How Conflict Occurs and What Causes Conflict: Conflict Analysis Framework for Public Infrastructure Projects

Jang Hee Min[1]; Woosik Jang[2]; Seung Heon Han, M.ASCE[3]; Doyun Kim[4]; and Kwak Young Hoon, M.ASCE[5]

Abstract: This study proposes a conflict analysis framework to investigate how conflict occurs and what causes conflict by considering the characteristics of public infrastructure projects. The conflict occurrence process over construction projects was structured as four stages based on the paradigm model approach of grounded theory. Two types of Korean cases (the first one is linear facilities and the second one is clustered facilities) were analyzed using the proposed framework. The study examined that each infrastructure type has its own pattern during conflict occurrences, with the impact of conflict factors also varying significantly. The results showed that the "procedure of deciding facility's location and its route" is commonly extracted as a major factor. For linear infrastructure facilities, "the validity of the public engagement process" and "technical alternatives to mitigate conflict" were distilled as major factors. In contrast, "environmental and ecological concerns in the early site selection phase," because the facility required a large amount of territory, was identified as more important for clustered infrastructure facilities. This framework is expected to be useful for conflict analysis from the early stage of public projects, according to the inherent characteristics of the given infrastructure project. **DOI: 10.1061/(ASCE)ME.1943-5479.0000625.**

Author keywords: Public Infrastructure; Conflict analysis; Project management; Grounded theory; Paradigm model.

Introduction

As society develops, public demand for a high quality of life and delivery on public construction projects increases, but not all governments have adopted the methods necessary to meet the rising expectations of public services because of time and budget constraints (Gurgun and Touran 2014; Soomro and Zhang 2015; Winters et al. 2014). Currently, many public construction projects are conducted in an authoritarian manner, in which the project's main emphasis is to stimulate economic growth, instead of enhancing the life of local communities or improving the quality of the finished product (Klakegg and Haavaldsen 2011; Banihashemi et al. 2017). This gap in priorities between governments and local communities has resulted in an increase in conflicts over the entire cycle of public construction projects. Countries with low levels of social cohesion are more likely to experience conflicts over public projects (Easterly et al. 2006). South Korea is one such country. It often experiences extensive delays, exceeding initial time and cost estimates (Mahamid et al. 2012; Lee et al. 2017).

Generally, a public infrastructure project can be defined as a project executed and maintained by government to enhance public services that is based on social and economic needs (Wu et al. 2014a; Li et al. 2017). Despite a public infrastructure project's necessity, local residents consider some facilities, such as a nuclear waste site or electrical energy transmission tower, as unpleasant because of the possible harmful effects. This perception gap between the government and the public can cause nationwide conflicts (Femi 2014). Public construction conflicts are also considered multidimensional, with characteristics that are both qualitative (localized institutional aspects, regional history, regional tendencies, and attitudes toward a project) and quantitative [appropriateness of land acquisition and compensation, unbalanced cost-benefit ratios, and effectiveness of regional development; Yousefi et al. (2010)]. Thus, conflicts are difficult to formulate or generalize (Harmon 2003; Leung et al. 2005), but the analysis of conflict patterns and how conflicts occur, given the characteristics of the infrastructure, is emerging as an essential part of the study of conflict management.

This study aims to analyze how conflict occurs and what causes conflict by considering the characteristics of public infrastructure projects. Two representative case projects in South Korea were selected because Korean society has experienced a history of rapid economic development in conjunction with conflicts of interest in major public infrastructure projects. First, the research conducts a thorough literature review that focuses on the selection of representative cases of conflict on public infrastructure projects in South Korea. The selected cases are then analyzed using secondary data, such as policy reports, research papers, media data, and recorded tapes, to identify how and why conflicts developed and propagated in each case. Next, this study discusses how the proposed paradigm model, based on grounded theory, is used to structure the cause-and-effect relationships for various conflict events. This method is often applicable in situations in which certain social phenomena cannot be easily identified using available conceptual frameworks (AlMaian et al. 2016). This study also performs a supplementary

[1]Researcher, Dept. of Civil and Environmental Engineering, Yonsei Univ., Seoul 03722, South Korea; Staff, Dohwa Engineering, Seoul 06178, South Korea. E-mail: jhmin@dohwa.co.kr

[2]Postdoctoral Researcher, Dept. of Civil and Environmental Engineering, Yonsei Univ., Seoul 03722, South Korea; Assistant Professor, Dept. of Civil Engineering, Chosun Univ., Gwangju 61452, South Korea. E-mail: woosik@chosun.ac.kr

[3]Professor, Dept. of Civil and Environmental Engineering, Yonsei Univ., Seoul 03722, South Korea (corresponding author). E-mail: shh6018@yonsei.ac.kr

[4]Master's Student, Dept. of Civil and Environmental Engineering, Yonsei Univ., Seoul 03722, South Korea. E-mail: doyun.kim@yonsei.ac.kr

[5]Professor, Dept. of Decision Sciences, George Washington Univ., Washington, DC 20052. E-mail: kwak@gwu.edu

Note. This manuscript was submitted on September 13, 2017; approved on January 24, 2018; published online on April 25, 2018. Discussion period open until September 25, 2018; separate discussions must be submitted for individual papers. This paper is part of the ***Journal of Management in Engineering***, © ASCE, ISSN 0742-597X.

analysis using expert surveys on each case to ascertain commonalities and differences in the conflict occurrence process. Two representative cases, linear and clustered infrastructures, show common conflict factors from the perspective of location selection and environmental sustainability. On the other hand, most conflict factors show significant differences. This indicates that not only is an understanding of differences in nature between infrastructures essential, but also that customized conflict management is necessary.

Literature Review

Types and Characteristics of Public Infrastructure Facility

Public infrastructure projects aim to serve the public interest and are typically conducted by central or local governments. According to many previous studies, as presented in Table 1, each project constructs an infrastructure facility that can be classified in association with its sustainability, the preferences of local residents, facility location, and facility composition.

In the first facility category, Yao et al. (2011) classified infrastructure into three types (transportation, wastewater, and energy) and examined the sustainability of construction projects for different types of infrastructures. The second classification categorizes facilities as preferred or nonpreferred facilities, based on how local residents perceive the proposed facility. Some public facilities, including subway stations, green belts, and city parks, are preferred by local residents because of their positive external effects. However, other public facilities, such as radioactive waste sites and crematoriums, are nonpreferred because of their negative effects (Wu et al. 2014b). Based on the preferences of local residents, previous studies (Lam and Woo 2009; Sun et al. 2016) have proposed conflict resolution policies from local residents' perspectives of the given project by analyzing how conflicts occur during the site-selection phase of projects and/or by deducing factors of conflict (e.g., economic loss, technology suitability, health risks). Facilities are also classified by their components, such as modular infrastructure design, integral infrastructure design, or hybrid infrastructure design, based on their physical connectivity (Gil 2015). Last, infrastructure can be classified morphologically into such types as point infrastructure, band and network infrastructure, and clustered infrastructure. In many cases, morphological characteristics are widely and intuitively used to classify infrastructure, especially morphological characteristics, such as type, size, number, operations, appearance, and reputation, which have direct effects on perceptions in society (Dear 1992). Moreover, if other factors are equal, then a project located in a large area will face stronger barriers than a project located in a smaller area; a large area project is not only linked to more local residents, but it also leads to greater impacts on society (Dear 1992).

In previous research efforts, however, the physical characteristics of the facilities investigated were not fully considered, which makes it difficult to identify the underlying causes of conflict and how conflicts occur with relation to their morphological characteristics. To address this gap, this study investigates the conflict generation process in public construction projects inductively while considering the physical characteristics of facilities. To be more specific, point infrastructure is characterized by the location of single facilities in a specific area (e.g., church, community center, office), whereas clustered infrastructure includes composite forms of buildings and land, or only land (Howes and Robinson 2005). Because these two types have similar characteristics and clustered infrastructure concepts can include point infrastructure, the authors used clustered infrastructure as a representative term for both. Apart from clustered infrastructure, networks are also defined as band infrastructure for stretched ribbon-like formations, such as railroads, water and sewerage networks, and power transmission lines. Accordingly, both clustered and linear infrastructure projects are used as the representative physical characteristics of public facilities.

Overview of Conflict Management Research

Research on conflict management in public construction can be divided into two branches: (1) identifying conflict factors and (2) classifying types of conflict. In the first area of study, conflict factors are derived by analyzing how conflict could occur in a given case. In the latter, conflict types are partitioned into conflicts among the stakeholder with privity and those without privity, interest conflicts, value conflicts, the not in my back yard (NIMBY) effect, the please in my front yard (PIMFY) effect, and so forth (Ock and Han 2003; Feinerman et al. 2004; Chang and Nozawa 2013; Stigka et al. 2014; Shi et al. 2015). Conflict factor-related research examines real-world cases and classifies the associated conflict factors into six or more categories, with the most common as economic, social, institutional, technical, cognitional, and environmental (Awakul and Ogunlana 2002; Alzahrani and Emsley 2013; Baxter et al. 2013). In addition, a number of studies have developed conflict management systems to resolve such conflicts (Ng et al. 2007; Menassa and Peña Mora 2010; Yousefi et al. 2010). These efforts commonly analyze the processes of conflict occurrence at the policy-making stage or the policy-implementation stage (Gwartney et al. 2002). Nondisclosure on the government's part and a lack of clarity in project information are common problems at the policy-making stage, whereas a lack in soliciting public opinion and in enlisting public involvement are common problems at the policy-

Table 1. Breakdown of Public Infrastructure Facilities

Previous research	Classification	Example
Facility sustainability (Yao et al. 2011)	Transportation infrastructure	Road, harbor, railway
	Wastewater infrastructure	Sewage, water treatment facilities
	Energy infrastructure	Wind power, liquid natural gas plant
Local residents' preferences (De Feo et al. 2013; Sun et al. 2016)	Nonpreferred facility	Radioactive waste site, crematory, psychiatric hospital
	Preferred facility	Subway station, city park
Morphological characteristics (Howes and Robinson 2005)	Point infrastructure	Church, community center, offices
	Clustered infrastructure (space infrastructure)	Hospitals, university, airport, harbors, shopping complex
	Network infrastructure (band infrastructure)	Railroads, water and sewerage networks, power transmission lines
Facility composition (Gil 2015)	Modular infrastructure	Stadium, amusement park
	Integral infrastructure	Road, railroad, monorail

decision stage (Ko 2010; Leung et al. 2013). Therefore, policy procedures must be improved to minimize and resolve conflicts (Singh and Vlatas 1991; Tam et al. 2009).

Although there are many studies in the literature on deriving key conflict factors and classifying the types of conflict, few studies have focused on the diversity of conflict occurrence processes at the project level. In addition, most conflict-related research is in the social sciences domain, which basically considers the characteristics of a facility's infrastructure and addresses conflicts in broad terms, focusing on the policy-making stage. Thus, there were not enough studies to classify infrastructures according to their morphological characteristics (i.e., linear, clustered) and to highlight the differences among them. In addition, it is necessary to analyze a conflict in terms of the progress of the project because a conflict can be amplified during the ongoing construction stage (Lee et al. 2017). Thus, understanding the fundamental causes of conflict is essential to preventing such conflicts in public construction projects. In this regard, the previous studies simply listed conflict phenomena as they occur over a period of time. They also did not appropriately focus on why a conflict occurred within a given project.

Research Methodology

Grounded Theory and the Paradigm Model

Grounded theory, which was first proposed by Glaser and Strauss (1967), is widely used as a qualitative research method to identify the structure of cause-and-effect relationships in multidimensional conflict cases, based on a deep understanding of each case. In this study, a paradigm model was also developed as a part of grounded theory. This approach is useful when existing theories about a phenomenon are insufficient or lacking (Zou et al. 2011), assuming that the understanding of interrelationships between individuals and their society is based on symbolic communications. This method investigates how individuals feel about, experience, and give meaning to social structures to form a paradigm model within limited situations. Thus, grounded theory in combination with a paradigm model can be used in situations in which specific social phenomena cannot be easily identified using an existing conceptual framework. Recently, Zhou et al. (2015) and Sikder et al. (2016) adopted this approach to identify the causes of a given phenomenon using not only in-depth interviews with stakeholders involved in the events, but also related literature and other usable data. This combined method is first implemented in the subject of conflict analysis research of public construction projects.

Generally, conflicts in public infrastructure projects involve various stakeholders, such as federal and local governments, residents, environmental groups, and construction companies. In addition, these conflicts are complex because each stakeholder has different values. Because of these characteristics, it is difficult to reduce conflicts in public infrastructure projects to a single phenomenon (or event). In other words, because the actions and responses of each stakeholder arise in a fluid manner, various events occur according to the passage of time and the result of each event becomes a factor for another conflict event. In this study, conflicts were classified according to their processes and aspects of these processes, and the paradigm model of grounded theory was revised to reflect the preceding events as causal factors of subsequent events.

Grounded theory uses a three-step coding process to understand and to analyze the phenomena of interest. Coding is a type of clustering process that arranges data that are related to social phenomena, for example, social event occurrences, intervening conditions, stakeholder strategies, and consequences. The detailed coding process is as follows:

1. Open coding: This stage involves categorizing data obtained from the literature and interviews from experts. Categorization begins by specifying the particular concept found in the phenomenon under study. A wide variety of data are used in this process, and the classification is also performed at a general level.
2. Axial coding: This stage creates connections between the concepts that were identified through open coding and combines these data in new ways; in other words, the stage is creating integrated relationships within each category (Kendall 1999). To perform a detailed analysis, this study proposed a paradigm model customized in public construction projects, as shown in Fig 1. The concepts can be classified and interpreted into six categories based on the properties of the individual data source: conflict factor, project characteristics, conflict event, government reaction, main agent action, and conflict result. Fig. 1 shows the proposed composition of these six categories and the interactions between them. First, the phenomenon of interest in the paradigm model is identified as the main object and the core of the study. When the question "What happened in a public construction project?" is raised, the answer is a phenomenon called a conflict event. Conflict events are found through a review of patterns of events or behaviors that occur repeatedly in the cases. Second, causal condition refers to the social

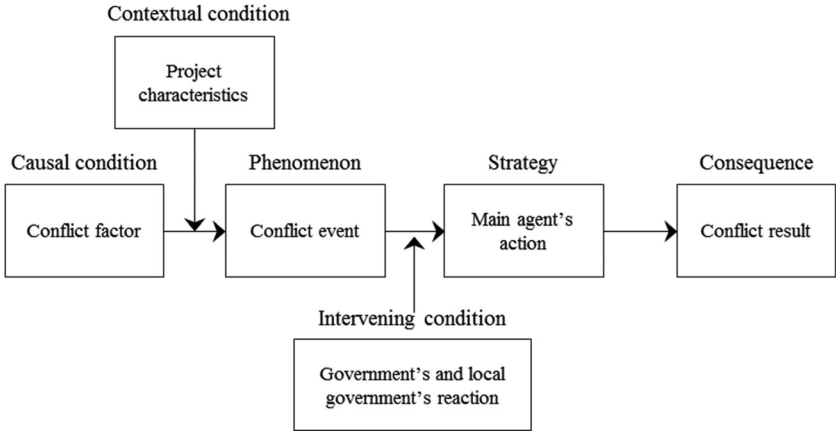

Fig. 1. Composition of the paradigm model of public construction conflict

J. Manage. Eng., 2018, 34(4): 04018019

structures and situations that cause conflict events; that is, "Why did it happen or how did it happen?" The answer to this question lies in causal conditions, which are also called conflict factors. Third, strategy refers to the strategic/general actions that an individual or group chooses after the occurrence of a causal condition. Fourth, consequence as a conflict result refers to the additional problems caused by the main agent's actions. Fifth, intervening condition captures the role of changing causal conditions in relation to conflict events. Usually, this factor represents the government's or local government's counterplan. Finally, contextual conditions are specific project characteristics that cause problems at a particular point. The main agent chooses strategy and action in response to the problem situation, in which the contextual conditions surrounding a given project are combined and ingrained.

3. Selective coding: This stage selects core categories and makes statements about their relationships. This is a process that refines the categories by connecting the core categories and other categories while confirming these relationship statements (Zhou et al. 2015).

In this paper, this paradigm model approach based on the grounded theory, including the three steps of open coding, axial coding, and selective coding, was applied in two infrastructure project cases to illustrate the generalized process of conflict occurrence and the difference in key conflict factors in each case. Using these analyses, two specific paradigm models were generated within the context of construction conflict occurrence processes.

Selection of Representative Cases and Data Collection

The first criterion for case selection is the level of prominence. In South Korea, there have been many conflict cases over the last decade (Lee et al. 2017), of which the six worst were classified as both multi-area and clustered facilities (Table 2). Not all six cases are included in the present study because one project was canceled and another remains ongoing; hence, both studies were excluded from the analysis. Accordingly, the Jeju naval port base project was selected as a representative of clustered infrastructure projects. In South Korea, public construction projects take 4–5 years on average to complete; those cases with the longest conflict duration were selected for case analysis. Thus, the Miryang electrical power transmission tower was chosen among the network-type facilities. These two projects are known as the worst conflict cases because the total conflict durations extended for up to 102 months and 120 months, respectively.

As for the data collection, relevant data accumulated during the construction process and related to the government's policy-making process are used for the case analyses. Secondary data from multiple sources are also incorporated to support the analytical data in Table 3 (e.g., policy reports, research papers, newspaper reports, interview records). In particular, policy reports including conflict management manuals and conflict effect analysis reports are used to investigate the government's response to conflicts and outline the limitations of the existing conflict management system. Research data, including research papers and publications, are further used to analyze conflict time lines, conflict factors, and event classifications. Media data, including newspapers and opinion survey reports, showed the bases of conflict amplification and public perspectives on the conflict. In addition, specific record data by the government released to the public (e.g., interview records, press conference records, transcripts of conversations) are used to investigate conflict issues, conflict factors, and stakeholders' opinions. This study thus analyzed multiple data sources with a greater weight on public reports because these reports could reflect various perspectives on conflicts and strengthen the objectivity of the data.

Comparative Analysis of Two Representative Cases: Application of Paradigm Model for the Miryang Power Transmission Project

Prior to describing a detailed case analysis, the coding process was structured based on an analysis of recorded conflict data, including articles and research papers. Shown as Appendix I and II, each event was classified into a main category and a subcategory. The subcategory describes the sequence of events that occurred from the project's planning to completion, and the main category comprises the general properties of that subcategory. These analyses are intended to generalize the structured paradigm model because the purpose of this study is to ascertain the inherent meaning of conflicts and outline the typical structure of the conflict generation process from the case study. Thus, in this study, after conducting a time-sequence analysis of the conflict generation process, each conflict event is classified into six elements: causal condition,

Table 3. Multiple Data Sources for the Case Studies

Data source	Material	Extracted data
Policy report	Conflict management manual	Government's response to conflict
	Conflict effect analysis report	Present conflict management system
	Public interest white paper	
Research data	Research paper	Time sequential changes of conflict
	Research report	Conflict factors
	Publication	Event classification
Media data	Newspaper	Cause of conflict amplification
		Public perspectives on conflict
Record data	Press conference record	Stakeholders' opinion and requirements
	Demonstration copy	Conflict issues and factors

Table 2. Representative Cases of Public Construction Projects

Facility	Project title	Conflict duration (months)	Project result
Clustered facility	Buan radioactive waste site	15	Canceled
	Pyeongtaek U.S. Army base relocation	53	Ongoing
	Jeju naval port base	102	Complete
Network facility	Sapae-san highway tunnel	31	Complete
	Cheonsung-san high-speed railway tunnel	49	Complete
	Miryang electrical power transmission tower	120	Complete

contextual condition, phenomenon, intervening condition, strategy, and consequence. These classified elements, which are components of the paradigm model, are defined as a subcategory because they are events that actually occurred in a given project. In the subcategory, the underlying attributes of the event are derived and classified into main categories to derive inherent and generalized meaning from a specific case analysis.

For example, the conflict occurrence phase in the Miryang Power Transmission Project (MPTP) case consists of causal condition, contextual condition, intervening condition, strategy, and consequence, centering on the phenomenon (Appendix I). Here, in the causal condition subcategory, "the government approved the project plan in November 2007 and did not disclose any information to the public" is presented because it is an actual event that occurred in the case project. Furthermore, the most general and objective inherent meaning can be derived from the subcategories, such as "top-down decision-making" and "lack of transparency." With this procedure, in the contextual condition, "the transmission towers spanned 90 km" can be classified as a subcategory, and "the facility passes through various regions" can be labeled as a category because its meaning is inherent in the meaning of the subcategory. Through this process, the events of each phase are analyzed and coded based on the six elements of the paradigm model by applying a content analysis method. Last, a phase that is coded based on the phenomenon is defined by the meaning of a phase that is both analyzed and coded based on the phenomenon. In the case of MPTP, the phenomenon of "occurrence of local conflict" and the other five elements outline an initial conflict generation process. Thus, the first event that is a part of the paradigm model can be labeled as a "conflict occurrence." Through these procedures, the coding and paradigm models of MPTP and Jeju Naval Base Project (JNBP) are extracted and structured.

In 2000, the South Korean government's plans included a 765-kV high-voltage transmission tower project that would run from the Ulsan Singori nuclear power plant to the Bukkyungnam substation in the Changnyeong-gun district. The project's goal was to resolve power shortage problems in the southeast region of the country. The MPTP was the portion of the project that ran through Miryang City and its surrounding area (Fig. 2 and Table 4).

In 2001, the government selected the transmission tower route without involving or informing the public. Conflicts related to the transparency of the project first occurred in May 2005 when the environmental impact assessment was officially conducted and the results were released to the public. The main factors in the conflict were the potentially harmful effect of the electromagnetic waves produced by the high voltage of the 765-kV transmission lines and the compensation for affected inhabitants.

In August 2008, local residents protested the project, but the government commenced with the work as planned. The conflict then spread nationwide due to the intervention of third parties including environmental groups. Then, the conflict became the most important social issue in Korea. The conflict caused occasional interruptions to the project. In an attempt to end the conflict, the central government formed conflict arbitration and compensation committees. Through these committees, a compensation agreement with locals in several of the affected regions was reached in November 2010 and construction resumed. However, conflict continued in another district on the route in which no agreement had been made and the project was repeatedly suspended. Despite continued resistance, the central government proceeded with the project, and in September 2014 the project was finally completed. In total, the project was stopped 11 times prior to completion, extending the construction duration by 3.4 years and further increasing total project costs by 500%.

The data collected regarding the Miryang power transmission towers were coded according to paradigm model conditions (refer to Appendix 1 for more details). Through the analysis of the secondary data, 62 subcategories were initially obtained in the case of MPTP, and 32 categories were regrouped by combining similar concepts. Fig. 3 depicts the results for MPTP as formulated by the concept of the paradigm model through axial coding.

Table 4. MPTP Overview

Parameter	Project overview
Project title	MPTP
Section	Singori nuclear power plant ~765-kV Bukkyungnam
Construction areas	Multi-area (Ulju-gun, Gijang-gun, Yangsan-si, Miryang-si, Changnyeong-gun)
Total cost	$470 million
Planned construction period	November 2007 to May 2011
Facility composition	Total 90.535-km length, 162 towers (Miryang section: 39.15 km, 69 towers)

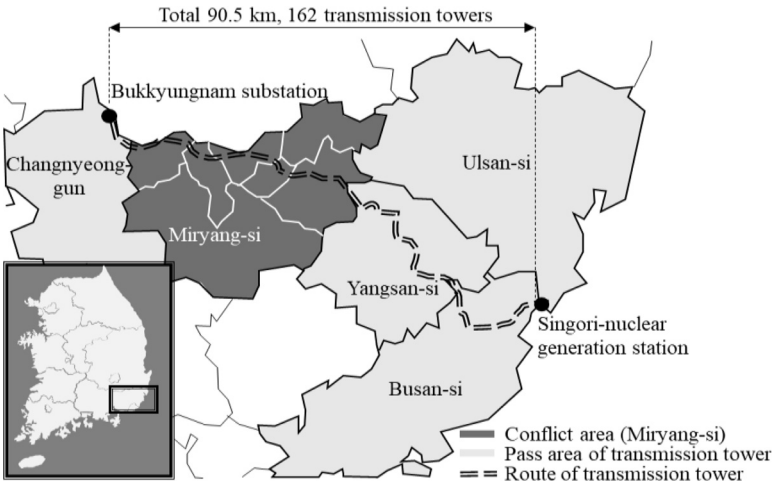

Fig. 2. Route of power transmission tower

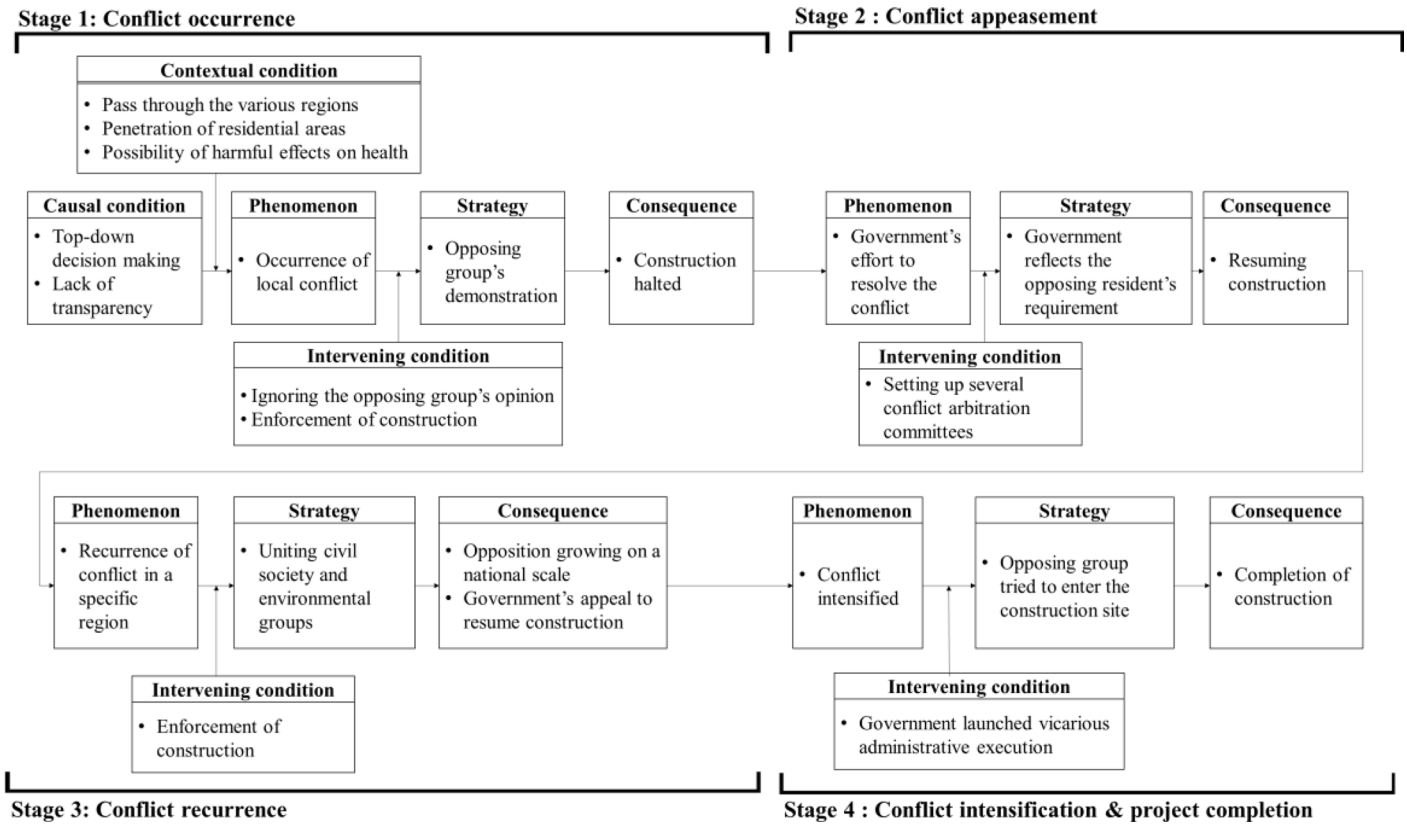

Fig. 3. Paradigm model for the Miryang Power Transmission Project

Given the conflict generation process, the MPTP has a total of four core phenomena. The first phenomenon is *occurrence of local conflict*. The project spanned 90 km passing through a total of five towns and 30 villages, each with its own unique history and characteristics. Local residents in these areas were completely unaware that they would be affected by the proposed project until 4 years after its conception when the environmental impact assessment was released. The government's top-down decision-making and lack of transparency in project planning quickly became an issue with local residents. Further, the strict decision that only individuals within 30 m of the outermost part of the power transmission towers would receive compensation was a major factor in the conflict. Despite these complaints and the brewing conflict, the government proceeded with construction in August 2008 as planned. This sparked the activity of various civil organizations and the escalation of the conflict from the local to national level. Inevitably, the project was halted repeatedly.

The second phenomenon is *government's effort to resolve the conflict*. Repeatedly suspending the project led to huge financial losses for the government. To mitigate its losses, the government made a belated effort to resolve the conflict by forming a conflict arbitration committee, by holding a conflict resolution conference, and by establishing a compensation improvement committee. As a result, most regions, except Sanoe-myun, reached consensus with the government. In this case, conflict cessation showed that the appeasement initiatives worked and the government therefore resumed construction.

The third phenomenon is *recurrence of conflict in specific regions*. Because the government had reached agreements with most regions in the project area, it resumed construction. However, conflict remained in some regions. In January 2012, an individual committed self-immolation in protest of the project in Sanoe-myun; no consensus had been reached in this locality. After this, the conflict reemerged as a critical social issue. The government agreed to a 90-day construction halt only in Sanoe-myun.

The fourth phenomenon is *conflict intensification*. When the 90-day halt to construction in Sanoe-myun expired, the government attempted to resume construction. This led to an intensification of the conflict. At that time, physical confrontations frequently took place between government members and local agents around the construction site. As a result, the government transported construction materials to the site by helicopter in July 2012, deployed police around the site, tore down opposing residents' encampments, and removed local residents who were disturbing construction. Finally, the MPTP project was conducted compulsorily and was finally completed in November 2014.

Application of Paradigm Model for JNBP

The necessity of the Jeju naval base was first proposed in 1993 in a bid to secure the safety of the south coast of Jeju Island. In contrast with the MPTP, the JNBP's conflict occurred at the location selection stage of the project (Fig. 4 and Table 5). The government first selected Hwasun-ri as a naval base pier, but the local residents officially opposed the construction. The government then added two other potential locations for the JNBP, Wimi-ri and Gangjeong-dong, and conducted a public opinion poll to determine where the base should be located in May 2007. As a result, Gangjeong-dong was reselected as the final location and the government enforced construction. In response, the Gangjeong-dong residents opposed the construction on the basis that the public opinion poll was biased in favor of residents with a positive perspective on the project.

Ultimately, the public selected Gangjeong-dong as the location for the naval base. Shortly thereafter, residents opposed to the proposed project set up an opposition committee and conflict spread throughout the country. Because of the large scale of the conflict, the government made an agreement with Gangjeong-dong residents to reconduct a public opinion poll. However, Gangjeong-dong was reselected as the location for the JNBP, so local residents and nongovernmental organizations (NGOs) who opposed construction began to conduct various group actions, such as sit-in demonstrations and rallies. As a result, the project was halted continuously, and the government finally forced construction to proceed and mandated evictions through a Korean legal provision known as "vicarious administrative execution." The project was eventually completed in February 2015.

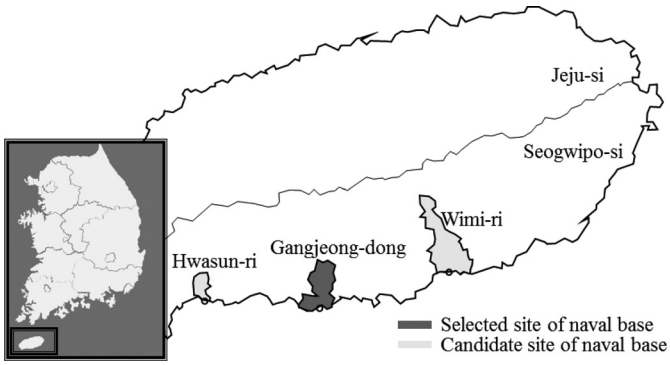

Fig. 4. Construction sites for the naval base

Table 5. Jeju Naval Base Construction Project Overview

Parameter	Project overview
Project title	JNBP
Location	Single-area (Jeju Island, Seogwipo-si Gangjeong-dong)
Total cost	$940 million
Planned construction period	November 2008 to December 2014
Facility composition	Civilian cruise harbor: 40,000 m^2 Naval base: 490,000 m^2

The previous information is grounded in secondary data and coded according to the paradigm model conditions (Appendix II). In the case of JNBP, 59 subcategories and 31 categories were obtained through open coding. The paradigm model is detailed in Fig. 5.

The JNBP project included a total of four core phenomena. The first phenomenon is *occurrence of location selection conflict*. The combination of the island's regional history and potential environmental damage from the JNBP led to conflict. Residents were concerned with the negative effects of construction on the region's image, the decline of land values, and the destruction of beautiful seaside lava (Gureombi rock), which is a local monument, because the project demanded significant repossession of land.

The second phenomenon is *occurrence of social conflict*. As soon as Gangjeong-dong was selected as the final location, local residents established an opposition committee and connected with a number of civil society organizations that were launched simultaneously at a national level. As the conflict intensified, the government attempted to resolve it by establishing a conflict resolution

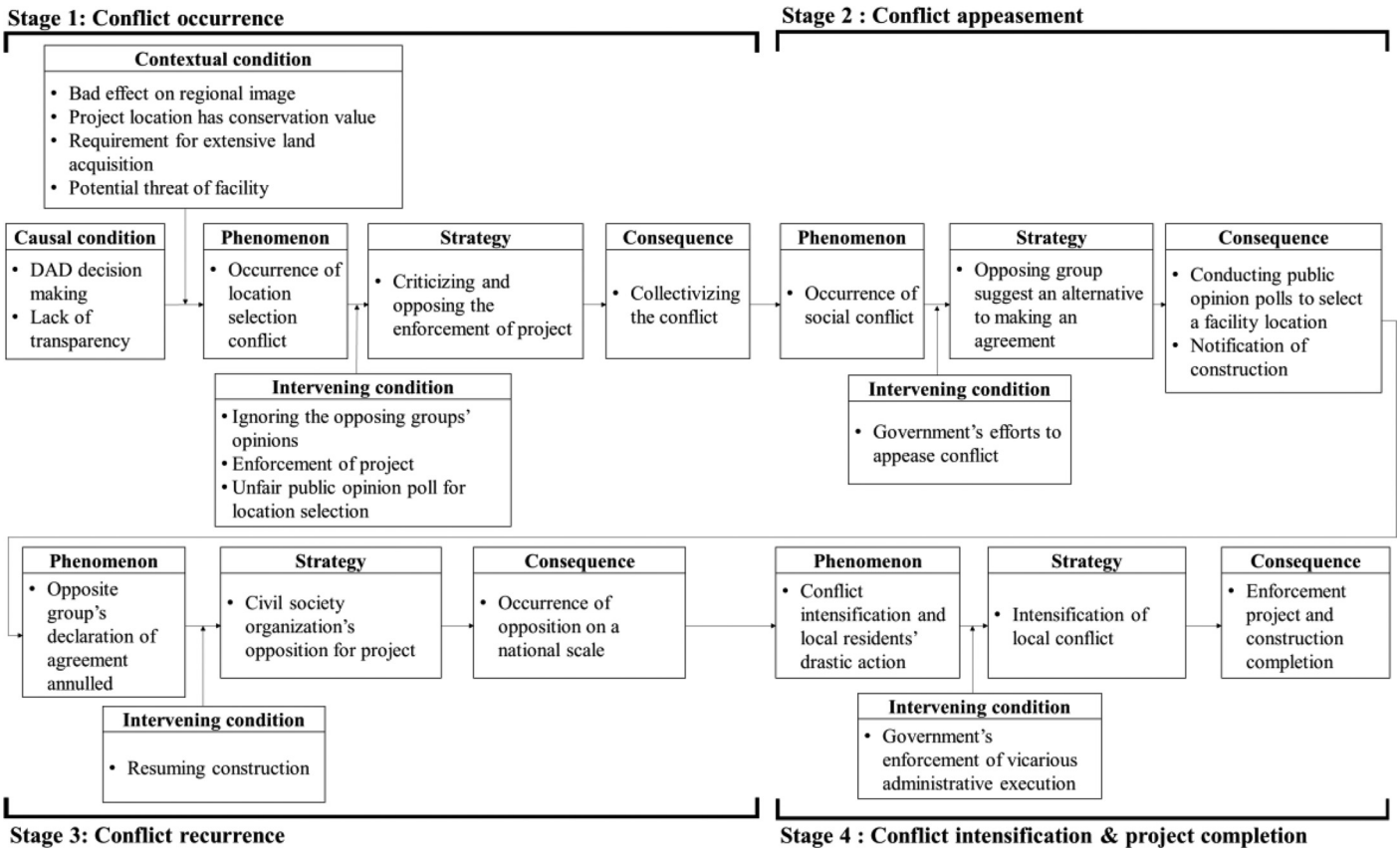

Fig. 5. Paradigm model for the Jeju naval base construction project

committee and opening a briefing session for local residents. This resulted in a conditional agreement, which stated that if there was no alternative region suitable for facility construction, Gangjeong-dong would be the final facility location, as planned. After Gangjeong-dong was once again chosen, the government informed residents that construction would begin.

The third phenomenon is *opposition group's declaration of agreement annulled*. After being informed that construction would begin, local residents annulled the conditional agreement they made with the government and opposed the project once again. However, the government then enforced the project because of the results of the original agreement. The first construction activity was dredging. To dredge, Gureombi rock had to be destroyed. This caused further intensification of the conflict. Protesters attempted to argue for the ecological value of the rock, but the government was not swayed because a geological survey conducted by the navy stated that the conservation value of Gureombi rock was too low. In response, several environmental groups united and interrupted the construction.

The fourth phenomenon is *intensification of conflict and local residents' drastic action*. The government's act of enforcing construction led to intensified conflict on the part of several environmental groups. To halt the construction, one resident attempted suicide; in fact, this incident was key to intensifying the conflict. However, the government enforced the construction and forced eviction to proceed through the vicarious administrative execution provisions and completed the construction in February 2015.

Lessons and Implications from the Two Case Applications

To verify the proposed framework, the authors used a two-step validation process: internal and external. For the internal validation, the two cases were broken down into components, and the characteristics of each case were compared individually. Based on the survey questionnaire about general conflict situations in the external validation, the two cases were comprehensively compared to examine their commonalities and differences.

First, in the internal comparisons, through the representative case applications of the proposed framework, several meaningful results are derived. In the integrated paradigm model in Fig. 6, the MPTP case is displayed over the upper part (solid line) and the JNBP case over the lower part (dotted line). The overlapping parts of the paradigm model represent commonalities between the two cases, and the remaining parts represent differences. This structure facilitates comparative analysis of the two cases. The results of case applications show there are differences in the causes of conflicts and their underlying factors, although the overall conflict processes and aspects of linear and clustered facilities are common.

The analyses culminated in the following significant findings. First, several factors underlying these conflicts differ according to the characteristics of the given project. The most critical cause of the conflict over the MPTP, which is a linear facility, was the validity of the public engagement process and technical alternatives. Because each region has different requirements, it is almost impossible to reach a comprehensive agreement with all stakeholders. On the other hand, conflicts over the JNBP stemmed from environmental and ecological concerns because the facility required a large amount of territory.

Second, the main causes of conflict featured commonalities. A main cause for conflict was unilateral decision-making by the government. When the government selects a location or route for the facility, the top-down decision-making or "decide-announce-defend" (DAD) procedure is typically used in many developing or underdeveloped countries. Damage to the environment and ecological conservation areas arose as another main problem of both projects because national values can shift from economic development to environmental and social issues in line with economic growth levels, as is well supported by other research (Franzen and Meyer 2010; Ferrero-Ferrero et al. 2016).

Last, the linear facility and the clustered facility feature commonalities in terms of the conflict occurrence and its characteristics. Generally, conflicts show four main stages of development: conflict occurrence, conflict appeasement, conflict recurrence, and conflict intensification and project completion. Conflicts originated locally in the project region. At this early stage of the

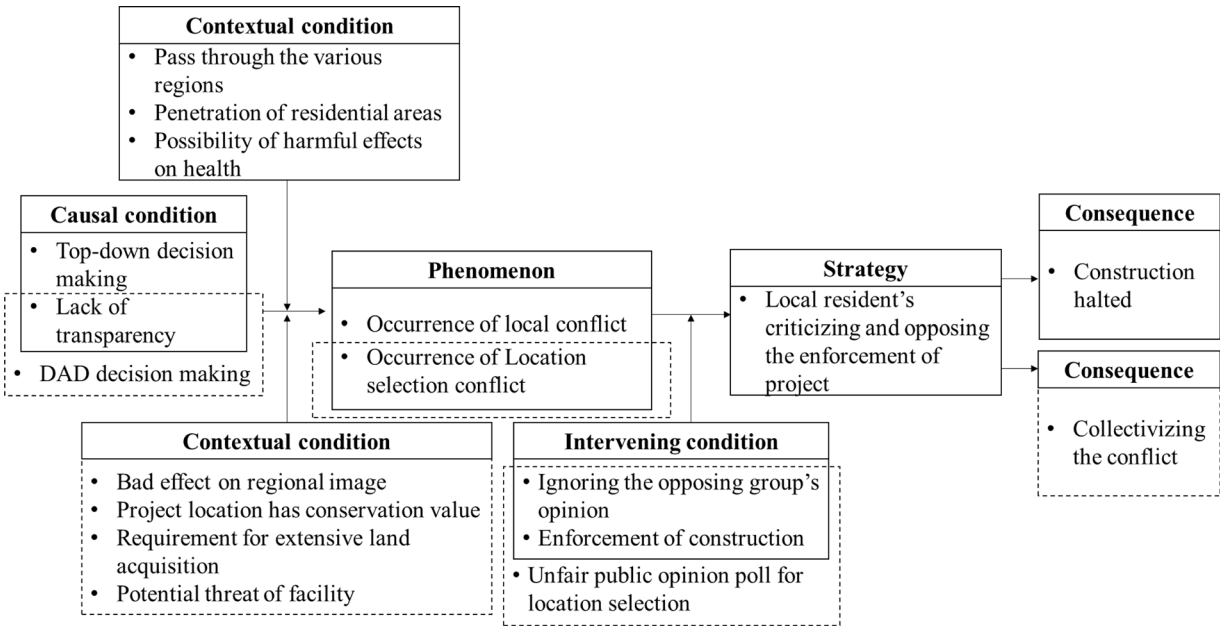

Fig. 6. Paradigm model for conflict occurrence in both cases

conflict, the government has the tendency to enforce the project. However, once the conflict has escalated to a national scale, the government is compelled to relieve the conflict through negotiation. Unfortunately, the government's effort to resolve conflict is rarely successful because the effort is often limited to specific areas or the opposing group changes its stance. Thus, the government's effort to resolve the situation through negotiation is usually not effective. After failing to resolve the conflict through negotiation, the government forced to resume the project, which only intensifies the conflict. Therefore, the government proceeds with projects without fully resolving the conflict in these representative cases.

For the external validation, secondary data were primarily used to analyze the MPTP and JNBP due to the difficulty of acquiring primary hard data. Two representative cases were analyzed in this study through in-depth analysis of secondary data, and meaningful results were obtained. However, it is necessary to confirm whether the unique characteristics presented in this study are applicable to other conflict situations in general. Compared with a general view of conflicts, the authors needed to distinguish the features of a linear and a clustered facility. An expert survey was thus conducted with participants who had practical experience with conflict analysis and mediation in public infrastructure projects to supplement the significance of each case study and the priority of conflict factors according to their impact on the given projects. The result of the survey is compared with those of the paradigm models. The survey is conducted with 10 experts who have an average of 12.9 years of experience. The experts have prioritized the impact of a total of 18 conflict factors derived from the MPTP and JNBP case analyses through the paradigm model based on their experience. The conflict factors and the rank of importance on each case are in Table 6.

In the case of the MPTP, the top five critical factors are E9, E8, E15, E10, and E12; whereas in the case of JNBP, the top five critical factors are E18, E9, E12, E11, and E17. Among these, E9 and E12 were determined to be common critical factors for both the MPTP and JNBP. In particular, E9 is consistent with the government's top-down decision-making, which was previously found qualitatively through the grounded theory paradigm model; E12 is also related to ecosystem destruction. In the case of the MPTP, the construction of power transmission towers invaded local residents' private property, such as agricultural land. In the case of the JNBP, because of extensive land acquisition, the project impedes on local residents' coastal fishery areas. Meanwhile, E18 differs the most between projects. The difference in ranking between the two projects is due to the seaside lava (Gureombi rock) near the JNBP; construction in the scenic area led to significant conflict. Last, E15 is ranked third in the MPTP and ranked 11th for the JNBP. The discrepancy in rankings is because of the proposal of technological alternatives, such as an underground transmission line option for avoiding hazardous impacts, which was only present on the MPTP. These perceptions mostly coincide with the results of the paradigm model, signifying that there exist commonalities and differences in the causes of conflicts and their propagation processes according to each facility type.

Public construction projects are long in duration, and conflicts have a variety of causes, such as economic, environmental, technological, and project characteristics. By structuring the conflict occurrence process over four particular stages of social phenomena, the core causes of conflicts are deduced. "Procedure of selecting location and facility route" is extracted as a common major factor. Both selected cases were unwelcomed facilities, so local residents responded sensitively to site selection. In the linear facility project (MPTP), "appropriateness of a public engagement process" and "appropriateness of technical alternatives and applicability" are major factors because the linear facility spanned many regions. Another key reason concerns the characteristics of the facility, which are power transmission lines. There was a demand for the alternative underground transmission line by local residents to mitigate the harmful effect of the electromagnetic waves, but the government could not accept it due to the doubling cost and technical possibility of a high-voltage line running underground.

Regarding the clustered facility project (JNBP), "existence of cultural asset or regional landmark around the facility" was a major conflict factor because there are cultural assets near the construction site. In both cases, the integrated outline of the process of the conflict occurrence is as follows: the root cause of the initial conflict was the government's top-down or DAD decision-making, and the

Table 6. Conflict Factors Impacts for the MPTP and JNBP

Identifier	Conflict factor	MPTP (rank)	JNBP (rank)
E1	Appropriateness of compensation	9	10
E2	Preparing a living support measure	14	12
E3	Reviving a regional economy	16	18
E4	Invading a private property	18	16
E5	Decline of land value due to regional image loss	10	14
E6	Validity of compensation system and procedure	12	17
E7	Legitimacy and feasibility	8	8
E8	Validity of public engagement process	2	9
E9	Procedure of selecting location and facility route	1	2
E10	Validity of conflict resolution effort and procedure	4	7
E11	Necessity of project	6	4
E12	Damage to the ecological environment	5	3
E13	Damage to the cultural asset or regional landmark	13	6
E14	Possibility of safety accident	11	15
E15	Validity of technical alternatives and applicability	3	11
E16	Urgency of project	15	13
E17	Harmfulness of facility and its range of influence	7	5
E18	Existence of cultural asset or regional landmark near the facility	17	1

common cause of the conflict was lack of transparency. The major difference between the types of facilities is that the harmful effect on health was a major issue in MPTP, which is a linear facility, whereas the regional destruction of the scenic village and land acquisition were the major issues in JNBP, which is a clustered facility. The government attempted to enforce the construction, but when the conflicts were collectivized, the construction was finally halted.

Conclusions

This study sought to provide an analytical benchmark for investigating conflicts over public infrastructure projects. In this study, the process of conflict occurrence was analyzed while considering the characteristics of the facility. The conflict occurrence process over public construction projects was structured as four stages based on the paradigm model approach of grounded theory. Infrastructure facilities were also broadly classified as either linear facilities or clustered facilities, and the MPTP and JNBP were selected as representative case studies. Each case was analyzed using the proposed framework.

In summary, this study proposed a paradigm model for public construction projects composed of six categories: conflict factor, project characteristics, conflict event, government reaction, main agent action, and conflict results. These six perspectives reveal common factors while framing the study's paradigm model used in the study. Because the existing methodologies were limited to a time series analysis or fragmentary perspectives, the authors' approach can be used as a way to overcome this limitation. For example, this study derived the characteristics of individual cases by analyzing two representative cases, based on structural frameworks, and comparing them with either detailed factors or a comprehensive view. In the case of MPTP, it is interpreted as a linear-type phenomenon because this case involves an "occurrence of local conflict" due to the following: "passing through various regions," "penetration of residential areas," and "possibility of harmful effects on health." In contrast, JNBP has a cluster-type phenomenon called "occurrence of location selection conflict" due to contextual conditions, such as "bad effect on regional image," "requirement of extensive land acquisition," and "project location has conservational value" phenomena. Thus, through representative case studies and an expert survey, the proposed framework was found to be useful for characterizing various phenomena that can occur in relation to public construction projects, as well as for structuring causal relationships according to the behaviors of stakeholders. Although the two case studies showed differences in terms of the causes of conflicts and their underlying factors, they also exhibited commonalities in the overall conflict process. In addition, the results of the expert survey mostly coincided with those of the analyses of paradigm model.

Despite these contributions, this study has some limitations. This study mainly used secondary data due to difficulties acquiring primary or hard data (in public projects in South Korea, most project data are not disclosed to the public). In addition, this study was limited to project-related interviews that were personally conducted with public officials. Although the authors tried to investigate conflict-related issues objectively by collecting and analyzing a variety of secondary data from various sources, those types of data can be viewed as subjective, reflecting the opinion of a stakeholder on a specific social phenomenon. For these reasons, the validation of the proposed framework is not fully sufficient in terms of statistics or probability. However, in an effort to validate the proposed framework, two-step validation (internal and external) was used. Through the internal validation, it was confirmed that the two typical cases have commonalities and differences, and, through the external validation, it was also confirmed that they share similarities with any situations of conflicts in general types of construction projects. Therefore, it is expected that the proposed framework can be applied to other conflict situations successfully. Using real, project-based information in the analysis of such situations will provide a practical understanding of social phenomena, such as differences in stance among stakeholders' perception of a certain social phenomenon. In addition, a wider range of case applications, including successful and unsuccessful projects in terms of the degree of conflict resolution and mediation, is necessary to aid the qualitative nature of the current research.

To overcome these limitations, future research should concentrate on collecting more consistent and primary data from various dimensions of public projects. Then, based on the compiled data, procedural research will focus on identifying the general commonalities and differences to conceptualize the conflict occurrence patterns in public infrastructure projects. For these future works, the use of (1) periodic records or transcripts of conversations from various participants and (2) questionnaire data or opinion survey reports between stakeholders would be essential. To encourage research in these areas, the authors have defined these two categories of core data and provided ways to collect them. In the public construction projects discussed in this study, conflicts became intensified due to a disagreement between the construction project administration organization and the residents of the project site. Therefore, records and transcripts of in-depth interviews with each stakeholder could be regarded as the best material to understand the various opinions of each stakeholder from an objective perspective. Differences in perceptions of particular conflict issues among stakeholders can be quantified by conducting a survey. In this study, the paradigm models were structured through two representative cases of public construction conflict in Korea. If more conflict cases are analyzed and the number of conflict factors is derived through a survey with each stakeholder, a more objective model can be developed.

Ultimately, the proposed framework can enhance the understanding of a public construction project through the structured analysis about how conflict occurs and what causes conflict. In addition, the proposed framework provides a potential way to build effective strategies and to support decision-making processes for minimizing the conflicts among stakeholders.

Appendix I. Open Coding: MPTP

Table 7 represents the result of open coding for the MPTP case. The subcategory is a sequence of events that occurred during the conflict. The category is an inherent meaning of each subcategory. The paradigm conditions are compositions of the paradigm model, and the event represents each phenomenon as a unit that is a part of the entire paradigm model.

Appendix II. Open Coding Example: JNBP

Table 8 represents the result of open coding for the JNBP case. The subcategory is a sequence of events that occurred during the conflict. The category is an inherent meaning of each subcategory. The paradigm conditions are compositions of the paradigm model, and the event represents each phenomenon as a unit that is a part of the entire paradigm model.

Table 7. Open Coding Result for MPTP

Event	Paradigm condition	Category	Subcategory
Conflict occurrence	Causal condition	Top-down decision-making Lack of transparency	The government approved the project plan in November 2007 and did not open any information to the public
	Contextual condition	Pass through various regions	The transmission towers spanned 90 km
		Penetration of residential areas	Project needed to repossess land in residential areas
		Possibility of harmful effects to locals' health	The 765-kV high-voltage electricity transmission posed health risks
	Phenomenon	Occurrence of local conflict	Local residents demanded the transmission cables be laid underground for health reasons and held a public objection meeting to oppose construction of towers
	Intervening condition	Ignoring the opposing group's opinion Enforcement of construction	The government ignored the opposing groups and proceeded with construction in August 2008 as planned
	Strategy	Opposing group's demonstration	Nationwide demonstrations were held and the construction became a crucial social issue
	Consequence	Construction halted	Construction was halted persistently
Conflict appeasement	Causal condition	Construction halted	Construction was halted persistently
	Phenomenon	Government's effort to resolve the conflict	The government and joint civil society organizations discussed conflict resolution, along with consultative organizations and the compensation improvement committee
	Intervening condition	Set up several conflict arbitration committees	The government operated conflict arbitration committees and a compensation committee to reach agreements regarding the safety of electromagnetic waves and on compensation for affected regions
	Strategy	Government reflects the opposing resident's requirement	An agreement on measuring electromagnetic waves before construction and improving compensation was made between opposing residents and the government
	Consequence	Resuming construction	Construction resumed based on the implementation of the agreement
Conflict recurrence	Causal condition	Resuming construction	Construction resumed based on the implementation of the agreement
	Phenomenon	Recurrence of conflict in a specific region	A self-immolation protest took place in Sanoe-myun where no agreement had been made, and an incident countermeasure committee was established
	Intervening condition	Enforcement of construction	The government resumed construction in the Cheongdo-myun section where an agreement had been made, and surveyed Sanoe-myun to resume construction
	Strategy	Uniting civil society groups and environmental groups	Environmental groups and civil society organizations held demonstrations all over the country
	Consequence	Opposition growing on a national scale	Environmental groups and civil society organizations based on incident countermeasure committees participated in hunger strikes and demonstrations in front of government buildings
		Government appealed to resume construction	The government compensated each household with $3,600 equivalent and appealed to resume construction
Conflict intensification and project completion	Causal condition	Opposition growing on a national scale	Environmental groups and civil society organizations based on incident countermeasure committees participated in hunger strikes and demonstrations in front of government buildings
		Government appeals to resume construction	The government compensated each household with $3,600 equivalent and appealed to resume construction
	Phenomenon	Conflict intensified	Construction was halted due to the physical confrontation taking place at the construction site; an opposing resident tried to commit suicide by taking poison
	Intervening condition	Government launched vicarious administrative execution	The government tore down sit-in sites around the construction site and removed protesters
	Strategy	Opposing groups tried to enter the construction site	Construction materials were transported to the construction site by helicopters as 2,000 protesters tried to enter the construction site and interrupt construction
	Consequence	Construction completion	A total of 69 transmission towers were constructed by November 2014

Table 8. Open Coding Result for JNBP

Event	Paradigm condition	Category	Subcategory
Conflict occurrence	Causal condition	DAD decision-making	Hwasun-ri was designated as the selected region for the military base, and this was only made known to the local residents at the location selection stage
		Lack of transparency	
	Contextual condition	Negative effect on region's image	The regional image will be damaged by the military facility
		Project location has conservation value	Jeju Island is a UNESCO biosphere and was designated one of the new seven wonders of nature in 2011
		Requirement for extensive land acquisition	Construction would destroy and harm local ecosystems
		Potential threat of facility	The facility would be a potential target in the event of war
	Phenomenon	Occurrence of location selection conflict	The Jeju countermeasure committee and Hwasun-ri residents officially opposed the construction
	Intervening condition	Ignoring the opposing groups' opinions	The government promoted the naval base construction project to Hwasun-ri residents
		Enforcement of project	The government set up the JNBP planning group and presented the results of the construction impact analysis
			$540 million was earmarked in the following year's budget plan as a nominal deposit for the navy base's construction
		Unfair public opinion poll for location selection	The public opinion poll on the candidate construction location caused controversy because it was biased toward residents with a positive perspective on the project
	Strategy	Criticizing and opposing the enforcement of project	The government's enforcement of the project created outrage on a national scale
	Consequence	Collectivizing conflict	Several civil society organizations and environmental groups united in opposition
Conflict appeasement	Causal condition	Collectivizing the conflict	Several civil society groups and environmental groups united in opposition
	Phenomenon	Occurrence of social conflict	Several protest groups participated in hunger strikes and held a joint press conference
			Physical confrontations took place between police and local residents around the construction site
	Intervening condition	Government's efforts to appease conflict	The government changed the project name to Civilian-Military Tourist Harbor and opened the briefing session for local residents by establishing the conflict resolution committee
	Strategy	Opposing group suggest an alternative to making an agreement	Gangjeong-dong conditionally agreed that if there were no alternative region for facility construction, Gangjeong-dong would be the final facility site
	Consequence	Conducting public opinion polls to select a facility location	The government conducted public opinion polls in Wimi-ri, Hwasun-ri, and Gangjeong-dong to select the final location
			The results of the public opinion poll were as follows: Hwasun-ri agreement 42.4%, Wimi-ri agreement 36.1%, Gangjeong-dong agreement 56%; therefore, Gangjeong-dong was selected as the final project location
		Notification of construction	The government issued notice to begin construction based on the results of the public opinion poll
Conflict recurrence	Causal condition	Conducting public opinion polls to select a facility location	The government conducted a public opinion poll in Wimi-ri, Hwasun-ri, and Gangjeong-dong to select the final location
			The results of the public opinion poll were as follows: Hwasun-ri agreement 42.4%, Wimi-ri agreement 36.1%, Gangjeong-dong agreement 56%; therefore, Gangjeong-dong was selected as the final project location
		Notification of construction	The government issued notice to begin construction based on the result of the public opinion poll
	Phenomenon	Opposite group's declaration of agreement annulled	Gangjeong-dong residents voided their conditional agreement
	Intervening condition	Resuming construction	The government commenced dredging and blasting activity of Gureombi rock

Table 8. *Continued*

Event	Paradigm condition	Category	Subcategory
	Strategy	Civil society organization's opposition for project	Several civil society organizations united and held a press conference in a bid to have the construction cancelled
	Consequence	Occurrence of opposition on a national scale	Several civil society organizations united and held a nationwide rally
			One-man demonstrations were held throughout the region, and opposing groups obstructed construction periodically
Conflict intensification and project completion	Causal condition	Occurrence of opposition on a national scale	Several civil society organizations united and held a nationwide rally
			One-man demonstrations were held over the region and opposing groups obstructed construction periodically
	Phenomenon	Conflict intensification and local residents' drastic action	The construction was interrupted during dredging because of local residents' opposition
			One opposing local resident tried to commit suicide by taking poison
	Intervening condition	Government's enforcement of vicarious administrative execution	The government destroyed sit-in sites around the construction site and detained some protesters
	Strategy	Opposing groups and local residents obstruct the project in the site	Gangjeong-dong residents' opposition intensified
	Consequence	Enforcement project and construction completion	The Jeju Naval Base was completed in February 2015

Acknowledgments

This work was supported by the Korean Science and Engineering Foundation (KOSEF) grant funded by the Korean government (MOST) (No. NRF-2015R1A2A1A09007327).

References

AlMaian, R., Needy, K., Walsh, K., and Alves, T. (2016). "A qualitative data analysis for supplier quality-management practices for engineer-procure-construct projects." *J. Constr. Eng. Manage.*, 10.1061/(ASCE)CO.1943-7862.0001046, 04015061.

Alzahrani, J. I., and Emsley, M. W. (2013). "The impact of contractors' attributes on construction project success: A post construction evaluation." *Int. J. Project Manage.*, 31(2), 313–322.

Awakul, P., and Ogunlana, S. O. (2002). "The effect of attitudinal differences on interface conflict on large construction projects: The case of the Pak Mun Dam project." *Environ. Impact Assess. Rev.*, 22(4), 311–335.

Banihashemi, S., Hosseini, M. R., Golizadeh, H., and Sankaran, S. (2017). "Critical success factors (CSFs) for integration of sustainability into construction project management practices in developing countries." *Int. J. Project Manage.*, 35(6), 1103–1119.

Baxter, J., Morzaria, R., and Hirsch, R. (2013). "A case-control study of support/opposition to wind turbines: Perceptions of health risk, economic benefits, and community conflict." *Energy Policy*, 61(Oct), 931–943.

Chang, S. O., and Nozawa, A. (2013). "Social process for wind farm construction in Jeju Island: A case of PIMFY-ism." *World Environ. Isl. Stud.*, 3(1), 17–31.

De Feo, G., De Gisi, S., and Williams, I. D. (2013). "Public perception of odour and environmental pollution attributed to MSW treatment and disposal facilities: A case study." *Waste Manage.*, 33(4), 974–987.

Dear, M. (1992). "Understanding and overcoming the NIMBY syndrome." *J. Am. Plann. Assoc.*, 58(3), 288–300.

Easterly, W., Ritzen, J., and Woolcock, M. (2006). "Social cohesion, institutions, and growth." *Econ. Politics*, 18(2), 103–120.

Feinerman, E., Finkelshtain, I., and Kan, I. (2004). "On a political solution to the NIMBY conflict." *Am. Econ. Rev.*, 94(1), 369–381.

Femi, O. T. (2014). "Causes and effects of conflict in the Nigerian construction industry." *Int. J. Technol. Enhance. Emerging Eng. Res.*, 2(6), 7–16.

Ferrero-Ferrero, I., Fernández-Izquierdo, M. Á., and Muñoz-Torres, M. J. (2016). "The effect of environmental, social and governance consistency on economic results." *Sustainability*, 8(10), 1005.

Franzen, A., and Meyer, R. (2010). "Environmental attitudes in cross-national perspective: A multilevel analysis of the ISSP 1993 and 2000." *Eur. Sociol. Rev.*, 26(2), 219–234.

Gil, N. A. (2015). "Sustaining highly fragile collaborations: A study of planning mega infrastructure projects in the U.K." ⟨http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2557370⟩ (Aug. 1, 2017).

Glaser, B., and Strauss, A. L. (1967). *The discovery of grounded theory: Strategies for qualitative research*, Aldine, Chicago.

Gurgun, A., and Touran, A. (2014). "Public-private partnership experience in the international arena: Case of Turkey." *J. Manage. Eng.*, 10.1061/(ASCE)ME.1943-5479.0000213, 04014029.

Gwartney, P. A., Fessenden, L., and Landt, G. (2002). "Measuring the long-term impact of a community conflict resolution process: A case study using content analysis of public documents." *Negotiation. J.*, 18(1), 51–74.

Harmon, K. (2003). "Conflicts between owner and contractors: Proposed intervention process." *J. Manage. Eng.*, 10.1061/(ASCE)0742-597X(2003)19:3(121), 121–125.

Howes, R., and Robinson, H. (2005). *Infrastructure for the built environment: Global procurement strategies*, Butterworth-Heinemann, Oxford, U.K.

Kendall, J. (1999). "Axial coding and the grounded theory controversy." *West. J. Nurs. Res.*, 21(6), 743–757.

Klakegg, O. J., and Haavaldsen, T. (2011). "Governance of major public investment projects: In pursuit of relevance and sustainability." *Int. J. Managing Project Bus.*, 4(1), 157–167.

Ko, K. M. (2010). "Public conflicts and the process of conflict management in local community: The cases of the Jeju naval base construction and the permission of for-profit hospital." *Dispute Resolution Stud. Rev.*, 8(2), 5–35.

Lam, K. C., and Woo, L. Y. (2009). "Public perception of locally unwanted facilities in Hong Kong: Implications for conflict resolution." *Local Environ.*, 14(9), 851–869.

Lee, C., Won, J. W., Jang, W., Jung, W., Han, S. H., and Kwak, Y. H. (2017). "Social conflict management framework for project viability: Case studies from Korean megaprojects." *Int. J. Project Manage.*, 35(8), 1683–1696.

Leung, M. Y., Liu, A. M., and Ng, S. T. (2005). "Is there a relationship between construction conflicts and participants' satisfaction?" *Eng. Constr. Archit. Manage.*, 12(2), 149–167.

Leung, M., Yu, J., and Liang, Q. (2013). "Improving public engagement in construction development projects from a stakeholder's perspective." *J. Constr. Eng. Manage.*, 10.1061/(ASCE)CO.1943-7862.0000754, 04013019.

Li, Y., Wang, X., and Wang, Y. (2017). "Using bargaining game theory for risk allocation of public-private partnership projects: Insights from different alternating offer sequences of participants." *J. Constr. Eng. Manage.*, 10.1061/(ASCE)CO.1943-7862.0001249, 04016102.

Mahamid, I., Bruland, A., and Dmaidi, N. (2012). "Causes of delay in road construction projects." *J. Manage. Eng.*, 10.1061/(ASCE)ME.1943-5479.0000096, 300–310.

Menassa, C., and Peña Mora, F. (2010). "Analysis of dispute review boards application in U.S. construction projects from 1975 to 2007." *J. Manage. Eng.*, 10.1061/(ASCE)ME.1943-5479.0000001, 65–77.

Ng, H., Peña-Mora, F., and Tamaki, T. (2007). "Dynamic conflict management in large-scale design and construction projects." *J. Manage. Eng.*, 10.1061/(ASCE)0742-597X(2007)23:2(52), 52–66.

Ock, J., and Han, S. H. (2003). "Lessons learned from rigid conflict resolution in an organization: Construction conflict case study." *J. Manage. Eng.*, 10.1061/(ASCE)0742-597X(2003)19:2(83), 83–89.

Shi, Q., Deng, X., Shi, C., and Chen, S. (2015). "Exploration of the intersectoral relations based on input-output tables in the Inland River Basin of China." *Sustainability*, 7(4), 4323–4340.

Sikder, S. K., Eanes, F., Asmelash, H. B., Kar, S., and Koetter, T. (2016). "The contribution of energy-optimized urban planning to efficient resource use: A case study on residential settlement development in Dhaka City, Bangladesh." *Sustainability*, 8(2), 119.

Singh, A., and Vlatas, D. (1991). "Using conflict management for better decision making." *J. Manage. Eng.*, 10.1061/(ASCE)9742-597X(1991)7:1(70), 70–82.

Soomro, M., and Zhang, X. (2015). "Roles of private-sector partners in transportation public-private partnership failures." *J. Manage. Eng.*, 10.1061/(ASCE)ME.1943-5479.0000263, 04014056.

Stigka, E. K., Paravantis, J. A., and Mihalakakou, G. K. (2014). "Social acceptance of renewable energy sources: A review of contingent valuation applications." *Renewable. Sustainable Energy Rev.*, 32(Apr), 100–106.

Sun, L., Yung, E. H., Chan, E. H., and Zhu, D. (2016). "Issues of NIMBY conflict management from the perspective of stakeholders: A case study in Shanghai." *Habitat Int.*, 53(Apr), 133–141.

Tam, C., Zeng, S., and Tong, T. (2009). "Conflict analysis in public engagement program of urban planning in Hong Kong." *J. Urban Plann. Dev.*, 10.1061/(ASCE)0733-9488(2009)135:2(51), 51–55.

Winters, M. S., Karim, A. G., and Martawardaya, B. (2014). "Public service provision under conditions of insufficient citizen demand: Insights from the urban sanitation sector in Indonesia." *World Dev.*, 60(Aug), 31–42.

Wu, Y., Huang, Y., Luo, W., and Li, C. (2014a). "Construction supervision mechanism for public projects in China: Progress goal–oriented perspective." *J. Manage. Eng.*, 10.1061/(ASCE)ME.1943-5479.0000179, 205–213.

Wu, Y., Zhai, G., Li, S., Ren, C., and Tsuchida, S. (2014b). "Comparative research on NIMBY risk acceptability between Chinese and Japanese college students." *Environ. Monit. Assess.*, 186(10), 6683–6694.

Yao, H., Shen, L., Tan, Y., and Hao, J. (2011). "Simulating the impacts of policy scenarios on the sustainability performance of infrastructure projects." *Autom. Constr.*, 20(8), 1060–1069.

Yousefi, S., Hipel, K., and Hegazy, T. (2010). "Attitude-based negotiation methodology for the management of construction disputes." *J. Manage. Eng.*, 10.1061/(ASCE)ME.1943-5479.0000013, 114–122.

Zhou, Z., Irizarry, J., Li, Q., and Wu, W. (2015). "Using grounded theory methodology to explore the information of precursors based on subway construction incidents." *J. Manage. Eng.*, 10.1061/(ASCE)ME.1943-5479.0000226, 04014030.

Zou, P. X., Sunindijo, R. Y., and Dainty, A. (2011). "Review of construction safety research methods: Integrating theory and practice." *Proc., 27th Annual ARCOM Conf., Association of Researchers in Construction Management*, Association of Researchers in Construction Manager, Reading, U.K., 953–962