionnaire survey. Based on the classification of Assaf et al's, [29], the survey data were grouped also into nine areas: material, equipment, environmental, manpower, contractual relations, changes, scheduling and controlling techniques and government action. The desk result study, indicate that the group ranked highest, by the responders, was financial group. The second group that follows the financial one was the material group. Financial group includes: delay in honoring

payment certificates, fluctuation of prices. Material group includes shortage of materials and late delivery of materials. Some more important causes of delay were: poor management, poor supervision, delays by subcontractors, staff crises, construction methods etc.

[18] Apolot, Alinaitwe and Tindiwensi, on their research study, investigated the causes of delay of construction projects of Uganda's Public Sector. The results of the study, ranked the following factors as the main causes of the delays in Uganda's project: delayed payments, poor control and monitoring, political issues, change of work scope and high cost of capital.

Mustefa, [29], on his research study, analyzed time overrun factors and their effects in Addis's Ababa construction projects. Delay to furnish and deliver the site, inadequate planning and financial issues were said to be the most critical causes of time overrun.

Katre and Ghaitidak, [20], on their research study of identifying elements of cost and schedule overrun in construction project in India, clarified that low productivity of labor, lack of maintenance of the equipment, and delaying in Bill settlement were the most influencing factors of time delays.

A.Odeh and H.Battaineh, [30], on their research study, of identifying the key causes of delays in traditional contracts, founded that among top ten important factors of delays, contractors and consultants agreed that labor productivity, inadequate experience of contractor, payments and financing, improper planning, owner interference and slow decision making are the key factors of delay.

2.7 Review on factors causing overruns in Albania related to a previous study

V.Ballhysa, M.Blloku, [31], on their research study titled "Critical factors affecting construction cost in Albania", analyzed main factors influencing on cost of projects, by using questionnaire survey and interviews. Data analyzed was done by using PASW statistical program. The respondents evaluated and ranked the listed factors as below: slow payments of completed works, financial difficulties covered by contractors, design changes, incompetence designers or contractors, the practice of choosing the lowest bidder. According to the least affecting factors, they are listed as: Shortage of materials, shortage of site workers.

2.7.1 Review on main road projects with time and cost overrun in Albania

Table 3. Road projects with cost overrun

Nr.	Project's name	Estimated completion cost (€)	Actual complection cost (€)	Rate of cost overrun (%)
1	Reconstruction of road "Domaj- Ura e Lapajve"	1360090.74	2436481.58	79.1 %
2	Road segment "Levan-Dames"	31595100.5	43538048.8	37.8 %
3	Road segment" Dames-Tepelene"	27932628.0	33811034.2	21.0%
4	Reconstruction of road "Vau Dejes- Nenshat"	1443531.9	1827361.19	26.6%
5	Bypass of Fier and Vlora	75160000	84160000	12.0%

6	Bridge of Farka -Bridge of Erzeni -Center	1410155.4	1677167.1	18.9 %
7	Road Milot-Balldren	14000000.2	20000000	70.00001%
8	Road Thumanë–Kashar	9200000	22500000	40.8%
9	Road Orikum – Dukat	5000000	7000000	21.42%
10	Arbri's road	150000000	253000000	59.2%

Table 4. Road projects with time overrun

Nr.	Project's name	Estimated completion time (days)	Actual completion time (days)	Rate of time overrun (%)
1	Reconstruction of road "Thumane-Laç"	456	1102	41.37%
2	Road segment "Levan-Dames"	2555	3285	77.7%
3	Road segment" Dames- Tepelene"	2190	4015	54.54%
4	"Vau Dejes- Nenshat"	730	1095	66.6%
5	Bypass of Fier and Vlora	1460	2190	66.7%
6	Road Milot-Balldren	2190	2555	85.7%
7	Road Orikum – Dukat	1825	2190	83%
8	Arbri's road	730	1460	50%

2.8 General description of four of the above road projects

2.8.1 Road "Thumanë–Kashar"

In the late 2000s, the Albanian government gave priority to a highway in the central part of the country, namely in Thumanë-Rrogozhina to connect the new North-South highway, according to a shorter variant and to avoid traffic in this area.

The first part of this 20 km segment, Thumanë-Kashar, was included in the 13 priority projects of the transport sector strategy for the period 2016-2020.

The document, which has received government approval, envisioned a cost of 92m euros for 20km, but now, two years after the strategy came into force, the Albanian government contracted the construction segment through the PPP concession for 225m euros. The company Gener 2 won the concession, after making the lowest bid. The cost at which the road will be built is 2.5 times higher than the government has forecast in the document it itself approved last year.

One kilometer from the Thumanë-Kashar highway will cost over 11m euros. Sector experts estimated that this is very high, as the highway passes in a plain part where some parts of the segment are paved. While the works of art are four kilometers of bridges and three junctions of underpasses and overpasses.

According to these results, Albania is among the countries with high costs in road construction. According to World Highways estimates, the highest cost of building highways per kilometer is Austria with over 12 million euros per kilometer, Hungary with 11 million euros and Germany with over 8 million euros. The high cost of these highways in these countries comes from the difficult terrain, as on the roads of mountainous areas, the cost per kilometer in Germany and Austria is over 25 million euros per kilometer.

Sector engineers are concerned that the contracting of a third of the Thumanë-Rrogozhina highway will make zero investments. In total, the axis is 72 kilometers

but the government has contracted with concession only 20 kilometers for the remaining kilometers from Kashari to Rrogozhina, the government has planned to spend 41 billion or 308 million euros. In total, the cost of the axis is estimated at 533m euros. A report by the Islamic Bank, which finances roads in Albania, estimated that the cost of Thumanë-Rrogozhina is 320 million euros.

2.8.2 Road "Milot-Balldren"

In the list of six segments programmed to be given with PPP concession, this year, published by the Ministry of Finance which accompanied the 2018 budget during the discussions in the Assembly, the Milot-Balldren road will cost 14.2 billion ALL, but the Ministry of Energy has given the bonus to the company ANK against the value of ALL 20 billion, with which a little more than 18 kilometers will be laid.

According to official data, the object of the project is the design, construction and maintenance of the road segment Milot-Balldren, which extends along the axis of the road that connects Milot with the city of Lezha and deviates as a completely new road, from the junction of the city of Lezha to in Balldren, where it is then connected to the existing road in the direction of Shkodra. It is thought that this road will be strategic for the coming years of development of the coastal area. The cost per kilometer of the project will be 8.8 million euros, several times higher than the cost for the highway that connects the capital with Shkodra. The road is of category A with a width of 25 meters.

This axis also facilitates communication with the rest of the northwest in Albania and with the neighboring country, Montenegro. This road also realizes the bypass of the city of Lezha, which is very necessary for this city.

2.8.3 Road "Orikum – Dukat"

Orikum - Dukat road is part of the package of concessions "One Billion", which has the dimensions of a local tourist road type C2 with two lanes, with a width of just over 7 meters. However, the government has decided to give a concession only its first part

Orikum-Dukat, for 50 million euros, nullifying the efficiency of the segment as in the case of Thumanë - Rrogozhina, where only half was given by concession. The part from Orikumi to Dukat will be a C2 category road, in which the projected speed of movement will be between the quotas 60-80 kilometers / hour according to the areas where it passes.

In 2009, the Albanian government built 35 kilometers of C2 type roads, which according to the data of the Ministry of Finance have cost 664 thousand euros per kilometer. One kilometer of local two-lane road will be built at a cost 5 times higher than in 2009.

2.8.4 Arberi's road

The Arbri Road, over 70 kilometers long, which connects Tirana with Macedonia via Dibra, started as an idea in 2008. The proposed project was a type C road, 7 meters wide, the total cost of which was initially estimated at 150 million euros, due to difficult works in a mountainous terrain with many tunnels. Because all studies found the road unfeasible, the government started building it with its own funds, but the 2008 crisis and high costs for the National Road limited the possibilities to build the Arbri Road, although some segments of it about 20 kilometers, have been completed, while the hardest part with the tunnels inside remained unfinished.

Seeing the difficulties of financing the road, the well-known engineer Faruk Kaba had proposed to the Albanian government a variant to build the remaining kilometers with only 70 million euros. But Mr. Kaba's proposal has not been considered, which is one of the creators of the largest road projects in the country.

Considered a populist project, Rruga e Arbrit was included in the 1 billion-euro package, with 250m euros in funding for 53 kilometers. The cost of one kilometer in this segment from the concession is 4.5 million euros per kilometer, more or less logical for the terrain with many tunnels and there is no big difference with the road Orikum - Dukat which does not have the same difficulty.

2.9 Summary of literature review

Table 5. Literature Review for Cost Overrun Critics Summary

No	Title	Year	Author	Main factors
1	Risk Leading to Cost Overrun in Building Construction from Consultant's Perspective	2011	Mahamid, [16]	• Political situation • Economic instability • Level of competitors • Unexpected inflation of material prices • Currency exchange
2	Time and Cost Performance in Construction Projects in Southern and Central Regions of Penisular Malaysia	2012	Memon , Rahman, Azis, [17]	• Design and documentation issues • Financial resource management • Project management and contract administration • Contractor's site management • Delay of material • Machinery resources
3	Investigation into the causes of delays and cost overruns in Uganda's public sector construction projects	2013	Apolot, Tindiwensi and Alinaitwe, [18]	• Changes in work scope • Unexpected inflation of prices • Poor management and monitoring • Fuel shortage • Delayed payments to the contractors
4	Factors contributing to cost overruns of construction projects	2010	Ramabodu and Verster,[19]	• Change in work scope • Incomplete design at time of tender • Contractual claims • Lack of cost planning • Lack of monitoring of funds • Delay in costing variation and additional works
5	Elements of Cost and Schedule Overrun in Construction Projects	2016	Katre and Ghaitidak, [20]	• Delay in preliminary handing over the site • Delays of material delivery • Highly inflation of prices

6	Analysis of cost overrun in road construction activities -A critical review	2016	Rajakumar, [21]	• Land cost • Highly inflation of prices • Delays in payments • Force majeure • Design changes during construction phase
7	Study on the cost overruns in road construction projects in Sri Lanka	2011	Wijekoon, [22]	• Delays in payments • Cost escalation • Changes of design during construction • Problems in land acquisition • Delays in shifting existing utilities
8	The level of existence and impact of cost and time overruns of building construction projects in Ghana	2017	Bentil, Addy ,Assare and Kusi, [23]	• Changes in work scope • Price escalation • Lack of cost planning during pre-contract and post-contract stages • Contractual claims • Poor project management • Economic instability
9	A theoretical review of the causes and effects of construction projects cost and schedule overruns	2014	Mumuka ,Thwala and Aigbavboa, [24]	• Fluctuation of prices of material • Financial issues covered by contractor • Poor management • Lack of experience of labor or contractor
10	Significant factors causing cost overruns in the construction industry in Afghanistan	2017	Niazi and Painting, [25]	• Corruption • Poor management of contractors • Delays in payment by the owner • Changer order by the owner • Material inflation prices • Security
11	Critical factors affecting construction cost in Albania	2014	Ballhysa, Blloku, [31]	• slow payments of completed works, • financial difficulties covered by contractors, • design changes, • incompetence designers or contractors,

Table 6. Literature Review for Time Overrun Critics Summary

No	Title	Year	Author	• Main factors
1	Delays in construction projects : The case of Jordan	2007	Sweis, Hammad and Shboul, [26]	• Poor planning and scheduling of the project covered by the contractor • Financial problems covered by the contractor • Change orders covered by the owner • Shortage of manpower • Unskilled labor • Unskilled technical staff assigned to the project
2	Contractor perspective on time overrun factors in Malaysian construction projects	2014	Memon, [17]	• Design changes • Financial difficulties of the owner • Change in scope of the project • Unforeseen ground condition • Late decision making
3	A study of project delay in Sudan Construction Industry	2015	Mohamed, [27]	• Inaccurate time estimation • Poor planning • Design changes • Inaccurate cost estimation • Project schedule changes • Errors during construction • Old technology • Late delivery of material • Unskilled contractors • Poor management of staff • Fluctuation of prices • Delays in payments to contractors • Economic problems • Contractual claims

4	Delays in Building Construction Projects in Ghana	2010	Fugar and Agyakwah-Baah, [28]	• Delay in honoring payment certificates, fluctuation of prices • Shortage of materials • Late delivery of materials • Poor management • Poor supervision • Delays by subcontractors • Staff crises • Construction methods
5	An investigation into the causes of delay and cost overrun in Uganda's public sector construction projects	2013	Apolot, Alinaitwe and Tindiwensi, [18]	• Delayed payments • Poor control and monitoring • Political issues • Change of work scope • High cost of capital
6	Factors affecting time and cost overrun in road construction projects in Addis Ababa	2015	Mustefa, [29]	• Delay to furnish and deliver the site • Inadequate planning • Financial issues
7	Elements of cost overruns, delays and risk involved in construction management	2016	Katre and Ghaitidak, [20]	• Low productivity of labor • Lack of maintenance of the equipment • Delaying in bill settlement
8	Causes of construction delays : traditional contracts	2002	Odeh and Battaineh, [30]	• Labor productivity • Inadequate experience of contractor • Payments and financing • Improper planning • Owner interference • Slow decision making

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter describes the methodology used to conduct this research study. It includes a full ranking of how data is collected. In addition to that, in this chapter will have a full explanation of questionnaire content, data collection and data analysis of questionnaire design, and a full insight of data collection of case studies and the method for analyzing the results.

Therefore, for the realization of this work are used both quantitative and qualitative research methods, which are explained as follows.

The theoretical framework acts as the basis of the research, while the primary data try to respond to the stated objectives of the research and provide evidence to support the secondary data. The baseline data for this study came from field professionals and citizens who completed the questionnaires. The empirical component of the study focuses on determining how experts think and how citizens think about these factors.

This study aims to provide unique knowledge on overcoming time and costs in road projects.

3.2 Research methodology

The research methodology used in this paper consists of combining primary and secondary data. The collection of primary data, for the realization of the empirical part of the study, was achieved through a survey conducted in businesses. The questionnaire questions were mainly structured and with multiple solutions and were designed in such a way that they were clear and not misinterpreted by the survey subjects. The order of the questionnaire was compiled in such a way as to start with

general questions on the activity of these enterprises and then to continue with narrower questions that are directly related to the topic.

The survey was conducted with the responsible persons of the enterprises, specialists and citizens. The reason for communicating only with the responsible persons of these enterprises was to obtain more accurate information about the general activity of these enterprises. This data collected through this survey was then processed and analyzed through Excel. While through secondary data we have identified the theoretical background of the topic. Various literature and reports were used to collect this data. This includes studying books and articles from various national and international conferences. Both of these types of data, both primary and secondary, have enabled us to successfully achieve the work objective and have enabled its successful realization.

3.3 Quantitative strand

3.3.1 Questionnaire content

The questionnaire design is prepared in order to answer the research questions and also to realize the objectives of the study.

The questionnaire content is composed into three sections:

The first section is a composition of four questions, where the first question is related to name of organization, the second question is related to the respondent organization type, in which the choice options are: client, contractor or consultant. The third question is related to respondent designation, in which the choice options are: owner of organization, project manager, site engineer and office engineer. The fourth question is related to relevant working experience in years, in which the choice options are: 1-4 years, 4-8 years, 8-12 years or greater than 12 years.

The second section of the questionnaire survey is related to the factors that causes time overrun of road construction project. A total of 27 factors responsible for time overrun, were carefully designed from early review studies conducted from literature

review. The significance of each factor is selected in the form of a priority scaling (1 = not significant, 2= slightly significant, 3= moderately significant, 4=very significant and 5=extremely significant).

The third section of the questionnaire survey is related to the factor that cause cost overrun in road construction project. A total of 18 factors responsible for cost overrun, were carefully designed from early review studies conducted from literature review. The significance of each factor is evaluated in the same way as for the responsible factors of time overrun.

3.3.2 Data Collection

The questionnaire design is done by taking in consideration different articles or master's thesis related to similar cases and similar objectives, by different authors all over the world. The formulation of the questionnaire content is done based on a questionnaire survey, prepared by A.Mustefa, [29], on his research study titled "Factors affecting time and cost overrun in road construction projects in Addis Ababa". The questionnaire survey is prepared in the English language, as well as in the Albanian language, for the persons who don't have fluently knowledge of English. It is prepared with understandable questions, in order to be easily answered by the respondents.

The questionnaire survey was prepared and distributed to professional respondents, which have dealt with cost and time overrun in projects. It includes a total number of 40 company profiles, with different type of organizations and different years of experience. From the 40 surveys distributed, 19 of them were completed, that means 47,5 % of the respondents were part of the contribution of this study.

3.3.3 Data Analysis

The methodology used to analyze the results of questionnaire survey 1 is by using Relative Index Method:

$RII = \frac{\sum W}{A*N} (0 \leq RII \leq 1)$, where the mentioned characters are:

- RII - Relative Importance Index
- $\sum W$ = Weighting given to each factor by the respondents, which in this case ranges from 1 to 5
- A = The highest weight
- N= Total number of respondents

3.4 Qualitative strand

3.4.1 Survey content

The survey design is composed by ten open-ended questions with multiple choices. The closed-ended questions consist of a list of questions with possible answers that the respondents can check. Closed queries were used to make coding easier. Respondents were able to answer topics that were relevant to the study using multiple choice questions. The clarity of the questionnaire form was critical to ensure that respondents understood the questions correctly as intended by the researcher.

3.4.2 Data Collection

The questionnaire was developed using the theoretical framework - decision making, information processing theory and social media marketing - which was thoroughly discussed in previous research chapters. Not all of the ideas previously expressed could be included in the questionnaire due to the researcher's request to keep the questionnaire widely accepted. The questions were organized logically based on the stages of the decision-making process: problem discovery, information gathering, alternative evaluation, final choice, and post-purchase behavior. The

questions also included aspects of information processing theory. The survey was conducted using a customized questionnaire by Lee, [32].

3.4.3 Data Analysis

After data collection, the findings were analyzed using Microsoft Office Excel and the results were displayed in tables with corresponding frequencies and percentages. Data tables were aided in the rapid comparison of statistical data presented in rows and columns. Moreover, the tables helped clarify complex situations and uncover hidden truths that were not apparent from the tabular data.

3.5 Monte Carlo Method

Monte Carlo Simulation, also known as the Monte Carlo Method or a multiple probability simulation, is a mathematical technique, which is used to estimate the possible outcomes of an uncertain event.

3.5.1 Data Collection

The Monte Carlos Method was achieved through two surveys that are used in the implementation of this project. The methodology used is based on paper: S.Brokbals, V. Wapelhorst, I.Čadež, [33], "Calculation of risk costs in construction projects".

The purpose is that the above questionnaires were sent and once online to the contractors of the case studies projects, to extract the probability of the data and to reach the result of the Monte Carlos method. The ranking of responses is as follows; from which are derived the numerical probability data in percentage and the number of projects depending on the occurrence of individual risk.

E.S.= extremely significant(5)

V.S.= very significant (4)

M.S.=moderately significant (3)

S.S.= slightly significant (2)

N.S.= not significant (1)

Given that in Albania there is no real study at an earlier time about the factors that affect time and cost overrun in road construction projects, it will be considered two case studies. These two case studies are: "Arberi's road" and road "Orikum-Dukat". The questionnaires used above, will be sent to the contractors of these case studies. The contractors will answer 26 questions which measured the risk of cost overruns expressed in rank. The results obtained will be analyzed later with the Monte Carlo method.

These two roads have the same problems in terms of costs and time, although with different values and deadlines, so what changes are the external conditions and length.

3.5.2 Data Analysis

Based on [44] S.Brokbals ,during the risk identification, the individual risks [k] of the project are captured and subsequently compiled in a risk list, which provides the basis for the following risk management process. Afterwards, in the course of the risk evaluation, a first appraisement of the individual risks [k] is made. Thereby both, the probability of risk occurrence [Pk] and the cost amount by risk occurrence [Ck] are evaluated (eg, verbal classification extremely significant, very significant, moderately significant, slightly significant, and not significant. The product of these values results in the risk costs of individual risks in % of the construction costs [Rk].

$R_{Project,k}$ = project risk costs of individual risks [€]; Pk = probability of risk occurrence in % of the number of projects; C_k = cost amount by risk occurrence in % of the construction costs. In this way the following questions were used using online surveys and data from the above case studies and the following steps:

- Step 1: Define the distribution function according to the online survey
- Step 2: Customize the data using distribution customization
- Step 3: Simulation of risk risks of individual risks [Rk]
- Step 4: Simulate the project risk risks of individual risks [RPproject, k]

CHAPTER 4

DATA PRESENTATION, ANALYSIS AND DISCUSSION

4.1 Introduction

This chapter describes data presentations, analysis and discussion of the qualitative and quantitative research method results, which concern with factors affecting time and cost overrun in road construction projects in Albania, Also, in this chapter are represented the results of case studies, using Monte Carlo Simulation.

Data collection of quantitative research (questionnaire survey) will be analyzed and evaluate with Relative Index Method RII.

Data collection of qualitative research (survey design) will be analyzed by using Microsoft Excel.

Data collection of case studies will be analyzed by using Monte Carlo Simulation method.

The purpose of data analysis and interpretation is to turn the information gathered into compelling evidence about the progress and effectiveness of the intervention.

4.2 Results of quantitative research

4.2.1 Background information of the respondents

This part represents the results and analysis of the first section of questionnaire, which concerns with types of respondent's organization, respondent designation and their relevant experience.

The questionnaire survey was distributed to 40-company profile, with different respondent's organization type. From the 40 surveys distributed, 19 of them were completed, that means 47, 5 % of the total respondent's rate were part of the contribution of this study. In Table 7, is shown that the total number of questionnaire distributed for the contractors were 24, and only 12 of them were returned back (50%). The total number of questionnaire distributed for the consultants were 16, and only seven of them were returned back (44%). Based on these facts, in this study, participated 63, 2 % (12 contractors) and 36, 8 % (7 consultants), as shown in *Figure 4*.

Table 7. Respondent's organization type

	Consultants	**Contractors**
Questionnaire Distributed	16	24
Questionnaire Returned	7	12
Response Rate	44%	50%

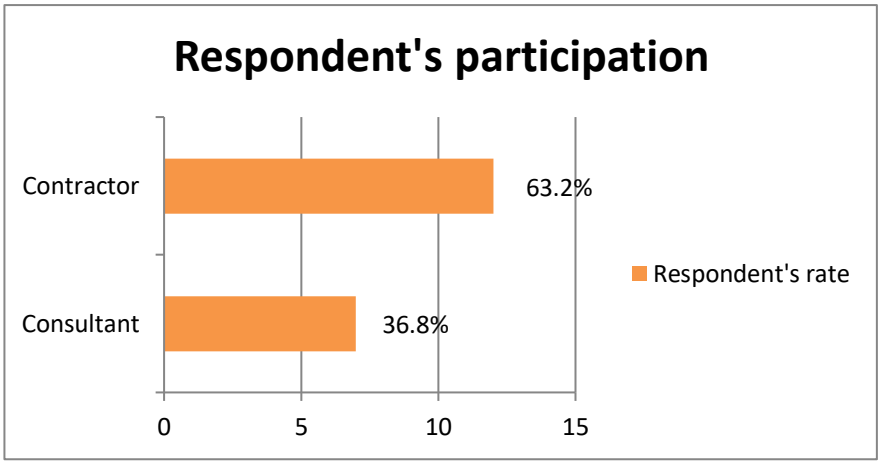


Fig 4. Respondent's participation rate

In Table 8 shown below, it has been found that 25 % (3) of contracting companies were owners of the organization, 50% (6) were office engineers, 0% (0) were site engineers and 25% (3) were projects managers.

On the other hand, for consultant companies, 43% (3) were owners of the organization, 28.5 % (2) were office engineers, 0 % (0) were site engineers and 28.5 % (2) were projects managers.

From the total 19 respondent designation received, as shown in Figure 5, 32% (6) were owners of the organization, 42 % (8) were office engineers, 0% (0) were site engineers and 26 % (5) were projects managers.

	Consultants	**Contractors**
Owner of organization	3	3
Project manager	2	6
Site engineer	0	0
Office engineer	2	3

Table 8. Respondent designation

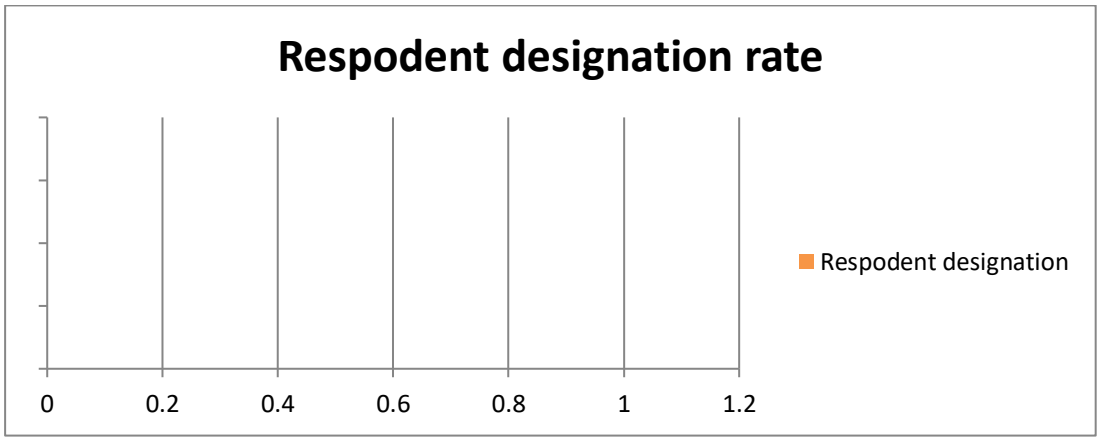


Figure 5. Total respondent designation rate

In Table 9, is shown that 16,5 % (2) of the contracting companies have experience 1-4 years in construction sector, 25 % (3) of them have 4-8 years of experience, 16.5 % (2) have 8-12 years of experience and 42% (5) of them have >12 years of experience.

On the other hand, in the same Table 9, is shown that 14 %(1) of consultant companies have 1-4 years of experience, 43% (3) have 8-12 years of experience and 43% (3) have >12 years of experience in construction sector.

From the total 19 respondents, 16 % (3) of them have 1-4 years of experience, 16% (3) have 4-8 years of experience, 27% (5) of them have 8-12 years of experience and 41% (8) of them have >12 years of experience, as represented in (*Figure 6)*.

Table 9. Relevant working experience (years)

	Consultants	**Contractors**
1- 4 Years	1	2
4-8 Years	0	3
8-12 Years	3	2
>12 Years	3	5

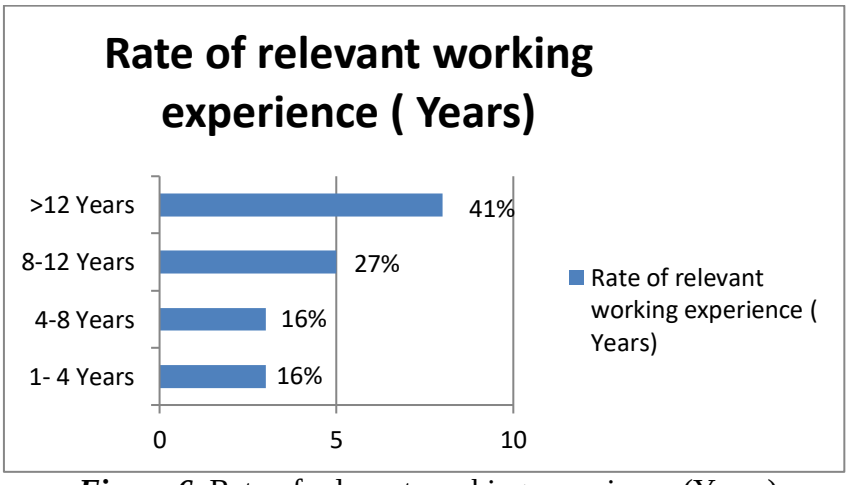


Figure 6. Rate of relevant working experience (Years)

4.2.2 Factors affecting time overruns in road construction projects in Albania

This part represents the results and analysis of second section of questionnaire survey. The results were obtained by using Relative Index Method RII, as mentioned in chapter 3, and concerns with factors affecting time overrun of road construction projects, from consultants and contractors perceptive.

4.2.2.1 Contractor's perspective

Based on the data gathering and evaluation, shown in Table 10, there has been a ranking of all factors causing time overrun, based on contractor's perspective, by calculating ∑W (Weighting of each factor, given by respondents).

CAUSES OF TIME OVERRUN	CONTRACTOR'S PERSPECTIVE												Σ W
Unforeseen ground conditions	5.00	5.00	5.00	2.00	1.00	4.00	5.00	5.00	5.00	5.00	4.00	5.00	**51.00**
Owner interference	2.00	5.00	5.00	4.00	1.00	5.00	4.00	5.00	5.00	3.00	1.00	5.00	**45.00**
Late decision making	2.00	5.00	4.00	4.00	1.00	4.00	5.00	5.00	5.00	5.00	1.00	4.00	**45.00**
Financial problems	4.00	3.00	4.00	3.00	1.00	4.00	4.00	5.00	4.00	4.00	3.00	5.00	**44.00**
Poor management of staff	1.00	4.00	3.00	3.00	3.00	4.00	4.00	5.00	4.00	5.00	4.00	4.00	**44.00**
Delay to furnish and deliver the site	2.00	4.00	4.00	2.00	4.00	5.00	-	5.00	5.00	4.00	4.00	4.00	**43.00**
Fluctuation of prices	1.00	4.00	5.00	4.00	2.00	3.00	4.00	5.00	4.00	3.00	4.00	4.00	**43.00**
Shortage and late delivery of materials	3.00	3.00	4.00	3.00	2.00	2.00	3.00	5.00	5.00	5.00	2.00	4.00	**41.00**
Shortage of manpower	4.00	4.00	4.00	4.00	1.00	4.00	-	4.00	4.00	5.00	2.00	5.00	**41.00**
Change orders	3.00	4.00	4.00	2.00	2.00	3.00	3.00	5.00	5.00	5.00	2.00	2.00	**40.00**
Poor planning and scheduling of the project	4.00	1.00	3.00	4.00	1.00	5.00	3.00	5.00	4.00	4.00	3.00	3.00	**40.00**
Weather conditions	2.00	4.00	3.00	2.00	2.00	4.00	5.00	5.00	5.00	-	4.00	4.00	**40.00**

Old technology	1.00	3.00	2.00	2.00	5.00	4.00	5.00	3.00	3.00	4.00	5.00	3.00	**40.00**
Design changes	4.00	3.00	4.00	2.00	1.00	3.00	-	5.00	5.00	5.00	2.00	5.00	**39.00**
Errors during construction	4.00	4.00	5.00	3.00	2.00	5.00	-	5.00	4.00	-	2.00	4.00	**38.00**
Project schedule changes	2.00	4.00	4.00	4.00	3.00	5.00	1.00	5.00	-	5.00	2.00	3.00	**38.00**
Change in scope of the project	3.00	3.00	4.00	3.00	1.00	4.00	4.00	4.00	4.00	3.00	2.00	2.00	**37.00**
Unskilled labor	4.00	4.00	2.00	2.00	2.00	5.00	3.00	5.00	3.00	-	4.00	3.00	**37.00**
Unskilled contractors	3.00	4.00	4.00	3.00	1.00	4.00	-	4.00	5.00	-	3.00	5.00	**36.00**
Preparation and approval of drawings	1.00	4.00	2.00	2.00	2.00	4.00	5.00	4.00	4.00	5.00	3.00	-	**36.00**
Suspension of work by the owner or contractor	3.00	4.00	4.00	1.00	1.00	5.00	-	4.00	5.00	-	4.00	2.00	**33.00**
Force majeure	2.00	4.00	4.00	4.00		2.00	-	4.00	4.00	-	3.00	4.00	**32.00**
Delays by subcontractors	2.00	3.00	4.00	2.00	1.00	4.00	-	3.00	4.00	-	3.00	4.00	**30.00**
Delays in payments covered by the owner	3.00	4.00	4.00	2.00	1.00	3.00	-	4.00	4.00	-	1.00	4.00	**30.00**
Political issues	2.00	4.00	2.00	1.00	4.00	3.00	-	2.00	3.00	3.00	4.00	2.00	**30.00**
Inaccurate time estimation	3.00	-	4.00	2.00	1.00	5.00	-	4.00	5.00	-	1.00	4.00	**29.00**
Lack of maintenance of equipment	2.00	4.00	3.00	2.00	1.00	3.00	-	3.00	4.00	-	2.00	3.00	**27.00**

Table 10. Data gathering and evaluation

According to results obtained, " Unforeseen ground conditions " seems to be the main factor causing time overrun in road construction projects in Albania, with a relative index coefficient 0,85. Unforeseen ground conditions refers to the unpredictable geological or seismological conditions during construction phase. The second important factor seems to be "Owner interference" with a relative index coefficient 0, 75; which is followed by "Late decision making" with a similar relative index coefficient 0, 75. Owner has a main role in the execution of the project, and his interference in appointment of contractors causes changes in approvals and policies. Meanwhile, late decision-making refers to late decisions by part of client or

consultant, of which many work activities are interrupted until the final decision. The fourth ranked factor related to time overrun, is "Financial problems ", with a relative

Index coefficient 0.73, which is also followed by "Poor management of staff", with a similar RII coefficient 0.73. Financial problems are very common for the contractors, because they are not paid evenly from the owners, causing delays in finishing the project in time. Meanwhile, poor management of staff refers to inadequate project manager, poor organization and lack of responsibility

Based on the RII coefficient, the importance of each factor is given in (*Table 11*) below:

CAUSE OF TIME OVERRUN	ΣW	A	N	A*N	RII
Unforeseen ground conditions	51.00	5.00	12.00	60.00	0.85
Owner interference	45.00	5.00	12.00	60.00	0.75
Late decision making	45.00	5.00	12.00	60.00	0.75
Financial problems	44.00	5.00	12.00	60.00	0.73
Poor management of staff	44.00	5.00	12.00	60.00	0.73
Delay to furnish and deliver the site	43.00	5.00	12.00	60.00	0.71
Fluctuation of prices	43.00	5.00	12.00	60.00	0.71
Shortage and late delivery of materials	41.00	5.00	12.00	60.00	0.68
Shortage of manpower	41.00	5.00	12.00	60.00	0.68
Change orders	40.00	5.00	12.00	60.00	0.66
Poor planning and scheduling of the project	40.00	5.00	12.00	60.00	0.66
Weather conditions	40.00	5.00	12.00	60.00	0.66
Old technology	40.00	5.00	12.00	60.00	0.66
Design changes	39.00	5.00	12.00	60.00	0.65
Errors during construction	38.00	5.00	12.00	60.00	0.63
Project schedule changes	38.00	5.00	12.00	60.00	0.63
Change in scope of the project	37.00	5.00	12.00	60.00	0.61

	Unskilled labor	37.00	5.00	12.00	60.00	0.61
	Unskilled contractors	36.00	5.00	12.00	60.00	0.60
	Preparation and approval of drawings	36.00	5.00	12.00	60.00	0.60
	Suspension of work by the owner or contractor	33.00	5.00	12.00	60.00	0.55
	Force majeure	32.00	5.00	12.00	60.00	0.53
	Delays by subcontractors	30.00	5.00	12.00	60.00	0.50
	Delays in payments covered by the owner	30.00	5.00	12.00	60.00	0.50
	Political issues	30.00	5.00	12.00	60.00	0.50
	Inaccurate time estimation	29.00	5.00	12.00	60.00	0.48
	Lack of maintenance of equipment	27.00	5.00	12.00	60.00	0.45

Table ***11.*** Relative Index Coefficient

4.2.2.2 Consultant's perspective

In Table 12 are shown data gathering and evaluation of the results, based on consultant's perspective, by calculating ∑W (Weighting of each factor, given by respondents):

CAUSE OF TIME OVERRUN	CONSULTANT'S PERSPECTIVE							ΣW
Unforeseen ground conditions	5.00	3.00	4.00	5.00	4.00	5.00	4.00	**30.00**
Financial problems	2.00	5.00	2.00	5.00	5.00	5.00	5.00	**29.00**
Poor planning and scheduling of the project	3.00	3.00	2.00	5.00	4.00	5.00	5.00	**27.00**
Fluctuation of prices	4.00	4.00	3.00	3.00	4.00	4.00	4.00	**26.00**
Change orders	1.00	5.00	3.00	4.00	4.00	4.00	4.00	**25.00**
Late decision making	3.00	3.00	2.00	4.00	5.00	4.00	4.00	**25.00**
Errors during construction	4.00	4.00	3.00	3.00	4.00	3.00	4.00	**25.00**
Shortage and late delivery of materials	4.00	-	3.00	5.00	4.00	4.00	4.00	**24.00**

Change in scope of the project	3.00	3.00	3.00	4.00	4.00	3.00	4.00	**24.00**
Inaccurate time estimation	3.00	4.00	3.00	3.00	4.00	3.00	4.00	**24.00**
Shortage of manpower	1.00	4.00	5.00	4.00	3.00	4.00	3.00	**24.00**
Project schedule changes	2.00	4.00	2.00	5.00	4.00	3.00	4.00	**24.00**
Delay to furnish and deliver the site	2.00	3.00	4.00	4.00	3.00	3.00	4.00	**23.00**
Poor management of staff	2.00	4.00	2.00	3.00	4.00	4.00	4.00	**23.00**
Weather conditions	3.00	3.00	1.00	4.00	3.00	4.00	4.00	**22.00**
Owner interference	5.00	3.00	1.00	-	3.00	4.00	5.00	**21.00**
Suspension of work by the owner or contractor	3.00	3.00	2.00	3.00	3.00	4.00	3.00	**21.00**
Design changes	1.00	3.00	1.00	4.00	4.00	4.00	4.00	**21.00**
Force majeure	1.00	3.00	4.00	3.00	3.00	3.00	4.00	**21.00**
Preparation and approval of drawings	1.00	2.00	2.00	4.00	4.00	4.00	4.00	**21.00**
Political issues	5.00	2.00	2.00	3.00	3.00	3.00	3.00	**21.00**
Delays by subcontractors	2.00	3.00	3.00	3.00	3.00	3.00	3.00	**20.00**
Delays in payments covered by the owner	2.00	3.00	2.00	3.00	3.00	3.00	3.00	**19.00**
Lack of maintenance of equipment	1.00	2.00	2.00	4.00	3.00	3.00	4.00	**19.00**
Unskilled contractors	2.00	-	3.00	3.00	4.00	3.00	3.00	**18.00**
Old technology	1.00	2.00	2.00	3.00	3.00	3.00	3.00	**17.00**

Table 12. Data gathering and evaluation

Based on the results obtained, it seems that the first important factor causing time overrun, in consultant's viewpoint, is the same as the first factor ranked by the contractor's viewpoint. So, "Unforeseen ground conditions" is the first ranked factor, with a relative index coefficient 0, 85. It is followed by "Financial problems", with a RII coefficient 0, 82. The third factor, it seems to be "Poor planning and scheduling of the project ", with a relative index coefficient 0, 77. Poor planning and scheduling of the project refers to inadequate establishment processes and tasks required to achieve

the project's objectives within cost and schedule. In Table 13 below, are ranked all the factors influencing time of construction projects, related to consultant's responses:

Table 13. Relative Index Coefficient

	CAUSE OF TIME OVERRUN	SW	A	N	A*N	RII
	Unforeseen ground conditions	30.00	5.00	7.00	35.00	0.85
	Financial problems	29.00	5.00	7.00	35.00	0.82
	Poor planning and scheduling of the project	27.00	5.00	7.00	35.00	0.77
	Fluctuation of prices	26.00	5.00	7.00	35.00	0.74
	Change orders	25.00	5.00	7.00	35.00	0.71
	Late decision making	25.00	5.00	7.00	35.00	0.71
	Errors during construction	25.00	5.00	7.00	35.00	0.68
	Shortage and late delivery of materials	24.00	5.00	7.00	35.00	0.68
	Change in scope of the project	24.00	5.00	7.00	35.00	0.68
	Inaccurate time estimation	24.00	5.00	7.00	35.00	0.68
	Shortage of manpower	24.00	5.00	7.00	35.00	0.68
	Project schedule changes	24.00	5.00	7.00	35.00	0.68
	Delay to furnish and deliver the site	23.00	5.00	7.00	35.00	0.65
	Poor management of staff	23.00	5.00	7.00	35.00	0.65
	Weather conditions	22.00	5.00	7.00	35.00	0.62
	Owner interference	21.00	5.00	7.00	35.00	0.60
	Suspension of work by the owner or contractor	21.00	5.00	7.00	35.00	0.60
	Design changes	21.00	5.00	7.00	35.00	0.60
	Force majeure	21.00	5.00	7.00	35.00	0.60
	Preparation and approval of drawings	21.00	5.00	7.00	35.00	0.60

Political issues	21.00	5.00	7.00	35.00	0.60
Delays by subcontractors	20.00	5.00	7.00	35.00	0.57
Delays in payments covered by the owner	19.00	5.00	7.00	35.00	0.54
Lack of maintenance of equipment	19.00	5.00	7.00	35.00	0.54
Unskilled contractors	18.00	5.00	7.00	35.00	0.51
Old technology	17.00	5.00	7.00	35.00	0.48
Unskilled labor	17.00	5.00	7.00	35.00	0.48

4.2.3 Factors affecting cost overruns in road construction projects in Albania

This part represents the results and analysis of the third section of the questionnaire survey, which deals with factors affecting cost overrun of road construction projects in Albania, from contractor and consultant's viewpoint.

As in the above section 4.2.2, the data evaluation will be done by using Relative Index Method.

4.2.3.1 Contractor's perspective

Based on the data gathering and evaluation, shown in Table 14, there has been a ranking of all factors causing cost overrun, based on contractor's perspective, by calculating ∑W (Weighting of each factor, given by respondents):

CAUSES OF COST OVERRUN	CONTRACTOR'S PERSPECTIVE												ΣW
Design and documentation	5.00	4.00	4.00	3.00	4.00	4.00	4.00	4.00	5.00	4.00	3.00	5.00	**49.00**
Poor management and monitoring	3.00	4.00	5.00	4.00	-	5.00	5.00	5.00	5.00	5.00	2.00	4.00	**47.00**

Lack of experience of labor or contractor	4.00	4.00	3.00	2.00	5.00	2.00	5.00	4.00	4.00	5.00	4.00	5.00	**47.00**
Financial resource management	4.00	5.00	2.00	2.00	5.00	4.00	4.00	4.00	4.00	4.00	4.00	4.00	**46.00**
Delays in payments	3.00	3.00	3.00	2.00	5.00	4.00	3.00	5.00	5.00	5.00	3.00	5.00	**46.00**
Incomplete design at time of tender	2.00	4.00	3.00	3.00	5.00	3.00	5.00	4.00	4.00	4.00	3.00	4.00	**44.00**
Highly inflation of prices	5.00	3.00	4.00	3.00	2.00	4.00	-	4.00	5.00	5.00	4.00	5.00	**44.00**
Inaccurate cost estimation	2.00	4.00	4.00	4.00	3.00	5.00	4.00	3.00	4.00	4.00	2.00	4.00	**43.00**
Problems in land acquisition	3.00	5.00	2.00	2.00	5.00	5.00	-	4.00	4.00	4.00	3.00	5.00	**42.00**
Change in work scope	2.00	3.00	3.00	3.00	4.00	5.00	3.00	4.00	5.00	4.00	2.00	4.00	**42.00**
Changes of design during construction	2.00	4.00	3.00	2.00	3.00	4.00	4.00	5.00	5.00	4.00	2.00	4.00	**42.00**
Political issues	4.00	4.00	4.00	3.00	3.00	5.00	-	4.00	4.00	4.00	3.00	4.00	**42.00**
Delay in costing variation and additional works	4.00	3.00	2.00	2.00	-	5.00	4.00	3.00	5.00	4.00	4.00	5.00	**41.00**
Change order by the owner	2.00	2.00	4.00	4.00	1.00	3.00	4.00	5.00	4.00	3.00	2.00	4.00	**38.00**
Contractual claims	4.00	4.00	2.00	2.00	2.00	5.00	3.00	5.00	3.00	-	3.00	4.00	**37.00**
Force majeure	2.00	3.00	3.00	3.00	1.00	4.00	-	4.00	4.00	-	2.00	5.00	**31.00**
Machinery resources	4.00	-	3.00	3.00	3.00	3.00	-	4.00	4.00	-	2.00	4.00	**30.00**
Delays of material delivery	3.00	3.00	2.00	1.00	5.00	3.00	-	2.00	3.00	-	4.00	3.00	**29.00**

Table 14. Data gathering and evaluation

According to results obtained, “Design and documentation issues " is said to be ranked as the first factor with influence in cost overrun of road projects in Albania, with a relative coefficient 0, 81. Design and documentation issues represent a major role in efficiency processes of construction, variations or claims that contribute in increasing of project cost. The quality of design and documentation supplied have also influence in the total price of tender submitted. The second factor that has an important role on increasing of project's cost it seems to be poor management and monitoring, with a relative index coefficient 0, 78; which is followed by lack of experience of labor or contractor, with the same relative coefficient 0, 78. Poor management and monitoring refers to inadequate project manager, with lack of experience on planning and coordination of the processes of work. Meanwhile, lack of experience of labor or contractor refers to the poor performance of contractor or labor. The contractor has the main role in execution of construction phase activities and poor performance of him lead to cost extensions. On the other, hand the lack of experience of labor lead to performance of work with defects and errors. The fourth factor that influence cost overrun is said to be "Financial resource management", with a relative coefficient 0,76 ; which is followed by "Delays in payments", with the same relative coefficient 0,76. Financial resource management refers to the process of controlling expenditures, outcomes and estimating of costs in order to obtain secure funds. Poor financial resource management, leads to extra cost for the project.

Meanwhile, delay in payments refers to cash flow problems for the contractors, which lead to inability of the contractor to finance the work, so the time execution of the project extends, as well as, cost of the project.

Based on the RII coefficient, the importance of each factor is given in (*Table 15*) below:

Table 15. Relative Index Coefficient

	ΣW	A	N	A*N	RII
Design and documentation	49.00	5.00	12.00	60.00	0.81
Poor management and monitoring	47.00	5.00	12.00	60.00	0.78
Lack of experience of labor or contractor	47.00	5.00	12.00	60.00	0.78
Financial resource management	46.00	5.00	12.00	60.00	0.76
Delays in payments	46.00	5.00	12.00	60.00	0.76
Incomplete design at time of tender	44.00	5.00	12.00	60.00	0.73
Highly inflation of prices	44.00	5.00	12.00	60.00	0.73
Innacurate cost estimation	43.00	5.00	12.00	60.00	0.71
Problems in land acquistion	42.00	5.00	12.00	60.00	0.70
Change in work scope	42.00	5.00	12.00	60.00	0.70
Changes of design during construction	42.00	5.00	12.00	60.00	0.70
Political issues	42.00	5.00	12.00	60.00	0.70
Delay in costing variation and additional works	41.00	5.00	12.00	60.00	0.68
Change order by the owner	38.00	5.00	12.00	60.00	0.63
Contractual claims	37.00	5.00	12.00	60.00	0.61
Force majeure	31.00	5.00	12.00	60.00	0.51
Machinery resources	30.00	5.00	12.00	60.00	0.50
Delays of material delivery	29.00	5.00	12.00	60.00	0.48

4.2.3.2 Consultant's perspective

Based on the data gathering and evaluation, shown in Table 16, there has been a ranking of all factors causing cost overrun, based on consultant's perspective, by calculating ∑W (Weighting of each factor, given by respondents):

Table 16. Data gathering and evaluation

	CONSULTANT'S PERSPECTIVE							ΣW
Highly inflation of prices	5.00	2.00	4.00	5.00	4.00	4.00	4.00	28.00
Problems in land acquisition	2.00	2.00	3.00	5.00	5.00	5.00	5.00	27.00
Lack of experience of labor or contractor	5.00	2.00	4.00	4.00	4.00	5.00	3.00	27.00
Financial resource management	3.00	2.00	3.00	5.00	4.00	4.00	5.00	26.00
Change in work scope	3.00	2.00	2.00	5.00	5.00	4.00	4.00	25.00
Inaccurate cost estimation	4.00	2.00	3.00	3.00	5.00	4.00	4.00	25.00
Political issues	3.00	3.00	2.00	5.00	4.00	4.00	4.00	25.00
Incomplete design at time of tender	4.00	2.00	2.00	4.00	4.00	4.00	4.00	24.00
Delays in payments	2.00	4.00	2.00	4.00	4.00	4.00	4.00	24.00
Design and documentation	2.00	4.00	3.00	3.00	5.00	3.00	3.00	23.00
Machinery resources	1.00	4.00	4.00	3.00	4.00	3.00	4.00	23.00
Delay in costing variation and additional works	1.00	2.00	2.00	5.00	4.00	4.00	4.00	22.00
Delays of material delivery	5.00	2.00	3.00	3.00	3.00	3.00	3.00	22.00
Poor management and monitoring	3.00	-	2.00	3.00	4.00	4.00	4.00	20.00
Force majeure	2.00	3.00	2.00	4.00	4.00	3.00	2.00	20.00

	Changes of design during construction	2.00	2.00	1.00	-	5.00	4.00	4.00	18.00
	Change order by the owner	3.00	4.00	3.00	-	3.00	3.00	2.00	18.00
	Contractual claims	1.00	2.00	1.00	3.00	-	3.00	3.00	13.00

According to results obtained, it seems that based on consultant's responses, "Highly inflation of prices " is the first factor causing cost overrun in road construction projects in Albania, with a relative coefficient 0,80. Highly inflation of prices refers not only to the rise on material and product's price, but also the cost of labor. The second factor, is said to be "Problems in land acquisition", with a relative index coefficient 0, 77; which is followed by “Lack of experience of labor or contractor, with the same relative coefficient 0, 77. Problems in land acquisition refers to cases when the land is not a property of the project sponsor, but in accordance with legal statutes, government authorities purchase the land, but the owner of the land, doesn't agree with a fair price for the land, causing delays in executing of the project and additional cost. The fourth factor ranked by consultants is said to be “Financial resource management", with a relative coefficient 0, 74. As mentioned above, financial resource management refers to the process of controlling expenditures, outcomes and estimating of costs in order to obtain secure funds.

Based on the RII coefficient, the importance of each factor is given in (*Table 17*) below:

Table 17. Relative Index Coefficient

	ΣW	A	N	A*N	RII
Highly inflation of prices	28.00	5.00	7.00	35.00	0.80
Problems in land acquisition	27.00	5.00	7.00	35.00	0.77
Lack of experience of labor or contractor	27.00	5.00	7.00	35.00	0.77

Financial resource management	26.00	5.00	7.00	35.00	0.74
Change in work scope	25.00	5.00	7.00	35.00	0.71
Inaccurate cost estimation	25.00	5.00	7.00	35.00	0.71
Political issues	25.00	5.00	7.00	35.00	0.71
Incomplete design at time of tender	24.00	5.00	7.00	35.00	0.68
Delays in payments	24.00	5.00	7.00	35.00	0.68
Design and documentation issues	23.00	5.00	7.00	35.00	0.65
Machinery resources	23.00	5.00	7.00	35.00	0.65
Delay in costing variation and additional works	22.00	5.00	7.00	35.00	0.62
Delays of material delivery	22.00	5.00	7.00	35.00	0.62
Poor management and monitoring	20.00	5.00	7.00	35.00	0.57
Force majeure	20.00	5.00	7.00	35.00	0.57
Changes of design during construction	18.00	5.00	7.00	35.00	0.51
Change order by the owner	18.00	5.00	7.00	35.00	0.51
Contractual claims	13.00	5.00	7.00	35.00	0.37

4.3 Qualitative research results

4.3.1 General information of the respondents

This survey was used to measure the opinion of experts by comparing it with that of ordinary cities. My colleagues and friends helped me to complete this questionnaire. The goal is a different approach to such topics by being closer to reality and making

the reasons more tangible. The people answering the questions were of different ages with a division as shown in the graph below; (Fig.7)

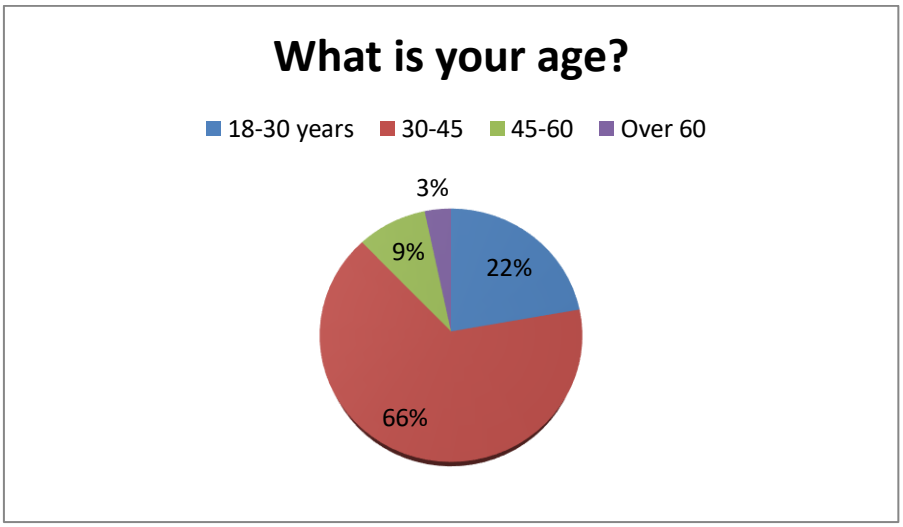


Figure 7. Age

Gender was mainly with a predominance of males since engagement in such projects belongs more to this gender data as follows;

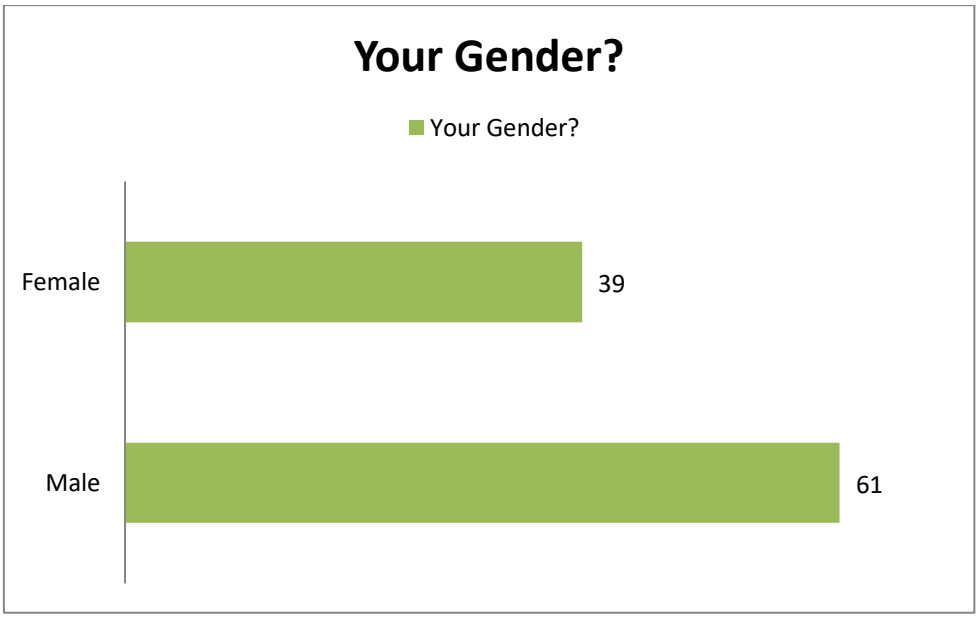


Figure 8. Gender

4.3.2 Respondent's results for 8 other questions

The following question raises many debates from the research, it results that historically the road projects in Albania have had many debates regarding the selection with the merit of the concessionaires and the realization until the end of the projects by them. Regarding the answer to the following question, not only the citizens but also the vast majority of specialists in the field think that the concessionaires are not selected on the basis of criteria and merits as we can see from the graph below (Fig.9) ;

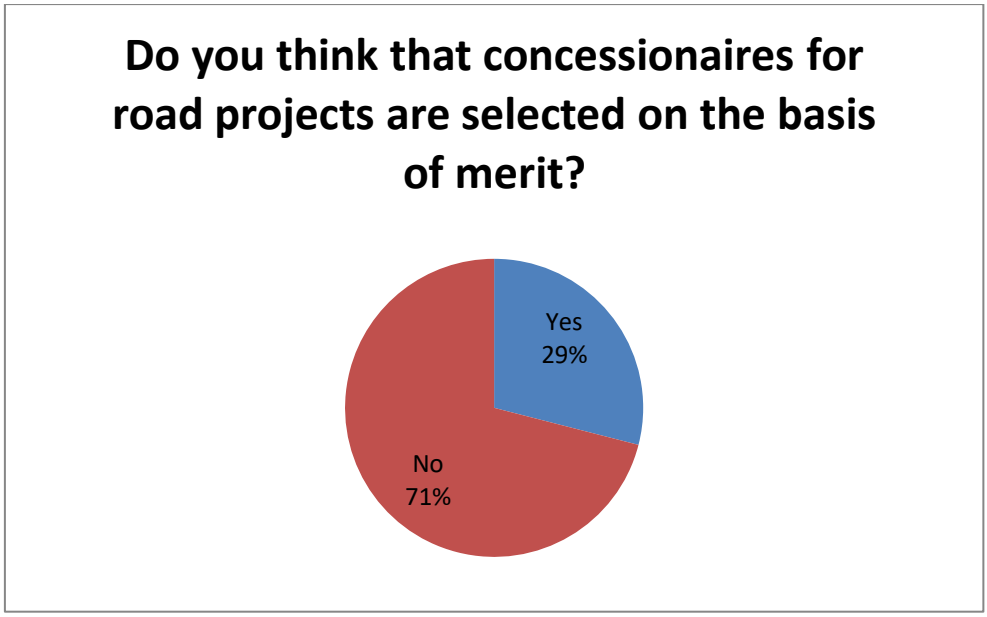


Figure 9. Concessions

Here are some concrete examples of these doubts. The government has revealed for the first time the bill of 5 major concessions that have been approved so far in the road infrastructure sector. The package, which is attached to the list of public investments 2019-2021, includes the construction of 4 new roads and the maintenance of the Durrës-Kukës highway. According to the document, for the maintenance of the National Road, the state budget will pay 9.4 billion ALL for the entire life of the contract. This money includes the subsidy provided for the minimum traffic, the payments for the hidden defects as well as those for the supervision of the contract.

The second concession is that of the Thumanë-Kashar road. The construction of the 20.8 km long segment will cost ALL 54.4 billion, including Value Added Tax, while if it is stripped of this tax, which is returned to the state, the net bill that citizens will pay is about ALL 45.3 billion. Next on the list are Rruga e Arbrit with 40.3 billion ALL, Milot-Balldre with 36.5 billion ALL and Orikum-Dukat, which is estimated to have a cost of 11.8 billion ALL. For some of these concessions such as Rruga e Arbrit or Durrës-Kukës, a contract has already been signed and work has started, while others are in the contract negotiation phase.. So, in total 1.2 billion euros including VAT or over 1 billion euros net, which will be paid for the next 13 years.

In the study of this project and in the above chapters it results that almost all road projects in Albania have a significant exceeding of deadlines. The reasons are various but as can be seen from the survey data there is almost an equal division of the following reasons: Bad Management, lack of transparency, lack of accountability, mismanagement. Less notice is the lack of manpower as it is not seen as a strong reason for exceeding the time of road projects. And in this question there is a great similarity between what the specialists think and what the citizens think and the answers are the same.

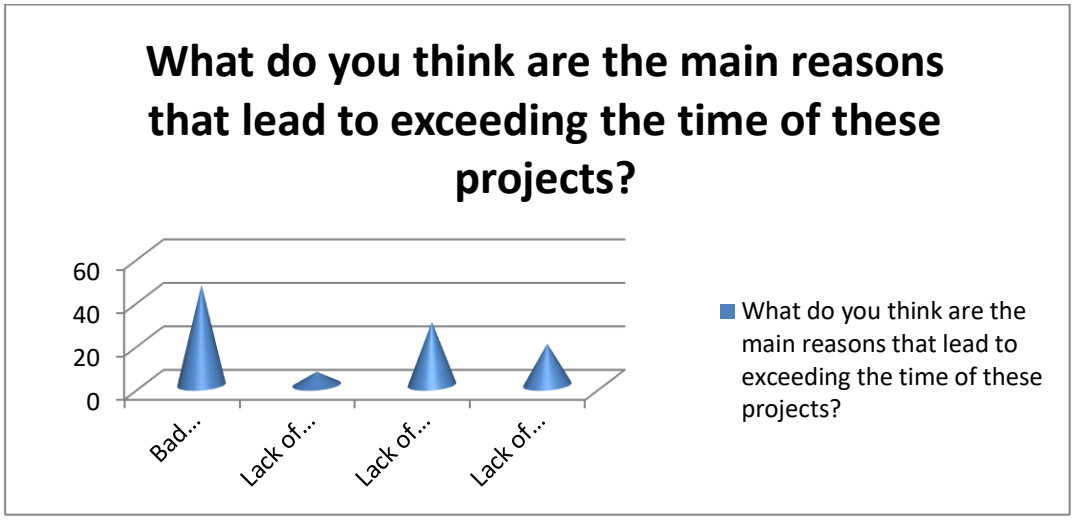


Figure 10. Exceeding the time of road projects

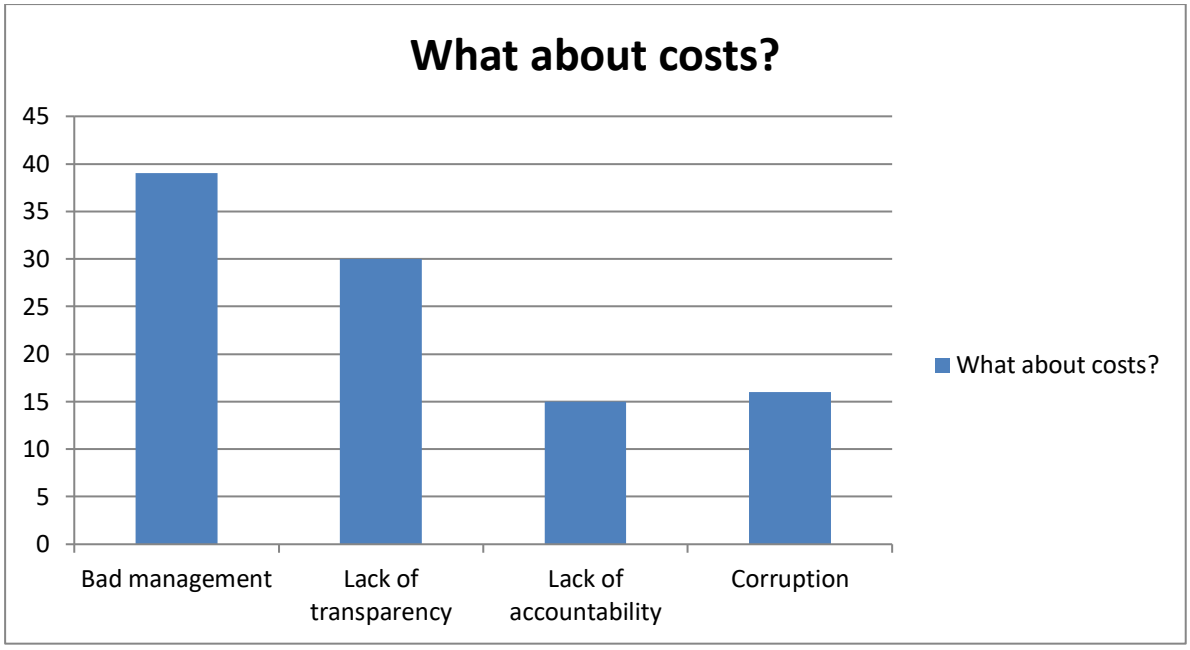


Figure 11. Exceeding the time of road projects

-Corruption is the central reason according to the citizens, while the specialists as the main reason list the bad management of road projects and this comes as a negligence of the government. Below we are taking some examples with concrete projects.

This year, the World Bank reviewed with increasing costs the construction of one kilometer of road in our country, estimating with 6 million euros a kilometer of category A highway and 1 million euros a kilometer of interurban secondary road of category C. The government contracted the road Milot- Balldren, of category A, through the PPP concession with 14.2 million euros per kilometer, or 132% more than the standard of costs of the Bank this year. The full value of the Arbri Road contract is still secret, while the government has been negotiating profits and interest on concessions after the winners were announced, undermining the race fundamentally. Here are all the differences between the concession contracts and the real costs.

The government approved the contract with the company Gjoka Konstruksion, for the construction of Arbri Road through the concession form with Public-Private Partnership last March. The decision of the government and then the full contract that

was published in the Official Gazette does not contain its full financial value. The contract is accompanied by 12 annexes which specify the exact estimates, but they have not been published to date, and more than a year has passed in implementation.

Gjoka Company was selected as the winner for the construction of Arbri Street by the Ministry of Infrastructure against an investment value of 33.7 billion ALL or 260 million euros. But this is only the value of the investment without calculating VAT.

As a main reason that is constantly mentioned in this paper, corruption is a key factor in public investment and it seems that this opinion is shared by most respondents.

Ribbon-cutting ceremonies marking the launch of investment projects - such as roads, dams, irrigation canals, power plants, ports, airports, schools and hospitals - are every politician's dream. They present an excellent opportunity for photography, while the very act of cutting the ribbon seems to portray the one holding the scissors as a contributor to the future growth of the economy. However, in some countries, corrupt politicians seem to choose investment projects not on the basis of their economic value, but on the basis of the opportunity for bribes and the benefits that these projects bring.

This paper claims that such corruption increases the number of capital projects undertaken and tends to increase their size and complexity. The result is that, paradoxically, some public investment may end up reducing economic growth because, although the share of public investment in gross domestic product (total of all goods and services produced in a country in a given year) may have increased, the average productivity of that investment has decreased.

This conclusion contradicts the conviction of many economists. The conventional wisdom of the economist profession is that a country needs capital to grow and, most importantly, that there is a direct link between capital spending and growth. In other words, if a country engages in capital spending, it is likely to increase. As a result of

this belief, economists strongly support capital spending by governments. When economists estimate the distribution of public money between current expenditures (for recurring, day-to-day expenditures) and capital expenditures in government budgets, they tend to be critical of countries that share a large share of government spending on current expenditures, but evaluate countries who refuse to hinder capital expenditures.

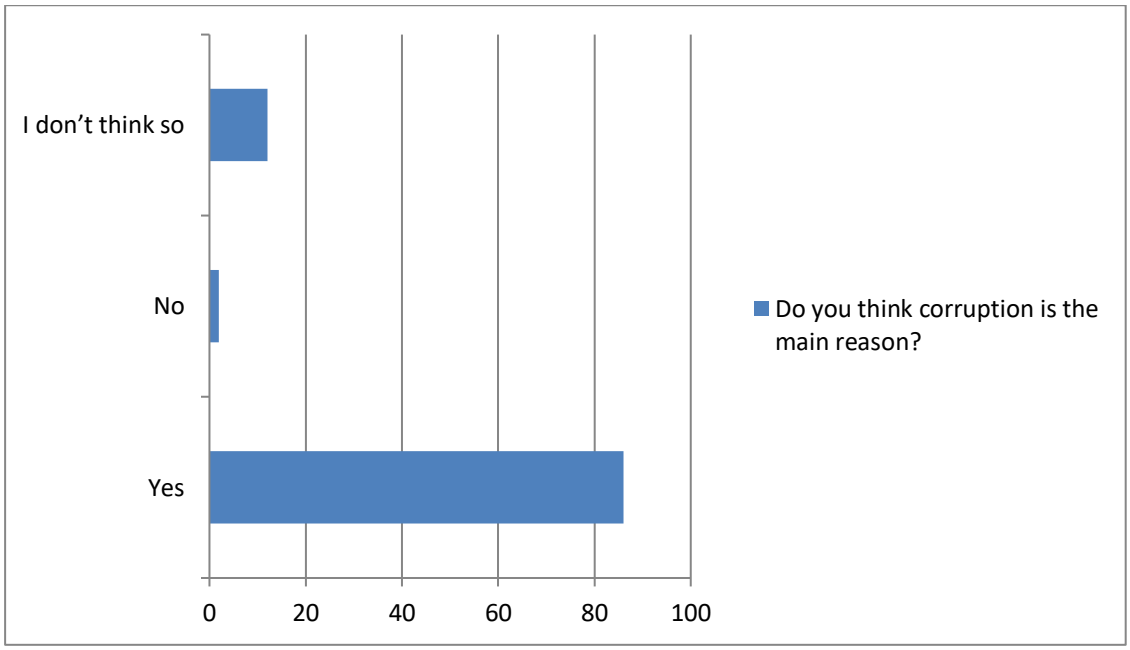


Figure 12. Corruption

-Undoubtedly, these have the effect that with the increase of costs, the public debt and taxes for the citizen's increase and the non-payment of the funds increases and this leads to the stopping of the works for the construction of the roads and their maintenance. The costs of road construction and maintenance are increasing rapidly as arguments with supporting analysis for this performance are lacking.

The Ministry of Infrastructure has announced that it intends to triple unit costs for road maintenance by bringing them to 11,000 euros per year per kilometer from the 300 euro per year currently spent.

But sources from ARA explained that the cost of road maintenance has increased significantly with the new project "performance maintenance", including maintenance with harsh winter conditions even in cities where there are over 300 days of sunshine.

Meanwhile, the Ministry of Transport in its medium-term budget program claims that the increase in maintenance costs aims to reduce the number of accidents resulting in loss of life and the number of black spots by 23%, according to the National Transport Strategy.

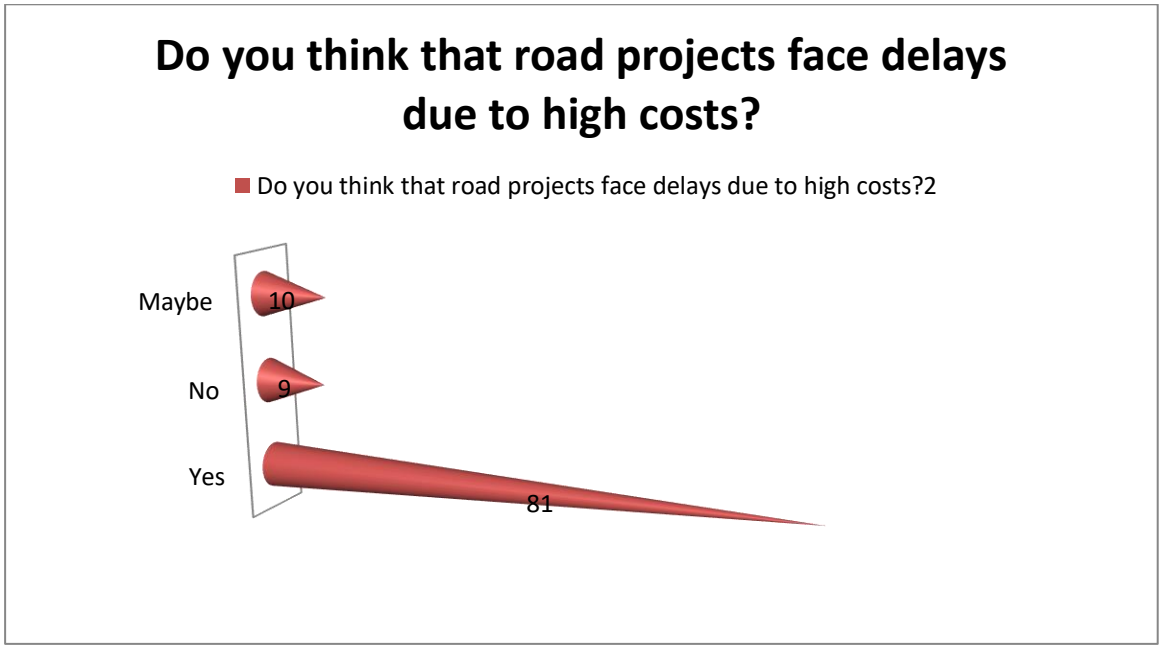


Figure 13. Cost-time delays

-All respondents agree that there are laws in Albania but not all projects are implemented based on these laws. It is very difficult for road projects to be based on these laws and therefore corruption is high because there is a lack of functional legislative power. The answers are as follows:

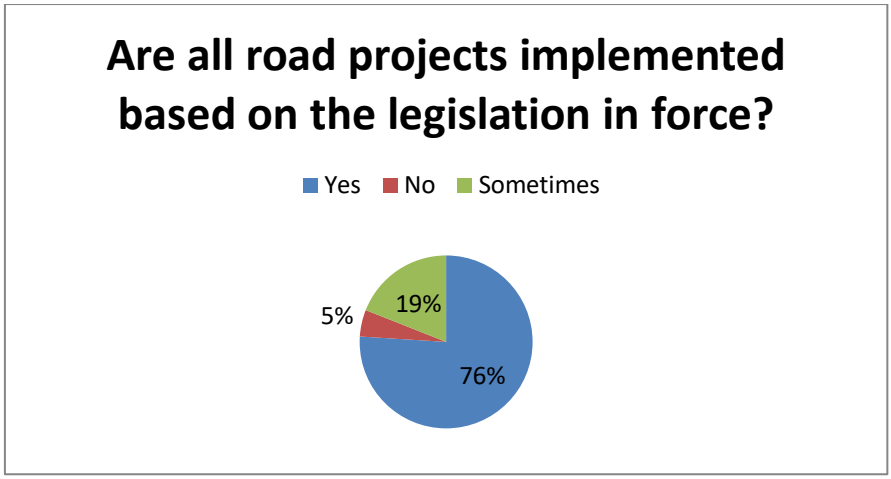


Figure 14. Road projects and legislation

Undoubtedly, it is the promises of the government that lead to non-compliance with the deadlines and costs set. The governments that gain power present inflated electoral programs and in reality it is their negligence that leads to overcoming these factors. Citizens and specialists agree that not all road projects are pursued by the government they are often overlooked.

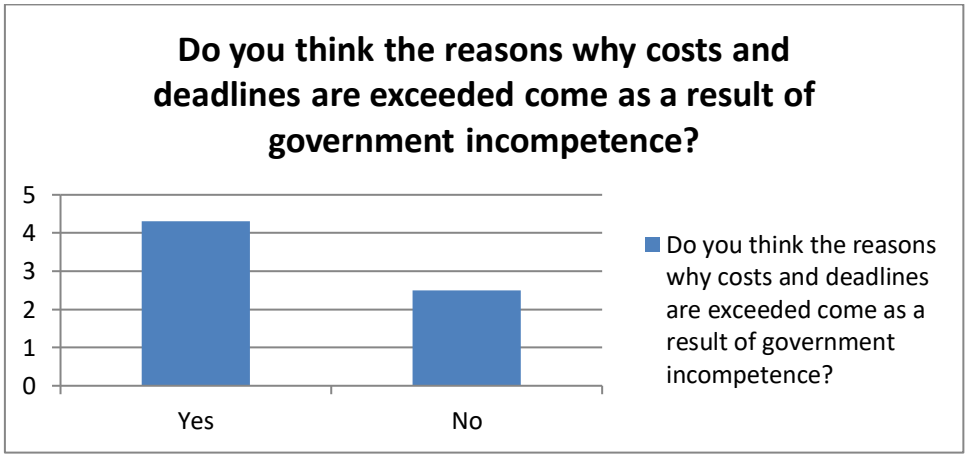


Figure 15. Government incompetence

The most frequently mentioned reasons are as follows: corruption, bad management and negligence.

4.4 Case studies results

The projects are analyzed based on the probability of occurrence of risk based on the survey conducted and making a correlation with the data that is explained and analyzed below.

The cost risks of the two road projects to be analyzed were made by calculating the probability translated into the frequency rankings, so in the frequency of responses received from the contractors. It should be noted that the sum of the defined risk costs corresponds to Schubert's results. The difference is because the project of this author has a greater time span and is calculated for housing construction projects, meanwhile in our case we are dealing with road projects. Furthermore, based on the results obtained, it can be noted that risk costs range between 2.79% and 8.9% of construction costs.

For the realization of this method we relied on the individual risks of the contractor, analyzing in particular the responses of each contractor from the use of unit price contracts for public customers during the tender phase and construction of road projects.

Based on Schubert's method are identified 26 individual risks [k], which are estimated by contractors according to the probability of occurrence of risk in % of the number of projects [Pk] and the amount of cost according to the occurrence of risk in% of construction costs [Ck]. The product of these results are the risk costs of individual risks in ‰ of construction costs [Rk], which provide the basis for risk ranking. The sum of risk costs (2.79% versus, 27.9) and average risk costs (%1.07) are added.

This hypothesis search process for the two projects is set out in the (*Figure 16*) below:

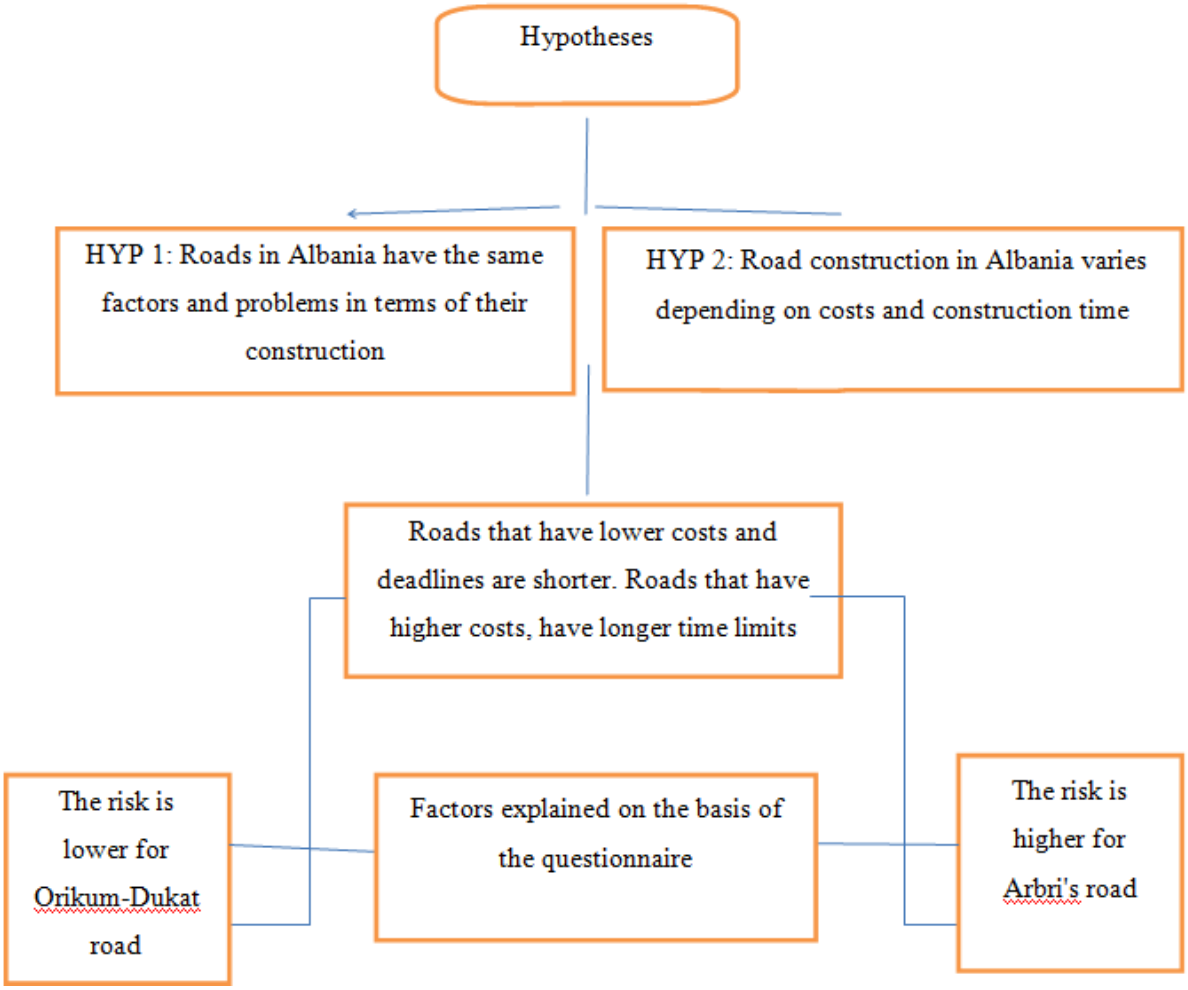


Figure 16. Examination of risk costs

In the first hypothesis: If it is assumed that there has been a development of road construction there is a difference in some factors of the first project with the second project., Then there is a change of (a) the order of risk and (b) the amount of risk costs.

The second hypothesis relates to the characteristic attributes (*Table 19*) chosen by Schubert. If the characteristic attributes (response options) of the probability of

occurrence of the risk [Pk] and the sum of the cost according to the occurrence of the risk [Ck] differ compared to Schubert, the sum of the costs of the risk changes once again. From these two hypotheses two research objectives are derived. The first objective of the research is to examine the altered risk ranking and the amount of risk costs compared to Schubert's 1971 study. Attribute change attributes. This is because the projects that are taken into analysis have different influencing factors and the same survey questions differ in rank for each project.

The study presented is not a pure trend study, but a hybrid of a trend and cross-sectoral study.

Consequently the characteristic attributes for the probability of occurrence of risk [Pk] and the amount of cost according to the occurrence of risk [Ck] have been partially modified in *Table 18*, in which the individual risks of Arbri's road are listed:

Table 18. Individual risk of Arbri's road

Rank	Individual risk [k]	Pk	Ck	Rk
1	Change orders	13.2	1.42	2.4
2	Design changes	12.1	1.39	2.1
3	Not calculated associated work (VOB/C)	11.5	1.55	1.8
4	Change in scope of the project	11.4	1.44	1.6
5	Suspension of work by the owner or contractor	10.3	1.45	1.5
6	Poor planning and scheduling of the project	10.49	1.41	1.6
7	Financial problems	11.9	1.36	1.4
8	Unskilled contractors	10.9	1.59	1.5
9	Old technology	10.4	1.39	1.4
10	Errors during construction	10.6	1.36	1.4
11	Shortage of manpower	10.1	1.30	1.3
12	Unskilled labor	9.0	1.33	1.2
13	Shortage and late delivery of materials	8.6	1.43	1.4
14	Poor management of staff	9.5	1.21	1.0
15	Delays by subcontractors	8.8	0.95	0.9

16	Delays in payments covered by the owner	6.9	0.92	0.7
17	Political issues	5.9	1.29	0.7
18	Late decision making	7.98	0.81	0.6
19	Owner interference	7.8	0.73	0.6
20	Delay to furnish and deliver the site	7.8	0.76	0.6
21	Project schedule changes	7.4	0.84	0.6
22	Inaccurate time estimation	3.7	1.0	0.4
23	Preparation and approval of drawings	6.3	0.70	0.4
24	Unforeseen ground conditions	4.4	0.79	0.3
25	Fluctuation of prices	4.7	0.62	0.3
26	Lack of maintenance of equipment	3.8	0.57	0.2

The following graph presents the probabilistic data of the above table:

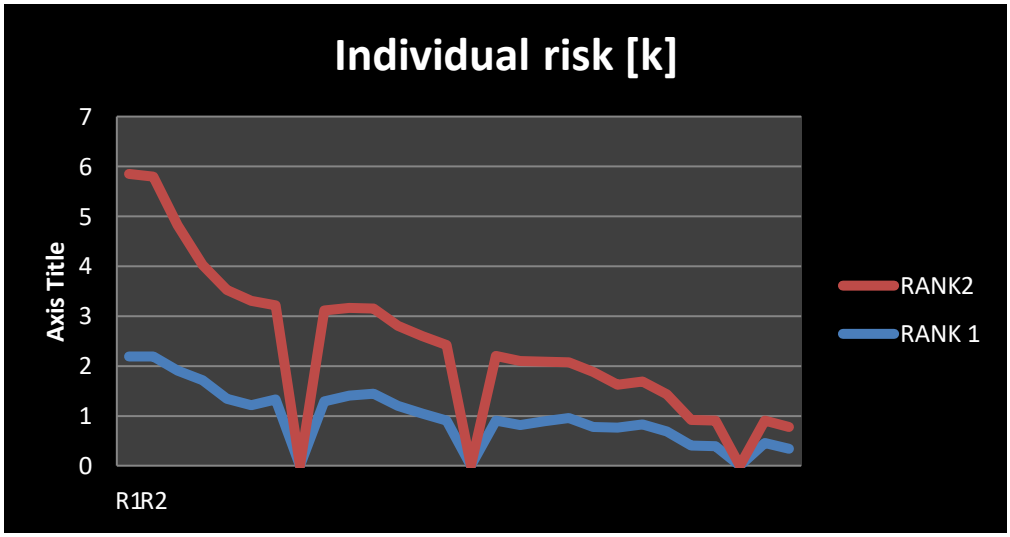


Figure 17. Data graph of Table 18

Consequently the characteristic attributes for the probability of occurrence of risk [Pk] and the amount of cost according to the occurrence of risk [Ck] have been partially modified in *Table 19*.

In the impossibility of time to compare projects in different time periods for the second analysis, two projects were taken, Orikum-Vlora and Rruga e Arberit.

Where Rk was issued for the two projects and later their graphic presentation. The amount of Rk is equal to 27.9% or 2.79% and the average risk costs increase (1.07%). In the table below Rk 1 is equal to 27.37 average 1.09. In this table where the comparison of two different projects is done, the data are as follows:

In the second project the Arber road is Rk2 equal to 38.98 or 3.8 Rk2 average 1.5.

The objective of the previously used deterministic analysis is to obtain a specific value for individual risk costs [Rk] to enable risk ranking and comparison of the amount of risk costs. Determining risk cost analysis is common in the construction industry. Due to the uncertainty of risk assessment, deterministic analysis is divergent to an accurate forecast of risk costs. Using probabilistic analysis, a statement can be made about bandwidth risk and statistical certainty. This enables the contractor to choose the amount of risk costs when calculating the tender depending on, for example, the market situation, the availability of company-specific risk and strategic considerations.

The comparison of the two projects, Arbri's road and Orikum-Dukat road, was realized through the Brokbals method, as follows:

Table 19. Adoption 1 dhe 2 based on S.Brokbals, [33]

Adoption 1 and 2				
Individual risk [k]	**Rank**	**Rk**	**Rank**	**Rk**
Design and documentation issues	1	2.19	1	3.66
Financial resource management	2	2.19	2	3.60
Not calculated associated works (VOB/C)	3	1.90	3	2.92
Machinery resources	4	1.71	4	2.31
Changes in work scope	8	1.34	5	2.18
Poor management and monitoring	10	1.21	6	2.1

Deadline	-	-	-	-
Incomplete design at time of tender	6	1.33	7	1.88
Contractual claims	9	1.29	8	1.82
Inaccurate cost estimation	7	1.40	9	1.76
Delay in costing variation and additional works	5	1.45	10	1.70
Delays of material delivery	11	1.20	11	1.61
Highly inflation of prices	-	-	-	-
Delays in payments	12	1.04	12	1.56
Force majeure	13	0.91	13	1.51
Political issues	-	-	-	-
Change order by the owner	14	0.90	14	1.30
Lack of experience of labor or contractor	18	0.81	15	1.29
Changes of design during construction	16	0.89	16	1.20
Problems in land acquisition	15	0.96	17	1.11
Design issues	20	0.78	18	1.10
Poor management of staff	19	0.76	19	0.86
Defects of working machines	17	0.83	20	0.86
Errors during construction	21	0.69	21	0.74
Poor monitoring	24	0.41	22	0.51
Return of the design by the contractor	23	0.39	21	0.6
Failure to meet the requirements	22	0.45	24	0.46
Delay in costing variation and time	25	0.34	25	0.43

Ekuation $R_k = P_k \times C_k \times 1000$

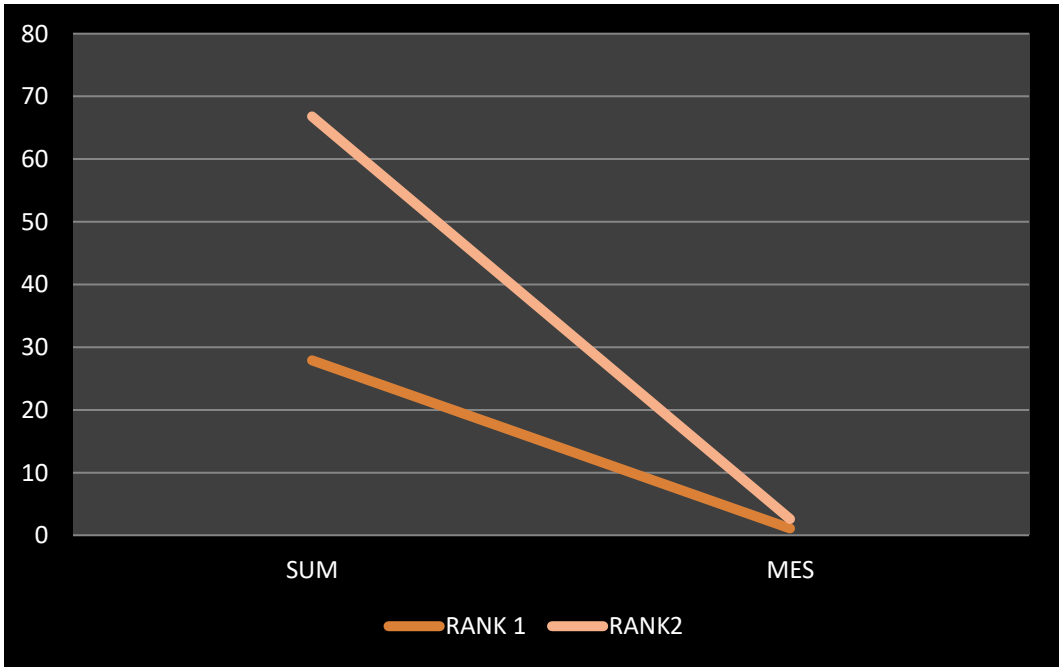


Figure 18. Data graph of Table 19

The following table is a comparison between the frequencies and probabilities of the first table based on the Risk costs method according to Schubert, 1977.

The first method is compared to the second method S.Brokbals, [33], based on the online questionnaire questions finding the commonalities and differences between the individual risk of each project. Upon completion of the risk cost assessment, the contractor's management decides, taking into account the project's risk situation and other strategic discussions, to submit a tender or not. In case of tender submission, the risk management process is followed in the construction phase. Risk documentation must be completed throughout the risk management process.

The results of S.Brokbals, [33], can serve as a benchmark for length, risk assessment and risk cost assessment and consequently simplify the determination of risk costs by the contractor for the calculation of the tender.

Table.20 Comparative table between Project 1 and Project 2

Comparative table between Project 1 and Project 2				
Individual risk [k]	**Rank**	**Rk**	**Rank**	**Rk**
Design and documentation issues	1	2.19	2	2.1
Financial resource management	2	2.19	7	1.4
Not calculated associated works (VOB/C)	3	1.90	3	1.8
Machinery resources	4	1.71	9	1.4
Changes in work scope	5	1.34	5	1.5
Poor management and monitoring	6	1.21	14	1.0
Incomplete design at time of tender	7	1.33	11	1.3
Contractual claims	8	1.32	15	0.9
Inaccurate cost estimation	9	1.29	25	0.3
Delay in costing variation and additional works	10	1.40	6	1.6
Delays of material delivery	11	1.20	20	0.6
Highly inflation of prices	12	1.04	25	0.3
Delays in payments	13	0.91	16	0.7
Force majeure	14	0.90	24	0.3
Political issues	15	0.81	17	0.7
Change order by the owner	16	0.89	19	0.6
Lack of experience of labor or contractor	17	0.96	8	1.5
Changes of design during construction	18	0.78	10	1.4
Construction Performance	19	0.76	12	1.2
Problems in land acquisition	20	0.93	24	0.3
Design issues	21	0.69	23	0.4
Insufficient quotation for site equipment costs	22	0.69	7	1.4
Financial resource management	23	0.39	7	1.4
Machinery resources	24	0.45	9	1.4
Changes in work scope	25	0.34	4	1.6

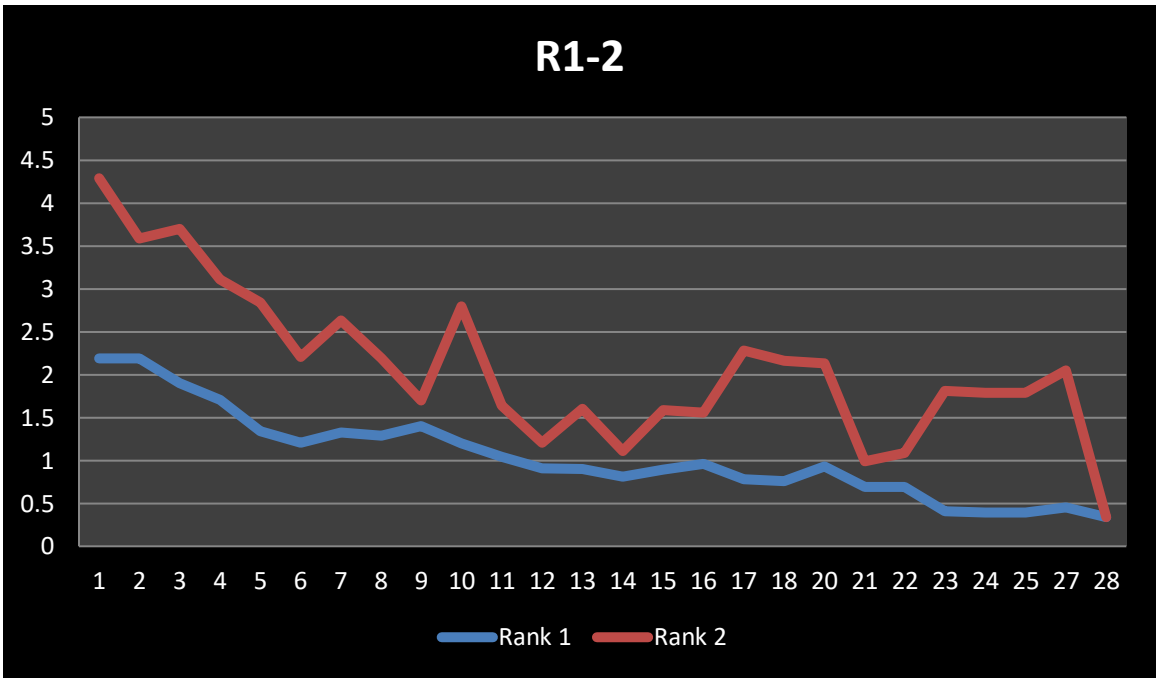
The amount of the first table of the individual risk rank is 27.1 so 2.71% while the average is equal to 1.04%. Compared to the rank of the second project using the method of table number two for defining the joint data of the projects collected through the online survey are the same as the previous method and the above data, which means that the projects in Albania have the same problems and contractors agree for the same reasons. Rank 2 is equal to 27.1 so 2.71% since in the second method two questions were analyzed less and had in accordance with the first method the average is equal to 1.12.

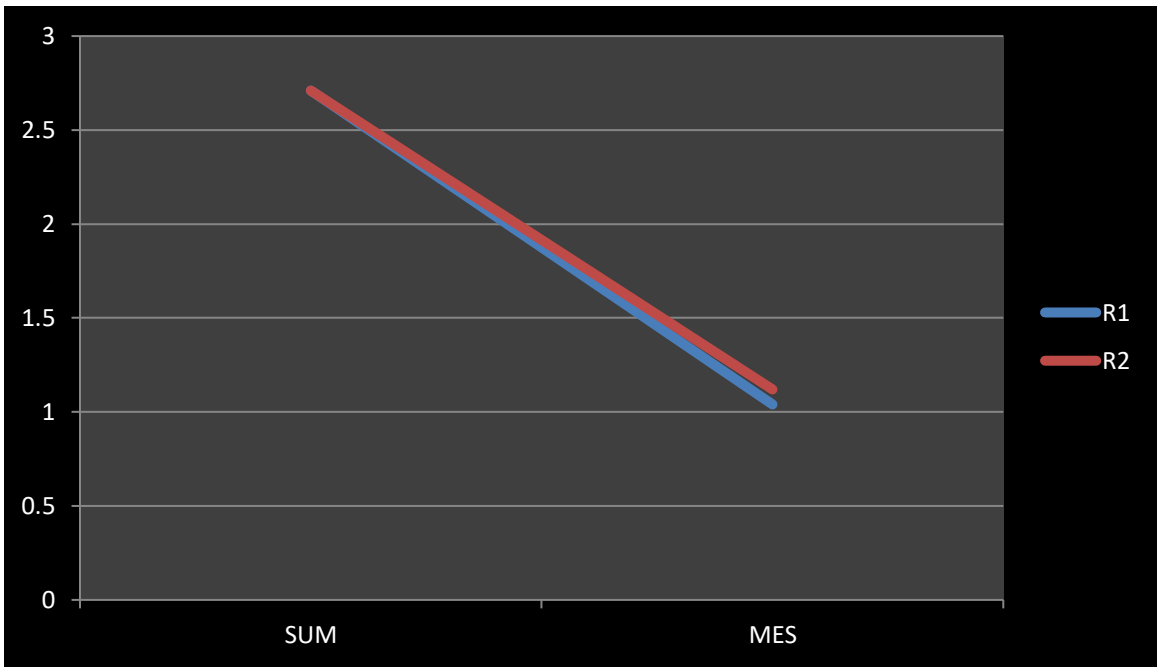
The desired value (risk costs selected in the tender calculation) represents the reference level chosen by the contractor. If for example a risk cost histogram is available, the average can be chosen to estimate the risk cost during the tender phase. The safety of exceeding or missing the reference level corresponds to 50% in each case. If the reference level is set higher or lower, the ratio between risk and chance is postponed. The choice of reference level depends, among other things, on the market situation, the availability of specific risk for the company. as strategic considerations. In the course of this, the alternation of the chance-risk ratio should be based on both, the economic success in case of acceptance of the tender and the degree of success of the tender. From experience, contractors typically choose a reference level with a high-risk affinity depending on the market situation.

The experiment consists of generating random numbers from the corresponding distribution and relating them to model parameters that depend on a certain random probability. We then calculate the model using the parameters selected by random means. A Monte Carlo simulation uses thousands of simulation experiments to determine and calculate the model, each time using a randomly selected variable. The method uses this large amount of experiments to determine a more important arithmetic mean over the considered distribution. Taking into account the scales presented in the previous section, we have created a simulation model that takes into account the following parameters: type of concern, level of risk determined taking into account the measurements made for each case.

Regarding the appearance of many graphics, the master would be as follows:

Figure 19. Data graph of Table 20





$R_k = 2.71 \times 1.04 \times 1000 = 2818.4$

RK=2.71X1.12X1000=3035.2

The compatibility of these projects is 1.07, it is understood that the highest individual risk has the Arber road. Overall, the results of the probabilistic risk cost assessment signal the importance of considering the sum of the risk costs in the tender calculation. If, for example, the profit calculated in the tender calculation is between 3% of the construction costs, the risk costs (assuming that the odds to be deducted are generally lower than the risks) will reduce the profit calculation delays or even cause a negative project result in many cases.

Monte Carlo simulation results for individual risk project risk costs [RPproject, k] in% of construction costs are presented. The results are described as a histogram and a cumulative curve. The sliders are fitted with Q0.05 and Q0.95 quantiles. It can be noted that, with a probability of 90%, risk costs are between 2.71% and 8.9% of construction costs. Post-risk costs will not exceed 8.9% of construction costs with a probability of 94%.

In order to provide a risk management solution using the Monte Carlo simulation should be taking into account three key aspects of managing each project: costs, time, quality and the most important route parameter.

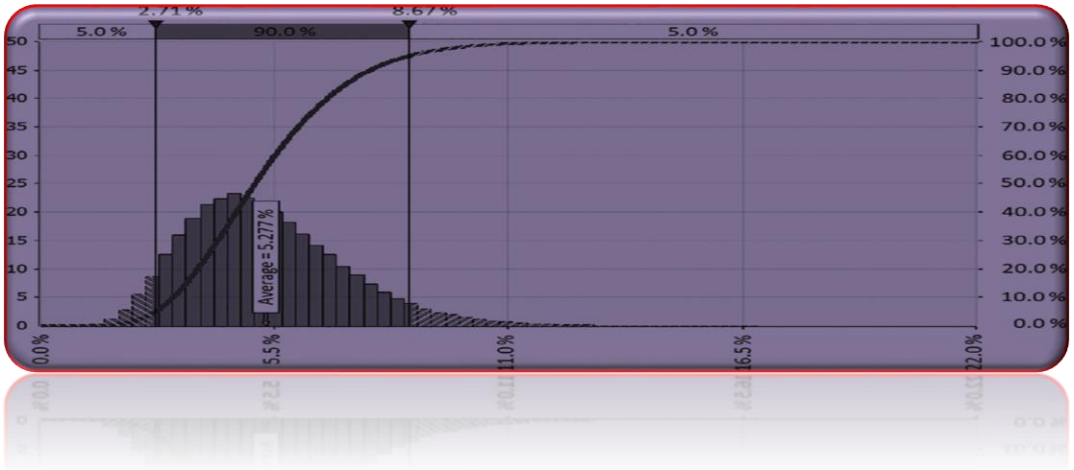
The results of the Monte Carlos method are as follows:

Table 21. Monte Carlo results

$Q_{0.05}$	2.71%
Median $Q_{0.5}$	5.41%
Arithmetic average μ	6.2%
Q	8.9%
SD (σ)	1.04%
μ - σ	4.1%
μ + σ	8.12%

Monte Carlo simulation results for individual risk project risk costs [RPproject, k] in% of construction costs are presented. The results are described as a histogram and a cumulative curve. The sliders are fitted with Q0.05 and Q0.95 quintiles. It can be noted that, with a probability of 90%, risk costs are between 2.71% and 8.9% of construction costs. Post-risk costs will not exceed 8.9% of construction costs with a probability of 94%.

2.71 % 8.9 % 6%



These data are statistically deterministic data derived from the results of risk measurements of the two projects, respectively: Table 18. Arbri's road and Table 19. Orikum-Dukat road, compared to Table 20.

CHAPTER 5

CONCLUSIONS AND RECOMMENDATIONS

This chapter includes all the conclusions we have reached and the recommendations needed to help solve the delays and overruns in Albania road projects. These research study had the objectives to determine which the main factor are that affect time and cost overrun in road projects in Albania, to estimate to what extent the cost increases and time delays in Albania road projects. The last objective was to make recommendations, in order to minimize or avoid delays and overruns.

5.1 CONCLUSIONS

1. The first objective was to find out whether cost and time overrun exists or not, and to evaluate the extent of overruns in Albania road projects. Ten road projects were considered to show the rate of cost overrun. For these road projects, the cost overruns range from 12.0 % to 79.1 % of the contract amount and the delays range from 41.37% to 85.7% of the contract time.

2. The second objective was to identify the factors affecting cost overrun in road construction projects in Albania. In the quantitative questionnaire, the respondents analyzed a total of 18 factors responsible for cost overrun. Results indicated that "Design and documentation" is the first ranked factor causing cost overrun, according to contractor's perspective. It is followed by poor management and monitoring. The first ranked factor causing cost overrun, according to consultant's perspective is highly inflation of prices which is then followed by problems in land acquisition.

In the qualitative survey, the respondents answered to ten open-ended questions. Based on the results obtained, a considered number of respondents agreed that

corruption, bad management of government and transparency are most frequently reasons for the exceeded of costs.

3. The third objective was to identify the factors affecting time overrun in road construction projects in Albania. According to the quantitative questionnaire, the respondents analyzed a total of 27 factors, responsible for time overrun. Results indicated that "Unforeseen ground conditions" has said to be ranked in the first position for time overrun, according to contractor's perspective. The same factor was ranked in the first position according to consultant's perspective. Owner interference is the said to be ranked in second position according to contractor's perspective, followed by financial problems. On the other hand, financial problems was ranked in second position by consultant's perspective and it is followed by poor planning.

4. The probabilistic risk cost calculation "Monte Carlo method" is used to discover the bandwidth of the risk costs of two case studies. It can be noted that risk costs range between 2.79% and 8.9% of construction costs.

5.2 Recommendations for future works

1- In order to avoid financial problems, contractors are recommended to use advance payment and it is advised to conduct breakeven analysis from time to time.

2- Contractors are advised to have a good planning and management system, so they should be able to avoid any mistake that can lead to rework of activities.

3- Consultants are recommended to hire a qualified staff in order to manage projects in a good way, so they should be able to deal with any management problem or issue.

4- Consultants are advised to be in constant contact with clients and contractors, in order to eliminate design errors.

5- In road projects in Albania there are many common features which negatively affect and can be improved by learning from the failures of each other's projects.

6- Road projects can be improved if more work is done on the factors that affect the above results.

7- The level of corruption and mismanagement greatly affects road projects and this is related to the government, so the implementation of projects should be seen from their proposal.

8- Government should create opportunities for the contractors and consultants of our country, to work and to share experience technology with international contractors and consultants.

9- In order to inspire investors, the government should create a sufficient economic stability.

10- It is advised to use probabilistic risk cost analysis. The results can serve as a benchmark for contractors when calculating the tender to determine the amount of risk costs depending on for example, market situation, company-specific risk disposition as well as strategic considerations.

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APPENDIX A

1. Name of Organization

Your answer

2. State respondent organization/company type. *

Client
Contractor
Consultant

3. Respondent designation *

Owner of organization
Project manager
Site engineer
Office engineer

4. Relevant working experience (Years) *

1-4 Years
4-8 Years
8-12 Years
> 12 Years

SECTION B:
FACTORS AFFECTING TIME OVERRUNS OF CONSTRUCTION PROJECTS IN ALBANIA

Please indicate the significance of each factor by ticking the appropriate boxes. Add any remarks relating to each factor on the last column e.g. as to the reasons, the critical factors or the solutions.E.S. = extremely significant (5) V.S. = very significant (4) M.S. =moderately significant (3) S.S. = slightly significant (2) N.S. = not significant (1)

	E.S. (5)	V.S. (4)	M.S. (3)	S.S (2)	N.S (1)
Change orders					
Design changes					
Change in scope of the project					
Suspension of work by the owner or contractor					

Poor planning and scheduling of the project
Financial problems
Unskilled contractors
Old technology
Errors during construction
Shortage of manpower
Unskilled labor
Shortage and late delivery of materials
Poor management of staff
Delays by subcontractors
Delays in payments covered by the owner
Late decision making
Owner interference
Delay to furnish and deliver the site
Project schedule changes
Inaccurate time estimation
Preparation and approval of drawings
Unforeseen ground conditions
Fluctuation of prices
Political issues
Weather conditions
Force majeure
Lack of maintenance of equipment
Change orders
Design changes
Change in scope of the project
Suspension of work by the owner or contractor
Poor planning and scheduling of the project
Financial problems
Unskilled contractors
Old technology
Errors during construction
Shortage of manpower
Unskilled labor
Shortage and late delivery of materials
Poor management of staff
Delays by subcontractors
Delays in payments covered by the owner
Late decision making
Owner interference
Delay to furnish and deliver the site
Project schedule changes

Inaccurate time estimation
Preparation and approval of drawings
Unforeseen ground conditions
Fluctuation of prices
Political issues
Weather conditions
Force majeure
Lack of maintenance of equipment

SECTION C:

FACTORS AFFECTING COST OVERRUN IN CONSTRUCTION PROJECTS IN ALBANIA

Please indicate the significance of each factor by ticking the appropriate boxes. Add any remarks relating to each factor on the last column e.g. as to the reasons, the critical factors or the solutions.E.S.= extremely significant(5) V.S.= very significant (4)M.S.=moderately significant (3) S.S.= slightly significant (2)N.S.= not significant (1)

E.S. (5)
V.S. (4)
M.S. (3)
S.S. (2)
N.S (1)

1. Design and documentation issues
2. Financial resource management
3. Machinery resources
4. Changes in work scope
5. Poor management and monitoring
6. Incomplete design at time of tender
7. Contractual claims
8. Inaccurate cost estimation
9. Delay in costing variation and additional works
10. Delays of material delivery
11. Highly inflation of prices
12. Delays in payments
13. Force majeure
14. Political issues
15. Change order by the owner
16. Lack of experience of labor or contractor
17. Changes of design during construction
18. Problems in land acquisition
19. Design and documentation issues

20. Financial resource management
21. Machinery resources
22. Changes in work scope
23. Poor management and monitoring
24. Incomplete design at time of tender
25. Contractual claims
26. Inaccurate cost estimation
27. Delay in costing variation and additional works
28. Delays of material delivery
29. Highly inflation of prices
30. Delays in payments
31. Force majeure
32. Political issues
33. Change order by the owner
34. Lack of experience of labor or contractor
35. Changes of design during construction
36. Problems in land acquisition

Submit

Clear form

APENDIX B

Factors Affecting Cost and Time Overrun In Road Construction Projects (Copy

Top of Form

1. What is your age?

- ☐ 18-30 years
- ☐ 30-45
- ☐ 45-60
- ☐ Over 60

2. Your Gender?

- ☐ Male
- ☐ Female

3. Do you think that concessionaires for road projects are selected on the basis of merit?

- ○ Yes
- ○ No

4. What do you think are the main reasons that lead to exceeding the time of these projects?

- ☐ Bad management
- ☐ Lack of manpower
- ☐ Lack of transparency
- ☐ Lack of accountability

5. What about costs?

- ☐ Bad management
- ☐ Lack of transparency
- ☐ Lack of accountability
- ☐ Corruption

6. Do you think corruption is the main reason?

- ☐ Yes
- ☐ No
- ☐ I don't think so

7. Do you think that road projects face delays due to high costs?

- ☐ Yes

☐ No

☐ Maybe

8. Are all road projects implemented based on the legislation in force?

☐ Yes

☐ No

☐ Sometimes

☐ Never

9. Do you think the reasons why costs and deadlines are exceeded come as a result of government incompetence?

☐ Yes

☐ No

10. List three reasons why this happens?

Corrections As Required by Examiners			Correction/ Comments by Candidate	Comments/ Confirmation by Supervisor	Comments/ Confirmation by Examiners
Section/Chapter	**Page**	**Comment**			
3.5.1 Data Collection	37	1. Do not use I. Use passive.	1. Changed "two surveys that I used" to "two surveys that are used ".		
	-	2.Case Study nr.1 is same as Chapter 2.8.2	1. Changed “I am based on the way the Monte Carlo Method is treated in paper [44]" to " The methodology used is based on [44].		
	-	3.Case Study nr.2 is same as Chapter 2.8.3	2. Details related to Case Study nr.1 remained only in Chapter 2.8.2. 3. Details related to Case Study nr.2 remained only in Chapter 2.8.3.		
4.2.2.1 Contractor's perspective	45 46	1. Change the design of Table 10. 2. Change the design of Table 11.	1. The format of the table was done same as Table 18.		
4.2.2.2 Consultant's perspective	47 49	1. Change the design of Table 12. 2. Change the design of Table 13.	1. The format of the table is done same as Table 18.		
4.2.3.1 Contractor's perspective	50 53	1. Change the design of Table 14. 2. Change the design of Table 15.	1. The format of the table was done same as Table 18.		
4.2.3.2 Consultant's perspective	54 55	1. Change the design of Table 16. 2. Change the design of Table 17.	1. The format of the table was done same as Table 18.		

4.4 Case studies results	65	1. Name all the graphs related to this chapter	1. The nomination of graphs: Figure 17. Data graph of Table 18 Figure 18. Data graph of Table 19 Figure 19. Data graph of Table 20		
	65	2. Explain Figure 16.Examination of risk costs	2. A brief explanation was available below the figure.		
	65	3. To give explanation for the tables in Chapter 4.4	3. A brief explanation was available on top of the tables.		
5.1 Conclusions	77	1. Rewrite the conclusions regarding the objectives.	1. An organization of conclusions was made by reviewing the objectives of the study.		
5.2 Recommendations	78	1. Rewrite the recommendations regarding the conclusions.	1. An organization of recommendations was done by reviewing the conclusions of the study.		