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Article

From crossover road to underpass: Examining the large-scale projects over their uncertainties

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ABSTRACT

Large-scale projects are among the characteristics of the current globalisation pattern. This phenomenological urban space changer (the large-scale project) has samples mostly in and around the megacities and urban regions, yet not limited to those areas. Besides the conventional aspects of large-scale projects which are mainly high cost, complexity, multi-actor collaboration, long duration, and great impact, some other identifiers are also apparent such as having high risks and specific types of uncertainties. The process should be analysed detailed and systematically to control the problems caused by uncertainties. An analytical perspective is required as it is very difficult to comprehend the nature of large-scale projects with conventional tools. In the study, the conceptual framework of uncertainties, which was adapted to large-scale projects by Hall (1981), was used to examine the selected case study. In mid-size cities, reveals some other projects, which do not totally meet the definitive criteria of large-scale projects but resemble the content and impact of such projects to a certain level. In the study, it is argued that such projects can and must be evaluated in terms of large-scale projects, even if they do not have an impact on a national or international scale. From this perspective, the Kaşüstü junction project in Trabzon city, which is an implemented sample of such relatively large-scale projects, was examined. By using archival research and in-depth interview methods, the process of the "Kaşüstü Junction" project was analysed. The characteristics of the junction project and the uncertainties that it contains show that a mid-sized city can also be exposed to the impact of large-scale projects.

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INTRODUCTION

For the last decades, urban projects have been built in the urban space in such a manner that considerably differs from the past. These projects with significantly high-cost attract a high level of public attention or political interest because their direct and indirect impacts contribute to national growth at a great magnitude (Patanakul et al., 2016; Pagliarin et al., 2020). These urban projects are named with multiple terms, such as mega projects (Flyvbjerg, 2014,

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Mok et al., 2015), urban strategic spatial projects (Monclus, 2003), urban development projects (Pagliarin et al., 2020), large-scale urban projects (Penpecioğlu, 2013; Leick, 2015). In this study, they are named "large-scale projects". Implemented examples of the large-scale projects that are visible in the cities are the central business areas, tourism centres, housing and shopping centre projects (Penpecioğlu, 2013), urban renewal/regeneration projects, (Taşan Kok, 2010; Köksal ve Öztürk, 2017), Olympic structures (Monclus, 2003; Erten, 2005), museums, exhibition halls, international landmarks events (Swyngedouw et al., 2002), transportation and infrastructure projects (Mok et al., 2015; Pagliarin et al., 2020).

Large-scale projects are seen as powerful landmarks to direct development at national, regional, and even local levels (Leick, 2015). The reasons for the rising number of large-scale projects that have become an urban policy mechanism are associated with the rise of neo-liberalism by the drive for great economic gain (Penpecioğlu, 2013). Large-scale projects are defined as a substantial capital project, which requires concerted efforts from major participants in terms of resources, skills and expertise (Mok et al., 2015). In addition to their political appeal; the ease of construction of the projects with technological developments, and the size of the amount of gain caused an increase in the number of large-scale projects (Flyvbjerg, 2014; Leick, 2015).

When the implemented projects are examined in terms of their types, effects and impact areas, it would be appropriate to say that the projects have different scopes and scales. In the study of Erten (2005) which was prepared in this context, the terms of small-scale and large-scale were used to define project differentiations. However, it was found that there is no clear consensus as a result of the literature review.

There are some common criteria for defining large-scale projects. Projects in urban areas have begun to differentiate depending on factors such as cost, impact area, duration of project and technology used. Youcef et al. (2013) defined the change in urban projects as the popular working form of modern cities. The phenomenon behind this definition is "megaprojects". Researchers consider megaprojects as wild projects of project world because of their complexity, long duration of construction and extremely high costs. On the other hand, Tekeli (2014) emphasises that the definition of these projects should be based on large-scale investment, large impact/change on the environment and the government budget, and the impact on the lives of the people in the region.

Large-scale projects are very high-cost projects that serve on a national and international scales. These projects differ from other projects in terms of decision-making, implementation and monitoring. Regardless of the scale, each project inevitably produces effects on the existing spatial texture to some degree. However, large-scale projects are inherently risky because of the construction techniques and engineering applications. This risk is generated by the lack of knowledge and its resulting uncertainty (Regev et al., 2006; Hetemi et al., 2020). The involvement of different stakeholders and rapidly developing technology increase the complexity of these projects. Therefore, risk identification, risk elimination, risk reduction, and risk control in such projects are also critical success factors (Regev et al., 2006; Kimiagari and Keivanpour, 2019). Large-scale projects should be analysed in detail and systematically because of these characteristics. In academic studies on the subject, risks and uncertainties in large-scale projects are pointed out (Hall, 1981; Sutterfield et al., 2006; Leick, 2015). Unforeseen results may be encountered in the decision-making, implementation or monitoring process of large-scale projects. An acceptable level of uncertainty may occur in many projects with a wide impact area (Regev et al., 2006; Türk and Erkan, 2018). The experiences gained from the applied projects can be a guide to eliminate, reduce or control the risks for the following projects (Sutterfield et al., 2006; Türk and Erkan, 2018). Thus, the aim of the study is to propose effective risk elimination policies for large-scale project management processes by analytically investigating and learning from a sample case.

Large-scale projects are different from other projects implemented in cities. An analytical perspective is required, as it is very difficult to comprehend the nature of large-scale projects with conventional tools. Hall (1981) used such a conceptual framework that identifies and classifies the problems and deficiencies experienced in the process as "*uncertainties*". Hall (1981) adapted the analytical framework for uncertainties introduced by Friend and Jessop (1969) to large-scale planning projects which constitutes the underlying concern of this article. The analytical framework introduced by Friend and Jessop (1969) has been used, modified, adapted and improved by several scholars since its first introduction. Hall (1981) adapted this framework to large-scale urban projects. Couclelis (2005) added a fourth category of uncertainty related to the reliability of planning support models (UM). Abbott (2012) added another fourth type (UVS) which reads as uncertainty in community values. Recent studies using, modifying, adapting and applying Friend and Jessop's analytical framework show that it is actually and potentially a working model. An elaborate application of this framework on uncertainties by Hall (1981) on large-scale projects can potentially be effective to eliminate, reduce or control the risks for large-scale projects.

Political discourses with criticism of large-scale projects and academic studies with technical reviews are common (Flyvbjerg et al., 2003; Sutterfield et al., 2006; Dooms et

al., 2013). Leick (2015) pointed out that existing research shows a certain bias toward studying projects in large metropolitan regions. The key argument of this study is the idea that many cities besides metropolitan cities can have large-scale projects within the scope of their own dynamics and financial budget, even if they do not have an impact on a national or international scale. Large-scale projects growing, differentiating and spreading worldwide, and their locations are not limited to broad regions or metropolitan areas. There are also several other projects which do not cover all the characteristics of this phenomenon but have a similar impact on their physical, economic or political environment.

Large-scale projects have started to become a phenomenon in Turkey, especially after 1980 with the effect of neoliberal policies. However, many projects similar to the projects that were described as large-scale projects 10 years ago build in many cities today. It may be an appropriate approach to include the size criterion among the definitions due to its effect on the relevant urban geography rather than mentioning the size due to the scope of the project. There are different opinions in the literature about whether large-scale projects should be considered in terms of scope, cost or results (Flyvbjerg et al., 2003; Tekeli, 2014; Leick, 2015). Sometimes, projects that do not have an international impact and do not fully meet large-scale project criteria, but significantly exceed the city's budget considerably are built. Flyvbjerg et al. (2003) also tried to explain the size of the project by emphasising that large-scale projects of a metropolitan city and a town will be different from each other. This is also an indication that a project cannot be defined independently of the region in which it is built. In this context, the process of the "Kaşüstü Junction", which is a transportation infrastructure project implemented in Trabzon, a mid-sized city[1], was examined in this study. Kaşüstü junction project is similar in size with constructed large-scale projects, and has high-cost. Even if it is not a project on a national scale, it is a project with a wide impact area in terms of transportation. The project was on the public agenda for many years with the involvement of many different actors in the process. Thus, Kaşüstü junction project largely meets large-scale project features. Actor-based chronology of the project process was identified. Hall's (1981) framework was used to examine the uncertainties involved in this project. As a contribution to the literature on the subject matter, the sample case investigated in the study was defined as a "relatively large-scale project" in a mid-sized city.

Characteristics of Large-Scale Projects

Competitive projects are being developed to create city brand strategies, to be included in international indexes, to attract global capital or to increase recognition in cities. Their visible implementations are large-scale projects. Large-scale projects are defined as a substantial capital project which requires concerted efforts from major participants in terms of resources, skills and expertise. Therefore, the main characteristics which differentiate large-scale projects from other projects in the cities are budget, the technology used and collaboration of stakeholders. In addition to the key characteristics, other common characteristics of large-scale projects are listed by examining other features identified in the literature (Table 1).

The most remarkable characteristic of these projects is the cost. Flyvbjerg (2014) explained the "extremely high-cost" in the "project cost" line in Table 1, with very high dollar figures by giving an example of the size of external debts of the states to each other. On the other hand, Youcef et al. (2013) expressed this situation with a cost criterion exceeding one billion dollars. These explanations help to understand the high-cost of large-scale projects.

Table 1. Characteristics of large-scale projects (compiled from Flyvbjerg et al., 2003; Youcef et al., 2013; Flyvbjerg, 2014; Patanakul et al., 2016)

Characteristics of large-scale projects				
Project cost	High-cost	Extremely high-cost		
Project duration	Long-duration			
Technology used in the project	High-technology	New Technology		
Impact area	Urban	National	International	
Scale of the project	Generally large-scale (may vary according to project type)			
Singularity of the project	Rare	Unique		
Stakeholders	Generally central government, public institutions beyond local	Public institutions beyond local + private company		
Uncertainties in the project	About Duration	About cost	About other estimations	High-risk

Another characteristic that makes large-scale projects different is the technology used. In such projects, either the latest technological developments or the new technology developed especially for that project are utilised. At this point, it is expected to encounter difficulties in terms of technology and logistics (Regev et al., 2006; Youcef et al., 2013; Hetemi et al. 2020). Increasing project scale and complexity also includes interdependencies between different actors at different points in time (Hetemi et al., 2020). Working with a partner or a contractor that has better knowledge of the technology can absorb the probable risks (Regev et al., 2006).

Although it varies according to the type of project, the impact area of the project is large as well as the size of the project itself. Due to this situation, the difficulties that may be experienced with the technology used can be tolerated. Because of all these characteristics, projects are rare or unique (or few). It is also expected that such projects will have long-duration. Youcef et al. (2013) also used the criterion of having a time frame of 5 years or longer for the duration of the project.

Large-scale projects often do not have a single actor. Because of the technology used, scope and scale of the projects, the implementation of such projects entails building governance regimes at the city or regional level (Taşan Kok, 2010). More than one public institution is involved in the decision-making process, and multi-partner models are established and project-based collaborations are carried out between private companies in the implementation process (Flyvbjerg, 2014). However, it is known that many projects fail because the project manager is sometimes unable to effectively manage the agendas of the various project stakeholders. Collaborations established between stakeholders also enable minimise the loss in case of failure of the project (Sutterfield et al., 2006). Therefore, the complex and uncertain nature of large-scale projects requires an effective stakeholder management approach to accommodate conflicting stakeholder interests (Sutterfield et al., 2006; Mok et al., 2015).

Uncertainties in Large-Scale Projects

Several kinds of problems occur in such projects because of the characteristics of large-scale projects. In the literature, researchers associate these problems with the terms of risk and uncertainty. Hall's (1981) framework [which was originally introduced by Friend and Jessop (1969)] in which the uncertainties encountered in large-scale project processes are classified, was taken as the basis for the study. In addition, recent studies using, modifying, adapting and applying Friend and Jessop's analytical framework show that it is actually and potentially a working model.

In the analysis of some large-scale projects seen as planning disasters, uncertainties are explained under 3 categories (Hall, 1981):

a) Uncertainty about the relevant planning environment:

It is a type of uncertainty that can be related to everything outside the decision-making systems such as project preparation, project duration, incorrect forecasting and unpredictability of human behaviour in society.

b) Uncertainty about decisions in related decision areas:

There are different actors who are decision-makers or practitioners in a project. However, these actors need to work in harmony and depend on each other. Any problem originating from one of the actors can cause the project to be disrupted and uncertainties to occur. For this reason, all actors involved in the project should consider each other's actions at all stages of the project.

c) Uncertainty about value judgment:

Generally, society does not have a homogeneous structure and includes different subgroups from each other. As a result of any project, not every group can benefit equally from the project. The positive or negative impacts of the project will also affect all groups differently. Therefore, uncertainty about value judgment arises during the questioning of values in the later stages of the project.

METHOD

Large-scale projects have a high level of complexity and uncertainty. In the literature, there are many studies exploring different dimensions of the phenomenon such as the risks of these projects, reducing/eliminating the risks, and management of the large-scale projects. Large-scale projects are different from other projects implemented in cities. It is very difficult to understand and manage these projects with conventional tools. The aim of this study is to propose effective risk elimination policies for large-scale project management processes by analytically investigating and learning from a sample case. To this aim, two crucial points were considered. Firstly, the literature review on large-scale projects has shown that in-depth analysis of large-scale projects requires an appropriate framework on its own rather than conventional analysis methods. The threefold analytical framework of "uncertainties" by Peter Hall was employed as a working model. Secondly, the range of large-scale projects is so wide and variable. There are also several other projects which do not cover all the characteristics of large-scale projects but have similar impacts on their physical, economic or political environment. In order to distinguish these highly influential projects from the classical understanding of large-scale projects, a notion of relativity is recommended in the article. In this manner,

as a contribution to the literature on the subject matter, the sample case that was defined as a relatively large-scale project in a mid-sized city was selected.

The uncertainties defined by Hall (1981) for large-scale projects were examined in the context of a transportation project implemented in Trabzon, a mid-sized city . Trabzon's "Kaşüstü Junction Project" was selected for the case study because of these reasons:

- The total area of the underpass project built is approximately 5500 m^2 as seen in Figure 1. It is similar in size to many projects defined as a large-scale projects.
- It is not a national or international project. However, it is a project with a wide impact area in terms of transportation, since it is built on a road that provides intercity and even international access.
- The junction project is a large-scale project in terms of the financial budget of Trabzon city.
- The project was on the city's agenda for a long period of time, and numerous different actors were involved in the process.

The project, which was originally designed as a crossover road, was later changed to an underpass project. After starting the construction of the underpass project, the route was changed because of an incomplete database (physical terrain data, topography, ground conditions, etc.) and problems with decision-making issues (e.g., lack of inter-institutional integration, and the hierarchy of authority). The high-cost project was realised in partnership with public and private entrepreneurs. Kaşüstü junction project largely meets the large-scale project criteria in literature, due to high-cost, long-duration, multi-actor, technologically challenging construction, and impact on an urban scale (Table 1). In this context, a case study was carried out.

In the study, archival research (bulletins, official records, minutes, media scanning, etc.) and in-depth interviews with key person methods were conducted and used together to complement each other. An in-depth interview was made with two civil engineers (E1, E2) from the Trabzon Branch of the Chamber of Civil Engineers which as an institute, raised objections to the project and suggested a new project; an academic (E3), who made a detailed technical analysis of the traffic in the area and based at Karadeniz Technical University Department of Civil Engineering; another academic (E4) specialising in geotechnical; a civil engineer (E5) who worked directly in the field as a leading personnel in the contractor company of the project. An actor-based chronological history of the project was created with the help of interviews and findings from archival research. The uncertainties experienced during the process were classified, and the risks of the project were examined by evaluating the opinions of the experts with whom in-depth interviews were conducted.

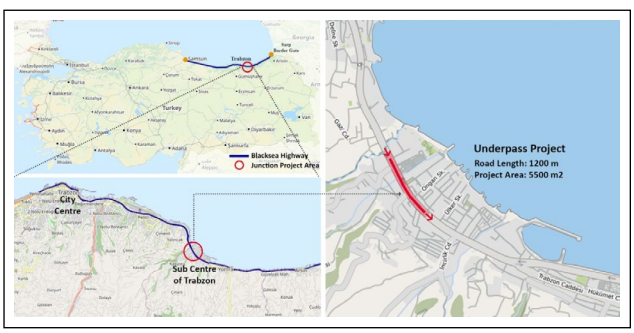

Figure 1. Location and features of the project area (It was produced from maps obtained from OpenStreetMap which is a geographic database).

KAŞÜSTÜ JUNCTION PROJECT

The most important road providing access on the east-west axis in Trabzon is Blacksea Highway (D 010), which was opened in 2007. It is an international road that starts from the Sarp Border Gate of Georgia-Turkey in the east to Samsun Province in the Central Black Sea Region. Although it is a highway according to the road hierarchy, it is frequently used for daily trip by local people in Trabzon, as in many cities in the region. This situation causes traffic congestion, especially during peak hours along the highway (Tatlı and Ünlü, 2015). Kaşüstü junction project, which was selected as the case study, is within the borders of the district Yomra, located in the east of the city. As seen in Figure 2, it was designed to be located on Blacksea Highway.

- To reduce traffic congestion caused by urban mobility on the highway
- To provide the connection of the district Yomra to

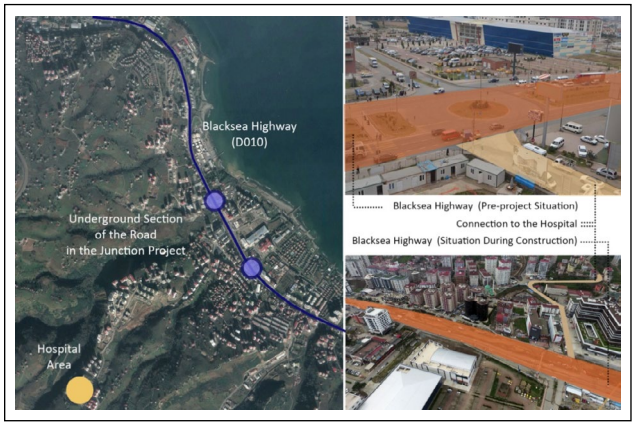

Figure 2. Project area in Kaşüstü neighborhood and pre-project situation.

Trabzon Southern Peripheral Road, which is still under construction

- To facilitate access to the hospital, which provides services at the regional level, located in the south of the project area.

The junction project, which had a high-cost and longer duration than estimated, provides services on a city scale today. Although it has a mid-sized content compared to many large-scale projects, the former mayor had once explained that the underpass project is one of the rare projects in Turkey in terms of construction technology (Milliyet, 2016). The project carried out in public-private cooperation included uncertainties and risks regarding duration, cost, etc. When the project process was examined in order to explore uncertainties, 4 different stages were distinguished (Figure 3). (1) design as a crossover road project, (2) downsizing of the project because of the roadside licensing works, (3) changing the crossover road project to an underpass and (4) starting the implementation and changing the route direction and length because of the physical constraints.

In 2008, the preparation of the crossover road project for the Kaşüstü region was started. Municipalities were informed so that the project will be taken into account in preparing development plans and managing construction activities. Yet, no activity related to the project was carried out until 2014. When the project preparation was given started in 2014, it was observed that roadside licensing works were carried out without taking into account the notifications made to the municipalities in previous years. It was very difficult to implement the designed project while new construction was being licensed alongside the direction. Thus, according to the information received from the Trabzon Branch of the Chamber of Civil Engineers (CCE) and media (Altıntaş, 2016), the crossover road project was downsized. However, the initial technical drawings of the project could not be obtained from the institutions. Therefore, it was not identified to what extent a change was made in the project. The contractor company won a tender for the crossover road project with a cost of 55,000,000 TL and started working. This process is the first stage identified in the study.

In 2014, Trabzon city was appointed to the status of a metropolitan municipality and the Kaşüstü region, where the project area is located, transformed into a neighbourhood of the district Yomra in terms of local administration. The crossover road project was approved by the Trabzon Metropolitan Municipality on the 14th of December 2015 and announced to the public. Local people were informed about the final version of the project for the first time (Table 2). However, non-governmental organisations, professional chambers and local people did not want the crossover road project. Local people preferred an underpass project for the area instead of a crossover road. Although many petitions of objection were submitted to the municipality for the project, the objections were rejected by a majority of votes at the council meeting. A meeting was arranged, consisting of the Trabzon Metropolitan Municipality Commission, representatives of the 10th Regional Directorate of Highways (RDH), relevant professional chambers and non-governmental organisations. The Trabzon Branch of CCE presented an underpass project proposal at the meeting. However, RDH found the proposed projects as a draft and claimed that it includes problems in terms of security. If the Trabzon Branch of CCE brought a new proposal until the completion of the expropriation process in the project area, RDH would re-evaluate the new project proposal (İHA, 2016). In summary, the second stage includes the

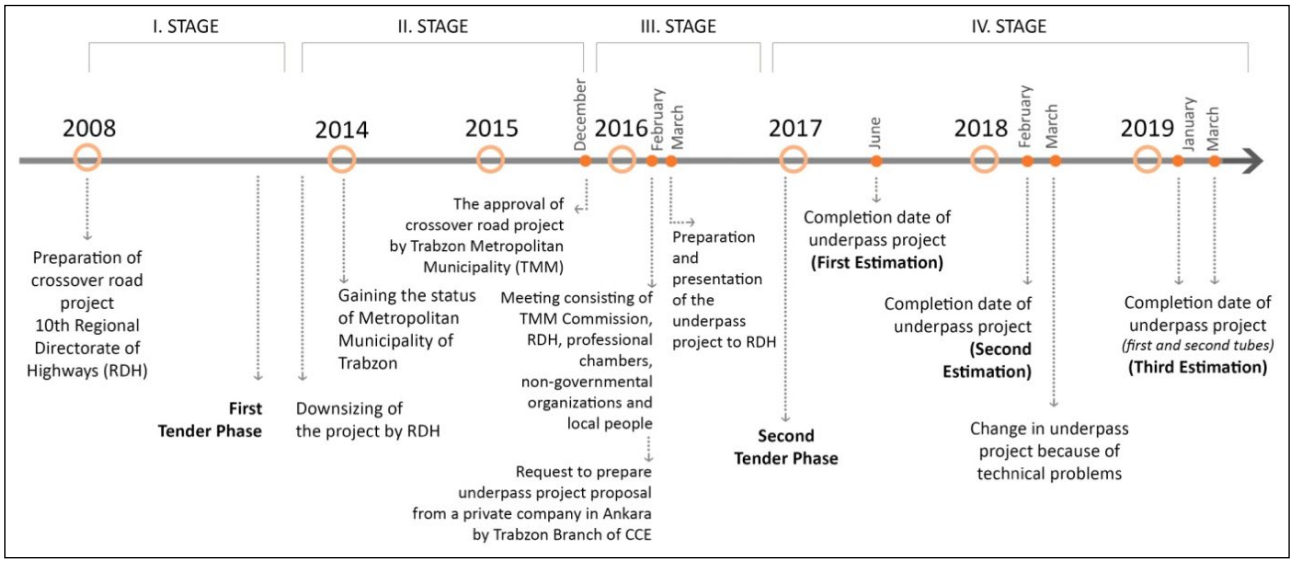

Figure 3. Process of Kaşüstü junction project (Compiled from URL-1-URL-13).

Table 2. Actor-based chronology of Kaşüstü Junction project process (compiled from compiled from Açkı Ulusoy, 2016; Altıntaş, 2016; Haber61, 2016; İHA, 2016; İMO, 2016; Milliyet, 2016; Sinop, 2016; Taka, 2016; Haber61, 2017; İHA, 2017; Haber61, 2018; Lakot and Paça, 2018; Öztürk, 2018).

	10th Regional Directorate of Highways (RDH)	**Trabzon Metropolitan Municipality**	**Local people + Professional chambers + Non-governmental organisations**	**Contractor company**
1st Stage				
2008	Design of crossover road Notification to municipalities that the project should be taken into account in construction activities	-	-	-
2014	Downsizing of the project because of the roadside licensing works	Gaining the status of metropolitan municipality of Trabzon The Trabzon Metropolitan Municipality became the responsible institution for the approval of projects prepared for the area	-	Winning the tender for downsized crossover road project with a cost of 55,000,000 TL and starting to work by contractor company
2nd Stage				
2015	-	The approval of crossover road project by the majority of votes in the Trabzon Metropolitan Municipality Council dated the 14th of December 2015 and numbered 598	-	-
	-	Announcement of the project to the public on the 26th of December 2015	Informed about the final version of project. Objection to crossover road project by the Trabzon branch of CCE and local people	-
2016	-	Rejection of the objections by a majority of votes at the council meeting on the 12th of February 2016	-	-
	-	-	Notification to the press of local people's demand by non-governmental organisations without having technical knowledge Explaining that such projects for the benefit of society should be carried out by taking the local people' the opinion Discussion on the situation by Trabzon branches of relevant professional chambers such as the Chamber of Civil Engineers, City Planners and Architects and consensus on an underpass project	-
	Having a meeting consisting of the Trabzon Metropolitan Municipality Commission, representatives of the 10th Regional Directorate of Highways (RDH), relevant professional chambers and non-governmental organisations			
	-	Requesting geometric study for the intersection from the Trabzon branch of CCE, stating that a re-evaluation will be made if the requested study is submitted	-	-

Table 2. CONT.

	10th Regional Directorate of Highways (RDH), Trabzon Metropolitan Municipality and Local People + Professional Chambers + Non-governmental organisations	Yomra Municipality	Contractor Company
3rd Stage			
2016	Starting expropriation process for crossover road project	-	-
	Request to prepare the underpass project proposal from a private company in Ankara, which prepares transportation projects throughout the country by the Trabzon Branch of CCE	-	-
	Starting to work by contacting RDH and the Trabzon Metropolitan Municipality of company	-	-
	Completion the project and presentation to the Trabzon Metropolitan Municipality on the 25th of March 2016 by company	-	Reaching the final point in drawings of the implementation project. Notification that the existing road would be raised 1.70 m
	Approval of the underpass project by RDH and the Trabzon Metropolitan Municipality	-	-
	Putting junction project out to tender for the second time as an underpass project in late 2016	-	Winning the tender for underpass project with a cost of 117,000,000 TL by same contractor company and starting to work
4th Stage			
2017	-	The mayor's explanation to the local press that they do not prefer crossover road themselves, and that underpass project will be the first for Turkey Announcement the date of June 2017 for project completion	-
	-	-	Incorrect measurement of depth for solid ground and prolongation of the project
	-	Announcement the date of January or February 2018 for project completion because of the technical problems	-
2018	-	Closure of some trade units in the vicinity because of ongoing work	Presence of dangerous high -voltage power lines in the area Unwillingness of operators and site managers to work because of the danger
	-	Encountering traffic problem of road users and people that live in the area	Determining that the solid ground on which the foundation can be laid is at a depth of 54 m. The need of different construction equipments than the company's own to excavate at this depth
	-	-	Establishing business partnership with another company because of the increased cost Increasing the length of underpass from 750 m. to 1200 m. Announcement of completion date (first tube– January 2019, second tube – March 2019)

announcement of the crossover road project and the rejection of the project by local people, non-governmental organisations and professional chambers.

In the third stage of the project, the Trabzon Branch of CCE contacted a private company in Ankara, which prepares transportation projects throughout the country, to prepare a proposal for the underpass project. The company started working by contacting RDH and the Trabzon Metropolitan Municipality. While the contractor company was about to achieve the final point in the drawings of the implementation project, it announced that the existing road would be raised by 1.70 m. according to the project. Immediately after the announcement, the company in Ankara completed the underpass project and presented it to the Trabzon Metropolitan Municipality on the 25th of March 2016 (IMO, 2016). The underpass project was approved by RDH and the Trabzon Metropolitan Municipality. Kaşüstü Junction Project was put out to tender for the second time in late 2016 as an underpass project. The same contractor company won the tender for the underpass project with a cost of 117,000,000 TL and started working (Açkı Ulusoy, 2016).

The last stage includes issues such as starting of the construction, problems experienced in the project because of technical and physical constraints, and incorrect estimations for the deadline. The Mayor of Yomra Municipality announced to the press that he did not want the crossover road. They would favour an underpass project which would be the first model of its kind for Turkey. It was announced that the project would be completed within 5 months (in June 2017) (Altıntaş, 2016). By August 2017 construction activities continued in the area. Construction activities were prolonged as a result of stones coming out in the area close to the surface because of incorrect measurements on the ground. February 2018 was announced as the extended deadline (Haber61, 2017).

The presence of high-voltage power lines in the area during the construction endangered the lives of the employees. Power lines had to be temporarily removed from the area. RDH had no authority to remove power lines. However, this work was costly and the electricity distribution company could not implement this temporary work. Operators and site managers stopped working because of this life-threatening situation. The problem was reported to the Minister of Energy and Natural Resources and the process of moving power lines was accelerated (Açkı Ulusoy, 2016).

A civil engineer who worked in the contractor company explained some incorrect estimations. The company which made the measurements of the ground determined the solid ground to be laid at a depth of 22 m, but in practice, it was realised that the solid ground was 54 m deep. Construction equipment different from the company's own instruments was needed to excavate at this depth. The number of such construction machines is few in Turkey and it is necessary to queue to use them. The civil engineer stated that the company waited for a long time and the cost doubled. Therefore, the contractor company established a business partnership with another company.

In August 2018, RDH announced that construction activities were continuing in line with the currently approved project, and there was no change in the project (Haber61, 2018). However, the company stated in March 2018 that some changes were made and the length of the underpass was increased from 750 m to 1200 m. A third ending date was on the agenda for the project that could not be completed because of technical problems. The underpass was designed as a round-trip 2 tubes model. The company announced that the first tube of the underpass will be opened in January 2019, and the second tube in March 2019. Nevertheless, the proposed time was exceeded, and the first and second tubes were opened in 2020, respectively.

As a result; the crossover road project was not accepted by local people and was changed over time. The project type was changed to an underpass project and started to be implemented in March 2016. The duration was prolonged and the cost was increased because of the reasons such as constraints caused by other relevant institutions authorised in the field and inaccuracies in technical measurements. The tradesmen in the vicinity started to lose money because of the continuing work and some tradesmen closed their workplaces (Haber61, 2017).

FINDINGS AND EVALUATION

It was determined that the Kaşüstü junction project, which largely meets the large-scale project criteria, contains uncertainty types stated by Hall (1981). In this context, uncertainty types examined for the junction project were (1) uncertainty about the relevant planning environment, (2) uncertainty about decisions in related decision areas and (3) uncertainty about value judgment.

Uncertainty About the Relevant Planning Environment

Issues such as project preparation, estimation for the duration, incorrect technical measurements, and unpredictability of human behaviour in society appear to be the representatives of uncertainty about the relevant planning environment. The crossover road project was decided in 2008, but the work started in 2014. This situation caused uncertainty about project preparation. Although the relevant municipalities were informed about the project, roadside licensing works were carried out in the project area. Therefore, the crossover road project was downsized.

During the project timeline, human behaviour in society was not appropriately taken into consideration. The crossover road project was not accepted by local people and non-governmental organisations. Several objections were made against the project. The fact that the requested project was different from the prepared project was an unpredictable situation for RDH. As a result, the crossover road project, which began operating, was changed to an underpass project, and it caused the prolongation of the process.

In the process, incorrect estimations were made about both technical measurements and the timeline of related operations. Developing a project with an incomplete database is one of the main reasons that create risks in large-scale projects. One of the situations that result in uncertainty regarding this issue in the junction project was the rainwater lines and irregular sewer lines, which were not included in the maps taken from the Trabzon Metropolitan Municipality, but were encountered in the field. Another incorrect estimate that created uncertainty was the depth of solid ground measured for the underpass foundation. Therefore, higher level technical equipment was needed and the difficulty in obtaining technical equipment resulted in exceeding the proposed deadline of the project.

The change in the type of the junction project, physical constraints and incorrect technical measurements not only caused incorrect estimations of project duration but also increased the cost of the project (Table 3). Cost estimation in the initial phases of the project did not consider such risks and incompatibilities thoroughly.

In summary, incorrect estimations in project preparation, project duration prediction, and technical measurements in the project process have led to uncertainties about the relevant planning environment.

Uncertainty About Decisions in Related Decision Areas

Since there are different actors as decision-makers or practitioners in a project, these actors must need to work in harmony and depend on each other. The actors directly involved in the Kaşüstü junction project were RDH and the contractor company. In the following process, the contractor company established a partnership with another private company as it could not cover the cost. The private company that made the technical measurements in the field, the Trabzon Branch of CCE, the private company that prepared the underpass project for the Trabzon Branch of CCE, the electricity distribution company and the 22nd Regional Directorate of State Hydraulic Works were indirectly involved in the process.

In the project, there were some uncertainties regarding the decision-making of the actors with each other. The first uncertainty determined on this issue was that the relevant municipalities were informed about the project by RDH, but roadside licensing works were carried out in the area. Therefore, changes were made to the project.

The project area is located in the sub-centre of the city. A participatory process was not carried out when the crossover road project, which will affect the silhouette of the city in the area, came to the agenda. Therefore, after the project was approved, many objections were made to the project by professional chambers, non-governmental organisations and local people. An underpass project was prepared by a private company upon the request of the Trabzon Branch of CCE to change the project type. However, RDH was not aware that the Trabzon Branch of CCE would prepare a different junction project and that the contractor company was preparing the implementation project at that time.

In the implementation stage of the underpass project, the power lines in the area posed a life threat to the operational work on the field. Power lines had to be temporarily removed from the area. However, the electricity distribution company had not been informed by the stakeholders about the project. There was no such project in the annual budget plan, thus the company could not perform the requested work.

The lack of coordination between the actors, the lack of information in the decision and implementation stages and the actors' ignorance of each other's jurisdictions caused in uncertainties.

Uncertainty About Value Judgment

The positive or negative impacts of the project affect all groups differently because of the heterogeneous structure of the society. Uncertainties about value judgment arise

Table 3. Cost of Kaşüstü Junction project (Açkı Ulusoy, 2016; Haber61, 2016; İHA, 2016; Sinop, 2016; Taka, 2016; Haber61, 2017; İHA, 2017; Haber61, 2018; Öztürk, 2018; Interview with expert 5 (E5), the 25th of November 2018)

Stages	Cost (TL)	Expropriated price (TL)
1st Stage (Crossover road project)	55.000.000	40.000.000
2nd Stage (Underpass project)	117.000.000	
3rd Stage (Changed underpass project)	80.000.000 (additional cost)	
Total cost	292.000.000	

during the questioning of values in the later stages of the project. Additionally, some uncertainties about value judgment emerged over time during the progress. There are different types of land uses and functions in the surroundings of the project area, mostly dominated by residential use and commercial uses, as well as some administrative facilities and leisure activities. The disruptions and uncertainties experienced in the process adversely affected the residents living in the area and its surroundings, the employers and employees in the area and road users.

The property owners living in the area did not leave their places for a long time, although they had been granted expropriation compensation at once by the administrations. That was unexpected social behaviour. On the other side, construction activities in the area and the prolonged project process negatively affected the daily life of the users (Figure 4). One of the reasons for the emergence of the junction project was to reduce traffic congestion. However, there was more traffic congestion than the existing traffic load during the construction process.

Another group that was adversely affected was project construction workers who were not permanent users of the project like those residents and business holders in the surroundings. Stream beds and high-voltage power lines in the project area were a risk for workers. Operators and site managers did not want to continue working unless necessary precautions were taken, thus they stopped the work occasionally.

The junction project affected different groups in different ways. The underpass project was opened to use in 2020 yet gradually. It is a project that has been finished regarding its total functioning, but technically not completed in March 2022. For this reason, uncertainties in value judgment can be determined more clearly in the following years.

CONCLUSION

Large-scale projects are among the characteristics of the current globalisation pattern. The necessary infrastructure for the operation of international economies, and developments in construction technologies are changing the physical structure of urban space rapidly and more drastically than ever. Numerous large-scale projects are under design, construction, revision or operation stages all around the world. The literature on large-scale projects, also known as mega projects, is also accumulating with special attention paid to their distinguishing characteristics. Besides the conventional aspects of large-scale projects which are mainly high-cost, high revenue, wide scope exceeding national boundaries, complexity, multi-actor collaboration, long duration, and great impact, some other identifiers are also apparent such as having high risks and specific types of uncertainties.

Large-scale projects are one-time undertakings. Consequently, they are performed under uncertainty and they are subject to risk (Regev et al., 2006). Unforeseen outcomes are highly likely to emerge in decision-making, implementation or monitoring processes of large-scale projects. Therefore, risk assessment techniques must be given special importance in project preparation and management processes. The aim of this article is to propose effective risk reduction/elimination policies for large-scale project management processes by examining a sample case.

The phenomenological urban space changer (the large-scale project) has samples mostly in and around the megacities and urban regions, yet not limited to those areas. Other projects that do not totally meet the definitive criteria of large-scale projects, but are similar to such projects in terms of content and impact, are constructed in mid-sized cities. In the study, it is argued that such projects can and must be evaluated in terms of large-scale projects, even if they do not have an impact on a national or international scale. These "relatively" large-scale projects embody most contents regarding large-scale projects. From this perspective, the Kaşüstü junction project in the city of Trabzon-Turkey which is an implemented sample of such relatively large-scale projects was examined.

The study employed Peter Hall's (1981) conceptual framework in dealing with the uncertainties in large-scale project processes. It was found that the three types of uncertainties defined by Friend and Jessop (1969) and applied by Hall (1981) were evident in the Kaşüstü junction project: 1) uncertainty about the relevant planning environment, (2) uncertainty about decisions in related decision areas and (3) uncertainty about value judgment. Basically; miscalculations, underestimation of important aspects, disharmonious actions of stakeholders, and wrong or incompetent choice of methodologies appeared as the sources for uncertainties about project revisions, budget extensions and time delays. In this context, the reasons for uncertainties and solutions can be discussed as follows:

- The uncertainties and risks identified for large-scale projects mainly originated from failures in project management (Regev et al., 2006; Taşan Kok, 2010). Even if large-scale projects are carried out in public-private cooperation, effective stakeholder management is required by the public sector (Mok et al., 2015). Although the projects have one or more than one executive institution, some other external institutions are likely to intervene directly or indirectly in the process. City management is a complex structure because there are several institutions authorised with

different powers for specialised service provisions. In the case of Kaşüstü junction, some institutions were different from the major actors such as the municipalities and the construction company involved in the process at certain phases. When they were required to make extra expenditures that were not included in their annual budget plans, problems emerged. These unexpected conditions can risk the project prolongation as happened in the Kaşüstü junction project sample.

- Monitoring all the necessary steps in the project can improve process management. In the Kaşüstü junction project, some fundamental steps were skipped in order to perform some type of result-oriented work. However, problems originating from the oversimplification were encountered frequently during the process and the project duration was prolonged.
- Large-scale projects should be approached more systematically and elaborately because of their high costs. Advanced studies should be carried out by groups that are specialised in the subject matter and calculations should be made delicately before as well as during the project. Incorrect calculations sometimes lead to increased costs sometimes to prolongation of the process, and sometimes to both. Incorrect calculations in the Kaşüstü junction project not only increased the cost but also prolonged the project duration by 270%.
- Projects are mostly constructed within the built-up area where people accommodate, work, etc. The prolongation of the project duration may also adversely affect the people living and working in the surrounding areas. Therefore, the project duration should be estimated correctly or at least within tolerable limits by considering all the steps. In addition, the public should be informed constantly about the progress. In the Kaşüstü junction project, the technical problems in the process were not always unknown or unpredicted. On most occasions, the project teams were aware of the potential problems long before they emerged. However, the public was not informed thoroughly, as it was not accurately estimated how long the technical problems would prolong.

The complexities of multi-actor governance influence the implementation of projects. Each city has its own particular experience with the implementation strategy (Taşan Kok, 2010). Problems, possibilities, uncertainties, and risks vary from city to city in accordance with the unique composition of local actors and their existing relations. Therefore, besides the common features of large-scale projects, there is always some level of uniqueness in the environment of large-scale projects. Kaşüstü junction project which was constructed in Trabzon, a mid-size city, is a significant example to understand the impact and authenticity of multi-actor governance mechanisms.

The uncertainties and failures as the results of project management in large-scale projects addressed in the literature have also been identified in the Kaşüstü Junction project. This experience showed similar results with others around the world that either megaprojects or large projects are home to uncertainties. It has been determined that not only mega projects or large-scale projects built in large-scale cities, but also relatively large-scale projects built in mid-sized cities have similar uncertainties. Every project contains uniqueness and uncertainties. Thus, project preparation teams should pay special attention to the concern of reducing uncertainties in their agendas. After several revisions, time delays, budget extensions, project shrinking / downsizings, organisational renewals, and corrosive public debates Kaşüstü junction project was finished with some degree of differentiation from the original project. It is suggested that learning from the analysis of the large-scale project experiences will contribute to efforts to reduce such negative effects of large-scale projects which show a worldwide tendency to become more expensive, more complex, more uncertain and riskier.

Figure 4. Construction activities of Kaşüstü junction project (Fieldwork photos of November 2018).

[1]*In Yazar's (2006) study, which includes the classification of the cities in Turkey according to population of their city center, Trabzon is considered as a mid-sized city.*

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REFERENCES

Abbott, J. (2012). Planning as managing uncertainty: making the 1996 livable region strategic plan for Greater Vancouver, Planning Practice & Research, Taylor & Francis Journals, 27:5, 571-593.

Açkı Ulusoy, E.N. (2016, March 5). Trabzon Kanuni Eğitim ve Araştırma Hastanesi yol planında son durum. Emlakkulisi. https://emlakkulisi.com/trabzon-kanuni-egitim-ve-arastirma-hastanesi-yol-planinda-son-durum/455733. Access 08 October 2018.

Altıntaş, Ö. (2016, February 12). Sağıroğlu ve Genç Kaşüstü için en güzeli dalçık kavşak. Trabzonhaber24. http://www.trabzonhaber24.com/trabzon/sagiroglu-ve-genc-kasustu-icin-en-guzeli-dalcik-kavsak-h4944.html. Access 08 October 2018.

Couclelis, H. (2005). "Where has the future gone?" rethinking the role of integrated land-use models in spatial planning, Environment and Planning A, 37, 1353-1371.

Dooms, M., Verbeke, A., Haezendonck, E. (2013). Stakeholder management and path dependence in large-scale transport infrastructure development: the port of Antwerp case (1960–2010), Journal of Transport Geography, 27, 14-25.

Erten, S. (2005). Büyük ölçekli kentsel projeler ve olimpiyat oyunları: Atina 2004 olimpiyatları deneyimi. Planlama Dergisi, 2005/2, 45-52.

Flyvbjerg, B., Bruzelius, N., Rothengatter, W. (2003). Megaprojects and risk: an anatomy of ambition. Cambridge: Cambridge University Press.

Flyvbjerg, B. (2014). What you should know about megaprojects, and why: an overview. Project Management Journal, 45:2, 6-19

Friend, J.K., Jessop, W.N. (1969). Local government and strategic choice: an operational research approach to the processes of public planning, London: Tavistock Publications.

Haber61. (2016, January 15). Yomralılar Kaşüstü'ne köprülü kavşak istemiyor. Haber61. https://www.haber61.net/gundem/yomralilar-kasustune-koprulu-kavsak-istemiyor-h254913.html. Access 12 February 2022.

Haber61. (2016, March 17). Uzmandan Kaşüstü kavşağı ve hafif raylı sistem açıklaması. Haber61. https://www.haber61.net/gundem/uzmandan-kasustu-kavsagi-ve-hafif-rayli-sistem-aciklamasi-h260627.html. Access 13 February 2022.

Haber61. (2017, November 7). Kaşüstü kavşağında tarih belli oldu. Haber61. https://www.haber61.net/kasustu-kavsaginda-tarih-belli-oldu. Access 08 October 2018.

Haber61. (2018, August 15). Trabzon'da Kaşüstü kavşağı dal çık projesi iptal mi?" Müdürlükten açıklama geldi. Haber61. https://www.61saat.com/bolgesel/trabzon-da-kasustu-kavsagi-dal-cik-projesi-iptal-mi-mudurlukten-h568723.html. Access 08 October 2018.

Hall, P. (1981). Great planning disasters, London: Penguin Books.

Hetemi, E., Jerbrant, A., Mere, J.O. (2020). Exploring the emergence of lock-in in large-scale projects: a process view. International Journal of Project Management, 38, 47-63.

İHA. (2016, April 22). TMMOB Trabzon İl Koordinasyon Kurulu'ndan Kaşüstü kavşağı açıklaması. Habertürk. https://m.haberturk.com/trabzon-haberleri-amp/44709088-tmmob-trabzon-il-koordinasyon-kurulundan-kasustu-kavsagi-aciklamasi. Access 13 February 2022.

İHA. (2017, September 11). Gümrükçüoğlu basın mensuplarıyla sohbet toplantısı gerçekleştirdi. İHA Yerel Haberler. https://www.iha.com.tr/trabzon-haberleri/gumrukcuoglu-basin-mensuplariyla-sohbet-toplantisi-gerceklestirdi-1798889/. Access 12 February 2022.

Kimiagari, S., Keivanpour,S. (2019). An interactive risk visualisation tool for large-scale and complex engineering and construction projects under uncertainty and interdependence. International Journal of Production Research, 57:21, 6827-6855.

Köksal, G., Öztürk, D. (2017). İstanbul'un "mega" dönüşümünü haritalamak. Mimarİst, 17:58, 56-69.

Lakot, T., Paça, E. (2018, June 11). Kaşüstü kavşağı mayın tarlası-bitirilememesinin sebebi belli oldu. Haber61. https://www.haber61.net/trabzon/kasustu-kavsagi-mayin-tarlasi-bitirilememesinin-sebebi-belli-h324801.html. Access 08 October 2018.

Leick, A. (2015). Large-scale urban projects in smaller metro areas: towards a broader conceptual perspective, Planning, Practice and Research, 30:1, 54-68.

Milliyet. (2016, October 19). Sağıroğlu "Kaşüstü dal-çık projesi Türkiye'de örnek bir proje olacak". Milliyet. https://www.milliyet.com.tr/ekonomi/sagiroglu-ka-

sustu-dal-cik-projesi-turkiyede-ornek-bir-proje-olacak-2329929. Access 08 October 2018.

Mok, K.Y., Shen, G.Q., Yang, J. (2015). Stakeholder management studies in mega construction projects: a review and future directions, International Journal of Project Management, 33:2, 446-457.

Monclus, F.J. (2003). The Barcelona model: an original formula? from "reconstruction" to strategic urban projects (1979-2004), Planning Perspectives, 18:4, 399-421.

Öztürk, A. (2018, March 5). Trabzon mimar mühendis odalarına dal çık çağrısı. Günebakış. https://www.gunebakis.com.tr/makale/12951446/ali-ozturk/trabzon-mimar-muhendis-odalarina-dal-cik-cagrisi. Access 08 October 2018.

Pagliarin, S., Hersperger, A.M., Rihoux, B. (2020). Implementation pathways of large-scale urban development projects (lsUDPs) in Western Europe: a qualitative comparative analysis (QCA), European Planning Studies, 28:6, 1242-1263.

Patanakul, P., Kwak, Y.H., Zwikael, O., Liu, M. (2016). What impacts the performance of large-scale government projects?, International Journal of Project Management, 34:3, 452-466.

Penpecioğlu, M. (2013). Büyük ölçekli kentsel projeler, mekanın üretimi ve neo-liberal hegemonya: İzmir örneğinde karşılaştırmalı bir araştırma. Megaron Dergisi, 8(2), 97-114.

Regev, S., Shtub, A., Ben-Haim, Y. (2006). Managing project risks as knowledge gaps, Project Management Journal, 37:5, 17-25.

Sinop, M. (2016, October 19). Trabzon Kaşüstü dal-çık projesi son durum. Emlakkulisi. https://emlakkulisi.com/guncel/tranzon-kasustu-dal-cik-projesi-son-durum/1534826. Access 08 October 2018.

Sutterfield, J.S., Friday-Stroud, S.S., Shivers-Blackwell, S.L. (2006). A case study of project and stakeholder management failures: lessons learned, Project Management Journal, 37:5, 26-35.

Swyngedouw, E., Moulaert, F., Rodriguez, A. (2002). Neoliberal urbanization in Europe: large–scale urban development projects and the new urban policy, Antipode, 34, 542-577.

Taka. (2016, October 19). Kaşüstü projesini 5 ayda bitiririz. Taka Gazete. https://www.takagazete.com.tr/bolgemiz/kasustu-projesini-5-ayda-bitiririz-h156933.html. Access 13 February 2022.

Taşan Kok, T. (2010). Entrepreneurial governance: challenges of large-scale property-led urban regeneration projects, Journal of Economic and Human Geography, 101:2, 126-149.

Tatlı, P., Ünlü, C. (2015). İnşaat sektörünün son dönem dinamikleri: Trabzon kenti örneği, Dünya Şehircilik Günü 39. Kolokyumu, Bildiriler Kitabı Cilt I, 530-545, 5-8 Kasım, Trabzon.

Tekeli, İ. (2014). Siyasetçiler ve mega projeler üzerine. Mega Projeler ve İstanbul Paneli, Mimar Sinan Güzel Sanatlar Üniversitesi Şehir ve Bölge Planlama Bölümü. https://www.academia.edu/27999587/S%C4%B0YASET%C3%87%C4%B0LER_VE_MEGA_PROJELER_%C3%9CZER%C4%B0. Erişim 27 Mart 2022.

TMMOB İnşaat Mühendisleri Odası Trabzon Şubesi (İMO). (2016). Kasım 2016 Mühendislik bülteni. http://trabzon.imo.org.tr/resimler/dosya_ekler/b1a52cf29518df3_ek.pdf?dergi=990. Erişim: 15 Ekim 2020.

Türk, E., Erkan, G. H. (2018). Gömleğin her düğmesini yanlış iliklemek: Artvin-Yusufeli zorunlu yeniden yerleştirme sürecinin eleştirel incelemesi, Planlama Dergisi, 28(2), 218-235.

Yazar, K. H. (2006). Sürdürülebilir kentsel gelişme çerçevesinde orta ölçekli kentlere dönük kent planlama yöntem önerisi, Doctoral Thesis, Ankara University, Institute of Social Sciences, Ankara.

Youcef, J., Zidane, T., Johansen, A., Ekambaram, A. (2013). Megaprojects-challenges and lessons learned, Journal of Procedia Social and Behavioral Sciences, 74, 349-357.