



Research paper

Assessment of causes and settlement mechanisms of construction disputes in public work contracts: an Ethiopian perspective

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Abstract: Construction contracts are susceptible to disputes as they regulate very complex multi-party relationships. Previous studies not only fail to aptly outline the distinction between “conflict” and “dispute”, but also fail to adequately study the causes of construction disputes in-light of project delivery systems. The present research aims at assessing the causes and settlement mechanisms of construction disputes in Design-Bid-Build (DBB) and Design-Build (DB) delivery systems with a view to add evidence to the existing knowledge. Accordingly, four most relevant causes of construction disputes identified from previous works of literature were incorporated in a questionnaire survey to determine their frequency of occurrence in the two delivery systems. The Relative Important Index (RII) of the four direct causes of construction disputes computed by SPSS software revealed that, in DBB contracts, the frequency of occurrence of disputable claims (unsettled claims for money/extension of time) has RII = 0.794969/0.777358, project delay has RII = 0.708176, and poor quality of work has RII = 0.469182. In DB contracts, the frequency of occurrence of disputable claims has RII = 0.533333/0.515723, project delay has RII = 0.495597, and poor quality of work has RII = 0.465409. The RII values proved that, DBB projects are significantly prone to disputes than DB projects. Furthermore, qualitative data obtained from road and building project reports exposed that DBB projects are exceedingly prone to disputes because they are frequently vulnerable to an increase in the volume of work due to frequent change orders and design deficiencies. The research further found out that, despite a clear proscription in the laws of the land, there is a routine out of court settlement of public construction disputes in Ethiopia.

Keywords: adjudication, arbitration, conflict, design-bid-build, design-build, dispute, dispute review board (expert)

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1. Introduction

Given the fact that construction contracts regulate a complex relationship of different stakeholders to undertake a construction project, it is no wonder they are prone to disagreements in the form of conflicts or disputes. Besides, a construction project is susceptible to economic and supply chain instabilities as it requires a longer period from the conception of the idea up to its completion [1]. These external economic and supply chain factors in turn fuel up adversarial attitudes that will pin down the successful completion of the project. Moreover, every project brings unique challenges to the stakeholders since site conditions are the most important determinants of the nature and complexity of construction works [1]. In this multiparty process, conflicts resulting from incompatibility of interest inevitably follow which is anticipated and acceptable as it is part of the project development process [2]. When the parties involved in the process are not able to contain the ensuing conflicts and the arguments revolve around justiciable rights, dispute materializes [2].

It is naive if someone ponders to wipeout construction disputes in some sort of ingenious way. However, it is possible to reduce the magnitude of occurrence by designing mechanisms that boost the spirit of teamwork among stakeholders. According to researchers, there are different ways of curtailing the magnitude of occurrence of disputes. An appropriate procurement plan including the choice of appropriate construction project procurement mode (also called delivery method or mode of contracting) is one of the mechanisms. Construction project contracting mode can be defined as “a *comprehensive process by which construction project responsibilities is contractually assigned to its stakeholders*” [3]. According to Miller J.B et al (2000), construction project contracting mode provides the system by which parties enter into legal agreements regarding organizing and financing of design, construction, operations, and maintenance services of a construction work [4]. Therefore, construction project contracting modes define the structure of the relationships of the parties, the roles and responsibilities of the parties, and the general sequence of activities required to deliver the project [5]. Based on the preceding definition, it is possible to figure out that a construction project contracting is “*contractual form of working relationship that defines the roles and responsibilities of different stakeholders involved in a construction project from the time of planning up to completion*” [6]. Construction project delivery systems may take any of the following forms; Design-Bid-Build (DBB); Design-Build (DB); Construction Management (CM); Design-Build-Operate (DBO); Design-Build-Operate-Maintain (DBOM); Design-Build-Finance-Operate (DBFO); Build-Own-Operate (BOO); and Build-Own-Operate-Transfer (BOOT) and so on. Out of the above-listed modes of contracting, DBB and DB are widely used in public work contracts in Ethiopia [6].

Confining the scope of the paper on DBB and DB modes of contracts in light of public work projects in the context of Ethiopia, the organization of the paper in the subsequent sections will be as follows. Based on the objective of the research discussed below, a thorough review of related works of literature will be made followed by the discussion of the problem statement. The research method discussed next to the problem statement is designed based on the stated problem that required investigation. As this research combines both quantitative and qualitative data, the first part of the data presentation and

discussion covers the results obtained from survey questionnaires followed by the presentation and discussion of the data obtained from project reports. The last part of the paper will examine the different methods of construction dispute resolution by making reference to laws and standard conditions of construction contracts applicable to domestic and international construction contracts and ends the paper with a brief conclusion and recommendation.

2. Research objective

Michael S. and Rick S. (2002) argue, “*The only good construction dispute is one which is avoided*” [7]. This statement stresses that parties in construction contracts as much as possible need to avoid disputes because once they happen, they may ruin every stakeholder’s chance of success in the project. Among the possible mechanisms of avoiding or at least reducing the possibility of occurrence of disputes is the proper and informed determination of construction project delivery method that is appropriate for the specific nature of a project. Irrespective of the parties’ effort to avoid the occurrence of disputes, however, disputes may arise and in the course of resolving the unpleasant occurrence, parties must show a collective and genuine interest in resolving the matter in good faith, fairly and cost-effectively. With this background, the present paper aims to investigate the causes of construction disputes and their frequency of occurrence in two widely used modes of contracting and the kind of dispute settlement mechanism(s) recognized in the laws and standard conditions of contracts applicable to public construction projects in Ethiopia.

3. Literature review

Different researchers use different terminology to describe the concept of construction project mode of contracting; Wearne, S.H. (1989) calls it Contract Strategy [8], Gordon, C.M (1994) used the term Construction Contracting Method [9], American Society of Civil Engineers (1997) calls it Project Delivery System [10] while Miller, J. B et al. (2000) and Touran, A. et al. (2011) used the term Project Delivery Method [4, 40], Rwelamila, P. et al. (2000) call it Construction Procurement System [12] and Sintayehu D.K. and T. Zhang (2020) call it construction project modes of contracting [41]. Despite the difference in terminology used by the above-enumerated authors, a common understanding that can be generated from them is that construction project delivery system is all about how the project participants are organized to transform the project owner’s goals and objectives into finished products [40]. In this research, the term project delivery system and Construction Project Contracting Method/Mode are interchangeably used.

In the background, it was highlighted that there are different types of construction project contracting methods. Since the second half of the 19th century, the DBB mode of contracting (also called general contracting or the traditional system) has been the standard choice in all sorts of construction works across the globe [13]. Gradually, however, different

other modes of contracting were introduced to the construction industry. The difference(s) between or among the modes of contracting basically emanates from the source of finance and the integration or disintegration of different project elements such as planning, design, construction, and operation. In terms of integration or disintegration of different elements of a project for instance, if an owner of a project opts for DBB mode of contracting, he first makes a separate contract with an engineering consultant to do the planning and design of the project and subsequently solicit bids from general contractors for the construction of the project which also requires a separate contract for work and after completion of the project the owner operates the facility by himself or hire it for a third party for its operation. On the other hand, if the owner chooses to make use of DBO mode of contracting, he will select a contractor and concludes a single contract with the contractor for the design, construction, and operation of the facility after completion [4].

In terms of sources of finance, on the other hand, certain modes of contracting do not require the owner to finance the projects while other modes of contracting necessarily require the employer to fully finance the project. For instance, in the case of BOT projects which often are associated with income-generating projects like bridges, toll roads, and tunnels, the revenue generated from the public use of the facility shall compensate the investment made by the BOT company (the contractor) [14]. DBO projects on the other hand are financed by the employer himself who also bears their commercial risks [15]. FIDIC Gold Book (2008) regarding the obligation of the owner to finance the project in DBO projects under Cl.2.4 states, *“The employer’s arrangements for financing the design, execution, and operation of the works, including the provision of the asset replacement fund, shall be detailed in the financial memorandum which refers to the document which details the Employer’s financial arrangements”* [16].

When we explore laws applicable to public work contracts in Ethiopia, we can find out that the Ethiopian public work contract laws except for giving an incidental recognition to other forms of contracting, seem to establish DBB as a default mode of contracting. For instance, the cumulative reading of Article 3244(1) of the Civil Code of the Empire of Ethiopia 1960 (Civil Code) and Article 2(3) of the Federal Public Procurement and Property Administration Proclamation Number 649/2009 reads:

“a contract of public work is a contract whereby a contractor binds himself in favor of an administrative authority to undertake a public work which constitutes all works associated with the construction, reconstruction, upgrading demolition, repair or renovation of a building, road, or structure, as well as services incidental to works if the value of those services does not exceed that of the works themselves and includes build-own-operate, build-own-operate-transfer, and build-operate-transfer contracts” [17].

It is possible to understand from the cumulative reading of the above two legal provisions that public work contracts in Ethiopia only constitute the work aspect of the contract leaving out the service aspect of the contract (which refers to design) to a separate contract of intellectual service regulated under Articles 2632 and the following of the Civil Code [6].

Besides the above inferential argument, some other legal provisions of the Civil Code further prove that Public work contracts for work and design are separately concluded. Art. 3052 states, *“The administrative authority shall regulate, by means of requisition orders,*

the development of the works and prescribe to the contractor the manner of performance of the works, and the contractor shall comply with the plans and models given to him by the administrative authorities in the execution of the specification” [18]. Therefore, the responsibility of the contractor is to execute the construction work as per the design drawings, details, and specifications furnished to him by the employer. Regarding the selection of the contractor, Art. 3246 prescribes, *“The administrative authorities may put up for competition the working out of a project of a work among skilled persons or specialized undertakings”* [18]. This provision dictates that the administrative authority shall select the contractor in an open competitive bid and it shall be strictly bound to respect the rules of procurement of public works [18].

In addition to what has been stated in the above paragraph, Federal Public Procurement and Property Administration Proclamation number 649/2009 separately defines “consultancy service” under Art. 2(d) as *“... a service of an intellectual and advisory nature provided by the consultants using their professional skills to study, design and organize specific projects, advise clients, conduct training and transfer knowledge”* [17]. From the reading of these two definitional provisions, it is possible to state that, the proclamation was promulgated with the assumption that public work contracts for the design of the project and construction need to be separately concluded.

Even though that seems to be the default rule, Art. 2(3) of the Federal Public Procurement and Property Administration Proc. No. 649/2009 implicitly accepted DB and its variant modes of contracting such as build-own-operate (BOO), build-own-operate-transfer (BOOT), and build-operate-transfer (BOT) contracts. Furthermore, Proc.No.649/2009 hints at the possibility of entering into public-private-partnership (PPP) agreements for the development of infrastructure projects in which the private entity finances the project and assumes the financial risk of the project (Arts. 2(27-28) and 34 of Proc. No.649/2009). Concurrent to this prescription of Proc.No.649/2009, Ethiopia has come up with public-private-partnership policy in 2017 [19] and further enacted Public-Private-Partnership Proc. No. 1076/2018 in February 2018 (hereafter called PPP Proc.). The preamble of the proclamation provides that the participation of the private sector is an essential strategy to realize the country’s development objectives, including the infrastructure system, and it is desirable to establish a favorable legislative framework to promote and facilitate the implementation of privately financed infrastructure projects [20]. As per Art. 5(1) (a) of the PPP Proc., PPP may involve the design, construction, financing, maintenance, or operation of new infrastructure facilities. Accordingly, the public authority shall select the appropriate mode of contracting which reflects the desired allocation of risks and responsibilities between itself and the contractor (Art. 5(2) of PPP Proc.).

The Federal Public Procurement and Property Administration Agency which is legally mandated to regulate federal public procurements under the provisions of The Ethiopian Federal Government Procurement and Property Administration Proclamation No. 649/2009 has developed its standard condition of contract to which several bid documents are attached with for procurement of non-complex works. For complex public works the value of which exceeds 10 million USD, government agencies in Ethiopia are instructed to make use of FIDIC standard contract forms [21, 41]. This standard condition of contract is applicable

only for DBB projects implemented by government agencies and the country has not yet developed a standard condition of contract to be used for other modes of contracting.

Tekle H.B. (2009) in his work on adjudication and arbitrability of government construction disputes stressed that the Ethiopian construction industry is a breeding ground of disputes [22]. However, the author did not show the causes of construction disputes specific to public construction contracts in Ethiopia or the frequency of any of these causes to a particular mode of construction project contracting. According to Levy S.M. (2006), DB particularly differs from DBB due to its single-source liability which helps in reducing the possibility of conflicts; while in DBB, since the public agency bears design adequacy risk, this situation often tends to create an adversarial relationship among the contracting parties rather than foster a cooperative atmosphere in which issues can be resolved efficiently and effectively [14]. Attempting to justify the need for a shift from the traditional mode of contracting to innovative modes of contracting Levy S.M. (2006) wrote;

“The traditional DBB system in recent times has become design-bid-redesign-rebid and build (DBRRB). Budgets prepared either by an owner’s consultant or capital improvements team often falls short of the actual cost of construction, requiring an expensive redesign, acceptance of less than-value engineering suggestions, and delays in bringing the project on stream” [14].

These arguments suggest that DBB mode of project procurement is prone to disputes and other factors of construction project inefficiency.

Conlin *et al.* (1996) in their work on the relationship between construction procurement strategies and construction contract disputes found out that there is a correlation between the kind of construction project procurement method employed and the types and frequencies of disputes. The authors studied procurement methods used by private, public, and local authority clients in the UK and concluded, projects which utilized the traditional procurement method encountered higher conflicts in budget and payment issues, performance issues, delay, and time-related matters, and so on [23]. It is believed that the frequency of disputes in the traditional construction project procurement system is connected to the inherent feature of the contracting mode itself. In this regard, Mante J. *et al* (2012) established that the traditional mode of contracting is characterized by fragmentation of the construction process and the client and project team relationship. The authors stressed that the traditional mode of contracting adopts fragmented employment in time and space of design consultants and contractors, which results in a relationship often based on suspicion, confrontation, and adversarial attitude [24]. Concurrent to the analysis of Mante J. *et al* (2012), Masterman, J.W.E. (2002) stressed that designs under the traditional method often lack clarity regarding the accuracy of bills of quantities which inevitably leads to excessive variations which is one of the well-understood cause of disputes [25]. Mohamed S.G. and Maged M. (2018) in their work which assessed the attributes and causes of contract disputes in the Egyptian construction industry, examined construction disputes collected from arbitration centers in Cairo between 1992 and 2010, and found out that the majority of the disputes are related to DBB contracts [26].

Even though the weight of evidence obtained from the works of literature studied for this research on the frequency of causes of construction disputes in the two routes

of contracting favor the DB instead of the traditional DBB mode of contracting, some other studies proved the contrary. For instance, Nasrollahi S. et al (2016) in their work on the impact of project delivery methods on dispute occurrence in public highway projects empirically showed that there is no sufficient evidence to demonstrate the integrated mode of contracting to provide a better chance of curbing the frequent occurrence of the construction disputes than the traditional mode of contracting [27]. Within the context of public work contracts in Ethiopia, even though there are few published works on the correlation between construction disputes and causes related to the employer, design consultants, contractors, or other extraneous factors, no published work has been identified by the author of this work on the nexus between mode of contracting and frequency of disputes.

4. Problem statement

The review of different works of literature made by the author of this work on causes and settlement mechanisms of construction disputes identified three problems. Firstly, most of the research works which attempted to explore the causes of construction disputes often raise a multitude of indirect but few instances of direct causes. Secondly, previous studies made very less attempt at studying causes of construction disputes with particular reference to a specific mode of contracting. Moreover, the identified causes of construction disputes by these researchers are mostly overlapping and should have been reduced to few directly relevant causes of dispute. In the opinion of the writer of the present work, the problem of establishing the clear line of distinction between direct and indirect causes of construction dispute by many authors emanates from the failure to establish the conceptual difference between “conflict” and “dispute”.

It is observed that many authors who produced research works on construction disputes interchangeably use these two terminologies in their works. In the context of construction law, a dispute is different from a mere conflict because it carries a justiciable matter that requires resolution while a conflict arises from the existence of incompatible interests which need to be managed to prevent it from being a dispute [28]. Therefore, it is possible to say that while conflicts are managed disputes are resolved often with the intervention of a third party in the form of an adjudicator, a dispute review expert (board), an arbitrator, or a judge. Within this framework, the author of this work is interested in investigating causes and settlement mechanisms of construction disputes as opposed to conflicts.

5. Methodology

Within the above-described definition of “dispute”, a thorough literature review was made to identify the most relevant direct causes of construction disputes which later were incorporated in a questionnaire survey that assessed the frequency of occurrence of the factors of construction disputes in the two project procurement modes. The factors which are directly related to the justiciable rights of either of the parties are disputable claims

which include claims for money, claims for extension of time or both, project delay, and low quality of the project work. The quantitative data was then computed by using a Software Package for Social Sciences (SPSS) and the susceptibility to a dispute of the two modes of contracting was determined based on the relative importance index (RII) of the causes of construction dispute. However, this can only address the issue of the magnitude of frequency of direct causes of disputes in the mentioned modes of contracting and does not further answer why these causes of disputes are more frequent in one mode of contracting than the other. As it was shown in the research problem above, the works of literature studied to develop the questions of the survey questionnaire did not sufficiently distinguish causes of contraction disputes in different modes of contracting. Therefore, to answer the second important question, the author studied project reports of randomly selected 57 roads and 19 building projects which were being undertaken under the two project delivery modes. The project reports of each project were thoroughly studied and the root causes that resulted in construction disputes were identified. As the other but related objective of this paper is to study the mechanisms of dispute settlement in public work contract laws of Ethiopia, a thorough legal analysis of the existing laws and conditions of contracts has been made and the result shall be discussed in the last part of the paper.

6. Result presentation and discussion

6.1. Sample size determination procedure

Before the survey questionnaires were distributed, the face validity of the questionnaire was checked by some academic professionals and experts of construction law and management. The experts' opinion was thoroughly incorporated in the revised version of the survey questionnaire and a pilot test of the questionnaire was done. In the meantime, a rough estimation of the survey population size and the institutions where the questionnaires are to be distributed were determined. The institutions include, Ethiopian Road Authority, Commercial Bank of Ethiopia, etho telecom, Jimma University, Ethiopian Construction Design and Supervision Corporation, Ethiopian Construction Works Corporation, Ministry of Construction, Zemen Bank, Hibert Bank, Metaferia Consulting Engineers Private Limited Company (PLC), Civil Works Consulting Engineers PLC, DANA & Associates Engineering Consultants PLC, Net Consult Consulting Engineers and Architects PLC, LIDET Consulting Engineers PLC, Afro- Tsiyon Construction PLC, Geom Luigi Varnero Construction Share Company and so on. The rough estimate of the population size was seven hundred professionals who work in the above mentioned institutions in Addis Ababa (the capital of Ethiopia) and Jimma (a regional town in Ethiopia). Even though the population size appears small, given the fact that the institutions where the professionals who are expected to complete the survey questionnaires work in are located at different places, time and finance enormously constrains the possibility of making a complete census of the survey participants. In order to determine an appropriate survey sample, Cochran's Sample Size Formula was used. Cochran (1977) developed a formula to calculate a representative

sample for proportions as:

$$n_0 = \frac{z^2 pq}{e^2}$$

where:

n_0 – the sample size,

z – standard normal deviation normally set at a 95% confidence level in social sciences,

p – the estimated proportion of an attribute that is present in the population,

$q = p - 1$ and,

e – the desired level of precision.

In determining survey sample by using Cochran's sample size formula, it is imperative to determine the level of precision and confidence level. The level of precision, sometimes called sampling error is the range in which the true value of the population is estimated to be [43]. In other words, level of precision is the margin of permissible error between the estimated value and the population value and measures how close an estimate is to the actual characteristic in the population [42–44]. It is often expressed in percentage. If the sampling error or margin of error is $\pm 5\%$, and 80% unit in the sample attribute some criteria, then it can be concluded that 75% to 85% of units in the population have attributed that criteria [43, 44]. A confidence level on the other hand is a measure of how confident a researcher is about the results. The 95% confidence level shows that if a researcher has to repeat his experiment over and over again, he would find 95 out of a 100 times the true population values within the results [43].

The above Cochran's sample size formula is often applied and considered to be more effective for large (infinite) population size. Therefore, if we have to determine the sample size of a large population size, the calculation will be as follows. Assuming the maximum variability which would give us a more conservative sample size is equal to 50% ($p = 0.5$) and taking 95% confidence level with $\pm 5\%$ precision, the calculation for required sample size will be $p = 0.5$ and hence $q = 1 - 0.5 = 0.5$; $e = 0.05$; $z = 1.96$. Thus:

$$n_0 = \frac{1.96^2 \cdot 0.5 \cdot 0.5}{0.05^2} = 384$$

Cochran (1977) pointed out that if the population is smaller (finite), then the sample size can be reduced slightly due to the fact that a very large population provides proportionally more information than that of a smaller population. In order to compute sample size for a smaller (finite) population size, he proposed a correction to the above shown formula which is:

$$n = \frac{n_0}{1 + \frac{(n_0 - 1)}{N}}$$

Here, n_0 is the sample size derived from the first formula discussed above and N is the population size. This is the formula used in this research to determine the sample size. Accordingly, when we compute the sample size for this research, the result shows:

$$n = \frac{384}{1 + \frac{(384 - 1)}{700}} = 247$$

Therefore, based on this result, the ideal sample size for the roughly estimated population size is 247. Since the survey questionnaire was collected personally by the writer of this work with the assistance of few previous colleagues, it was made sure that the response rate (the ratio of respondents that fill in the questionnaire compared to the total number of surveys sent out) was determined to exceed 95%. Accordingly, 250 survey questionnaires were distributed to be completed by civil engineering professionals and lawyers. Of the total number of questionnaires, 239 questionnaires were re-collected which represents 95.6% response rate. However, 81 of them were rejected because some of them were completed by professionals who do not have experience in different modes of project contracting while the remaining were rejected because the research participants gave inconsistent responses that would possibly skew the finding of the research and make it less credible. Accordingly, the presentation of the findings made hereunder is the result of the analysis of 158 survey questionnaires.

6.2. Background information of participants of the survey questionnaire

As shown under Table 1, participants of the survey questionnaire are different in academic level, professional qualification, and work experience. Based on academic level, the highest number of the participants of the survey questionnaire is first degree (BSc) graduates constituting 63.4%, followed by second degree (MSc) graduates who constitute 34.6%. The remaining respondents are diploma graduates. In terms of work experience,

Table 1. Population characteristics

SN	Respondent's demography	Qualifications	# of respondents	Percentage
1	Based on academic level	Diploma	3	1.8%
		First degree (BSc)	100	63.4%
		Second Degree(MSc)	55	34.6%
		Third Degree (Ph.D.)	None	None
2	Based on years of work experience	0–5 years	22	13.79
		5–10 years	54	34.18%
		10–15 years	39	24.45%
		Over 15 years	43	27.58%
1	Based on professional qualification	Office Engineers	33	20.8%
		Site Engineers	19	11.6%
		Project Managers	34	21.3%
		Designers and consultants	69	43.7%
		Client project Engineers etc. . .	6	3.5%

those who have been in the construction industry between five to ten years constitute 34.18%, while 27.58 % of the respondents worked in the construction industry for more than fifteen years followed by 24.45% of the respondents who have work experience between ten to fifteen years. The remaining respondents (13.79%) have been in the construction industry for less than five years. A greater number of the respondents (43.7%) are working as designers and consultants of construction projects. Project managers (21.3%), office engineers (20.8%), site engineers (11.6), and other civil engineering professionals such as client project engineers and construction lawyers (3.5%) also participated in the survey.

6.3. Frequency of occurrence of causes of construction disputes

As it was explained before, this research focuses on the most common direct causes of construction disputes and their frequency of occurrence in a specific mode of contracting. The comparison was done by asking the respondents to scale the frequency of occurrence of the causes of construction disputes from 1 to 5 where 1 represents very low frequency, 2 represents low frequency, 3 represents a marginal frequency while 4 and 5 respectively represent the high and very high frequency of occurrence in a particular mode of contracting.

The analysis of the frequency of occurrence of the causes of construction disputes in the two construction project delivery modes is done by SPSS for computing RII where the scores assigned by the research participants for these causes of construction project disputes were entered and analyzed. The contribution of each cause of construction dispute was examined in relation to a particular mode of contracting and ranked based on their RII value which later was used to determine the relative susceptibility of a mode of contracting to disputes. The following formula is used to determine the Relative Importance Index (RII) of each cause of construction disputes.

$$RII = \sum \frac{W}{A \times N} \quad (0 \leq RII \leq 1)$$

where:

W – weight given to each factor by the respondent on a scale of 1 to 5 with one implying the least and five the highest,

A – highest weight (i.e., 5 in this case),

N – the total number of respondents.

Under Table 2, the RI indices of the causes of construction disputes are provided for the two modes of contracting. The result clearly shows that unsettled claims for money ($RII = 0.794969$), unsettled claims for extension of time ($RII = 0.777358$), delay ($RII = 0.708176$) are the most significant direct causes of disputes while poor quality of work ($RII = 0.469182$) is the least frequent cause of dispute in DBB mode of contracting. In DB projects, on the other hand, delay ($RII = 0.533333$) and unsettled claims for extension of time ($RII = 0.515723$) are the most frequent causes of disputes while unsettled claims for money ($RII = 0.495597$) and poor quality of work ($RII = 0.465409$) respectively are less frequent causes. When we compare the two PDSs susceptibilities to disputes, the

RI indices of all the factors in the DBB mode of contracting are greater than DB which is equal to saying that DBB projects are more prone to disputes than DB projects. According to researchers, five important levels can be used to determine the degree of RII values: these are high (H) ($0.8 \leq RI \leq 1$), high medium (H-M) ($0.6 \leq RI \leq 0.8$), medium (M) ($0.4 \leq RI \leq 0.6$), medium-low (M-L) ($0.2 \leq RI \leq 0.4$) and low (L) ($0 \leq RI \leq 0.2$) [29]. When we evaluate the RII values presented under DBB and DB modes of contracting in the above table, we can see that in DBB modes of contracting unsettled claims for money, unsettled claims for extension of time and delay fall within the high medium range while the same factors of disputes fall under medium range in DB modes of contracting. In both modes of contracting, poor quality of work is the least cited cause of disputes and falls under the medium-low range.

Table 2. RII of the cause of construction disputes in DBB and DB

RII of the cause of construction disputes in DBB			
No	Causes of dispute	RII	Rank
1	Unsettled claims for money	0.794969	1
2	Unsettled claims for extension of time	0.777358	2
3	Delay	0.708176	3
4	Poor quality of work	0.469182	4
RII of the cause of construction disputes in DB			
No	Causes of dispute	RII	Rank
1	Delay	0.533333	1
2	Unsettled claims for extension of time	0.515723	2
3	Unsettled claims for money	0.495597	3
4	Poor quality of work	0.465409	4

As it was mentioned before, the above statistical finding can only answer part of the question on the direct causes of construction disputes in the two modes of contracting. Therefore, it begs a question about the root problems (factors) that resulted in the frequency of disputable claims, construction project delay, and low quality of works in the respective modes of delivery. To address this question the researcher made a thorough study of project reports of 57 road and 19 building projects which were undertaken in the two modes of contracting. Out of the 57 road projects, 27 are DBB projects while the remaining are DB projects, and out of the 19 building projects 13 are DBB projects and only 6 are DB projects. While most of the projects are completed, the remaining projects were not completed at the time when the data was collected although their contract period has already expired. The project reports give a summary of the number and causes of disputable claims, delays, number of disputes, and their settlement mechanisms. In the following table, the factors which give rise to disputable claims and delays and inferior quality of works are listed according to their magnitude of frequency.

As we can see from Table 3, the root causes of disputable claims, delay, and poor quality of works are greater in number and frequency in DBB projects than DB projects. However, it is also possible to observe that there is a similarity in the most important causes in both modes of contracting which are, an increase in the volume of work, problem in the removal of right of way obstructions, unfavorable weather condition, and contract variations. Design-related problems are among the most important causes of construction disputes in DBB projects. Although design-related causes are also reported in DB projects, they are different from those raised in relation to DBB projects. In other words, while defective design, design change, and late issuance of design information and design modification are the causes of disputable claims in DBB projects, disputable claims due to design in DB project on the other hand have to do with change of design owing to overlooked natural conditions and local community demands. Furthermore, contractors' weak execution efficiency of works and their failure to mobilize resources and commence the work on time were among

Table 3. Factors that give rise to disputable claims, project delays, and low quality of work

DBB	DB
1. Change of scope of work as a result of variation order, design change, local community demand, etc... 2. Problems in the removal of right of way obstructions 3. Adverse weather conditions 4. Defective design 5. Design change 6. Delay in issuing of a modified design 7. Contract variation and supplements 8. Owner's failure to hand over the site on time 9. Weak execution efficiency of works by the contractor 10. Late mobilization of materials and crew to commence work 11. Change in the sequence of work 12. Increase in work volume due to increase in rock excavation, and other undersurface conditions 13. The late release of advance and interim payments 14. Shortage of construction materials 15. Tax-related issue 16. Calculation of Liquidated damage 17. Prolongation Cost 18. Change of legislation which increases or decreases contractual right and obligations 19. Error in calculating unit rate price of materials 20. Public unrest	1. Problems in the removal of right of way obstructions 2. Adverse weather conditions 3. Increase in volume of work 4. Price escalation of construction materials 5. Unforeseen subsurface conditions 6. Change of design as a result of overlooked natural conditions and local community demand 7. Contract variation 8. Owner's failure to hand over the site on time 9. Delay in payment 10. Public unrest

the frequently reported causes of delay and poor quality of work in the DBB mode of contracting especially in building projects. Owners' failure to hand over project site within the commencement period and contractors' failure to swiftly mobilize human and material resources to commence work on time were also reported among the frequent causes of dispute and at times reasons for the termination of the contract in the DBB mode of contracting.

It can therefore be safely concluded that the higher the number of causes of disputable claims, delay, and poor quality of work, the more prone to dispute a particular project delivery system is. Concurrent to this assertion, the next tables (Tables 4, 5, and 6) provide the list of projects in the two modes of contracting where disputes arose.

Table 4. Frequency of disputable claims and number of disputes in DBB road projects

SN	Project name	# Disputable claims	# of disputes	Cause of action	Dispute settlement system
1	Hageremariam–Yabelo	8	4	Unsettled claim for money and extension of time	DRE+ Arbitration
2	Aposto–Wondo–Negele	5	1	Unsettled claim for money and extension of time	DRE
3	GedoBako–Nekemte	6	7	Unsettled claim for money and extension of time	DRE
4	Kibremengist–Shakiso	11	5	Unsettled claims for money, suspension of work	DRE + arbitration
5	Sembo–Sholagebeya–Gorfo–Gindeber	8	2	Unsettled claim for money and extension of time	DRE
6	Hawassa–Chuko	18	5	Delay and low quality of work	DRE + Arbitration
7	Chuko–Yirgachefe	9	3	Unsettled claims for money and right of way issues	DRE+ Arbitration
8	Debrebrihan–Ankober	3	3	Unsettled claim for money and right of way issues	DRE + Arbitration
9	Gedo–Manabegna	8	4	Unsettled claim for money	DRE + Arbitration
10	Mazoria–Durame–Durgi–Omo river lot I Mazoria Hadero	7	3	Unsettled claim for money, Slow progress of work	DRE + Arbitration
11	Sawla–Kakos Road Project Contract 2	8	5	Unsettled claim for money, Suspension of work for a long time	DRE + Arbitration

Table 5. Frequency of disputable claims and number of disputes in DB road

	Project name	# of claims	# of disputes	Cause of action	Dispute settlement system
1	Hargele–Dolobay–Dolo Odo	2	1	Unsettled claim for money	DRE
2	F6 Junction–F4 Junction	4	3	Unsettled claim for money and extension of time	DRE
3	Omo–F6 junction	2	2	Unsettled claim for money and extension of time	DRE
4	Debark–Buahit–Dilyibza	3	3	Unsettled claim for money	DRE + arbitration
5	Guba–Begondi	4	2	Failure to complete the project	Arbitration
6	Warabe–Bigober	6	4	Failure to complete the project	Arbitration

Table 6. Frequency of disputable claims and number of disputes in DBB building projects

	Project name	# of claims	# of disputes	Cause of action	Dispute settlement system
1	Sports Court Project	2	1	Delay	Litigation
2	Agaro Campus	5	3	Delay	Litigation
3	Student Canteen Complex	4	1	Suspension of work	A committee of experts
4	Veterinary teaching hospital	7	1	Delay	Litigation
5	Academic staff residence	4	1	Delay	A committee of experts

As it was mentioned earlier, the researcher studied project reports of 57 road and 19 building projects in the two modes of contracting. The results presented in the above three tables (tables 4, 5, and 6) also attest that the number of disputable claims and disputes is greater in DBB projects as opposed to DB projects. The tables further show the kind of dispute settlement system(s) used. In the following part of the paper, we shall consider construction dispute settlement mechanisms in Ethiopian laws.

7. Settlement mechanisms of construction disputes

The construction industry in Ethiopia suffers from a high number of disputes as a result of innate and persistent uncertainties and risks associated with it; however, since most of these disputes are settled extrajudicial, they remain unnoticed [22]. In the data collection phase of this research, the researcher had the opportunity to meet and discuss with the judge of the 16th Bench of the Federal High Court of Ethiopia. The judge attested to the researcher that the 16th Bench is solely established to hear construction disputes as a result of the massive increase in the number of construction disputes in recent years. He added that there are unbearable numbers of files that await resolution some of which are as old as three to five years in the bench without being resolved.

Extrajudicial resolution of disputes is accepted as alternative means of construction dispute settlement for the very well justified reasons of economizing cost and time, offering the parties the freedom to control the process, helping parties to maintain a smooth future business relationship, and avoiding adversarial stances. In commercial undertakings in general and in the construction business in particular, the reputation of construction firms is a highly cherished property. A construction firm that is litigious and has a consistent record of litigation is prone to lose business and wither away from the market in a short period. Therefore, even though disputes are bound to happen in construction, the parties especially the construction firms prefer to use a more confidential resolution scheme. In this regard, Tekle H. Bahita (2007) referring to international arbitration of construction disputes wrote:

“... the sanctity of the principle of confidentiality in international commercial arbitration coupled with their sensitivity to the reputation of the construction companies keeps many international construction contracts muffled to minimize their adverse impact. In effect, the numbers of published cases in construction disputes (domestic and international) are minimal as compared to the magnitude of the problems and construction disputes” [22].

Nevertheless, when one of the parties in a construction contract is a government agency, the public interest demands that the acts of a public organ should be transparent and known to the public. Therefore the question one would raise is, what is the place of extrajudicial settlement of construction disputes in Ethiopian laws when the dispute relates to a public work contract in which a government agency is involved? Even though there are different forms of extrajudicial resolution of construction disputes, this work discusses only three of them namely, “Adjudication”, “Dispute Review Expert/Board” (DRE/B), and “Arbitration”.

7.1. Adjudication

Until the introduction of adjudication as an independent form of construction dispute settlement mechanism, a party wishing to pursue a dispute which is not amicably resolved either by the disputants themselves or the contract administrator had to resort either to arbitration, if the contract made provision to that effect or to litigate it before a court of law.

However, following specific recommendations from the Latham Report (1994) which was commissioned by the UK government to identify and make recommendations regarding systemic failings of the construction sector in the country, “Adjudication” was brought as an important statutory development and incorporated under section 108(1) of the Housing Grants, Construction and Regeneration Act 1996 [30]. According to John M. and Will H. (2001), the lawmaker while incorporating adjudication as a new form of construction dispute settlement mechanism in the Act assumed that this new dispute settlement method is speedy and inexpensive and that it should result in a decision that is binding upon both parties, unless and until that decision is later successfully challenged at arbitration or in court.

“The Housing Grants, Construction and Regeneration Act of 1996” which is a mother document to this concept of “adjudication of construction disputes” does not provide a hard and fast definition of the concept in relation to construction disputes. Under Section 108 of the Act, it is enshrined that *“a party to a construction contract has the right to refer any dispute arising under that contract to an independent third party for a process called >>adjudication<<”* [31]. However, by looking at the elements of Section 108 of the Act, it is possible to define “adjudication” as a form of construction dispute settlement mechanism in which a neutral third party is entrusted with the authority to ascertain factual and legal issues concerning a particular justiciable matter emanating from a construction contract and resolve it within a short period’ (Section 108 (2) (a-f) of the Act).

Under Ethiopian construction laws, adjudication was considered as a construction disputes settlement system as per the provisions of the Federal Standard Bidding Document for the Procurement of Works issued by the Public Procurement Agency (PPA) of January 2006 (SBD 2006). According to Cl. 34 of the SBD 2006, the adjudicator is required to act as an impartial expert to resolve disputes between the parties as rapidly and economically as is reasonably possible. Regarding the practical implementation of adjudication to resolve construction disputes Tekle H. Bahita (2007) wrote, *“We are not sure of when and how adjudication was introduced to the Ethiopian construction contracts; it can be safely said, however, that it has become important in the resolution of construction disputes for quite some time now”* [22].

However, the latest version of the Federal Standard Bidding Document for the Procurement of Works applicable to both national and international competitive bidding does not consider adjudication as a mode of dispute settlement. Clause 26.2 of the Federal Standard Bidding Document (SBD 2011) For the Procurement of Works in National Competitive Bidding 2011 stipulates *“The Public Body and the Contractor shall make every effort to resolve amicably by direct informal negotiation any disagreement, controversy or dispute arising between them under or in connection with the Contract or interpretation thereof”* [32]. If an amicable settlement does not bear fruit, they can refer the matter to the engineer and the contractor’s contract manager (Cl. 26.3 of SBD 2011). And if the engineer fails to resolve the disagreement or if the parties do not agree with the decision of the engineer and the contractor’s contract manager, *“... the Public Body and the Contractor shall appoint more senior representatives than those referred to in Sub-Clause 26.3*

to meet solely to resolve the matter in dispute at the discretion of the chairman (the public body)” (Cl. 26.4 SBD 2011). If the Parties fail to resolve such a dispute or difference within twenty-eight (28) days from the commencement of such procedure, either party may require that the dispute be referred for resolution through the courts per Ethiopian Law (Cl. 26.5 SBD 2011).

7.2. Dispute review board/expert

It is an established practice in construction contracts that the consulting engineer serves as a quasi-arbitrator of many of the day-to-day disagreements between the employer and the contractor. However, as the consulting engineer is a representative of the employer, fair play demands that an additional or alternative dispute settlement procedure either by a panel of “*standing neutrals*” or an individual expert should be provided. Therefore, this panel of neutral experts which provide preliminary rulings upon disagreement and claims as they arise is called Dispute Review Board (DRB); and if such a role is played by an individual expert, it is called Dispute Review Expert (DRE) [33]. The board of impartial professionals or the neutral expert often is determined at the beginning of the project and their role is not limited to resolving disputes as they happen but also follows construction progress and encourages dispute avoidance [33]. The earliest reported use of a form of DRB is what was then called a “*Joint Consulting Board*” which was implemented on the Boundary Dam Hydroelectric Project in North-Eastern Washington in the 1960s [33]. However, the origin of the more common use of DRBs occurred in the mid-1970s on civil engineering works, particularly tunneling projects [33].

DRB is now adopted and implemented in construction disputes by several commercial dispute resolution tribunals. For instance, the Paris-based International Chamber of Commerce (ICC) adopts three forms of dispute resolution procedures for large construction and engineering projects [34]. These are Dispute Review Board (DRB), Dispute Adjudication Board (DAB), and Combined Dispute Boards (CDB). The Chamber’s DRB issues a non-binding recommendation for a dispute which will be binding on the parties if it is not objected to within a specified time frame [34]. The DAB on the other hand issues a provisionally binding decision until reversed by arbitration or litigation. The Chamber’s CDB is a hybrid of the other two in which a non-binding recommendation may at the request of either or both parties be made provisionally binding [34].

In the context of Ethiopian public works, we have witnessed that DRE is most commonly used as a dispute settlement mechanism in road projects (see Tables 4 and 5 above). A study by Alemu M., Wubishet J. and, Tamene A. (2015) titled “*Assessment of Effectiveness of Dispute Review Expert Practice in Ethiopian Federal Road Projects*” also revealed that more than 97% of disputes in Federal Government road projects are settled by DRE recommendations. Besides, the researchers confirmed that almost all stakeholders have a positive attitude regarding the effectiveness of DRE in resolving construction disputes [35]. Harvey J. Kirsh (2008) also confirmed that DRB has been used in Ethiopia in

numerous construction projects [34]. Now the question is ‘what is the legal foundation of DRB/DRE in settling disputes in public work contracts in Ethiopia?’

As it was highlighted earlier in relation to Adjudication, SBD for works 2011 under Cl.26.3 established that at the first tier, disputes in public work contracts are settled by the consulting engineer. However, if that fails for whatever reason, Cl. 26.4 establishes a different mode of dispute settlement that resembles but different from DRE. Therefore in the second instance, the public organ and the contractor each shall appoint more senior representatives than the consulting engineer to meet solely to resolve the matter in dispute. Such meeting(s) shall be chaired and minuted by the Public Body (but the chairman shall not have a casting vote). Such meeting(s) shall be conducted in such a manner and at such venue (including a meeting conducted over the telephone) to promote a consensual resolution of the dispute in question at the discretion of the chairman. A closer look at the provisions of this Clause reflects that this procedure of dispute settlement although resembles DRB, it has essential departures from it. One of the departures is, while DRB/DRE is a standing team of professionals or a standing expert, the procedure established by the SBD 2011 is not. The professionals are summoned by the owner of the project to resolve the disputes. Secondly, DRB/DRE’s role is not limited to resolving disputes but also avoiding them. Third and most importantly, the meeting of professionals in the SBD 2011 is chaired by the public agency and consensual resolution of the dispute is reached at the discretion of the public agency. This procedure of dispute settlement does not offer a space for an impartial resolution of disputes by the summoned senior professionals as opposed to DRB.

Therefore, it can safely be concluded that, despite the practical implementation of DRB/DRE as a mode of dispute settlement in public work contracts, it does not have a legal basis in the locally developed standard conditions of contract in Ethiopia. However, as many of the contracts for the construction of complex public projects in Ethiopia make use of the FIDIC contract forms, the dispute settlement procedures are also influenced by the mode of dispute settlement adopted by FIDIC forms of contracts. The relevant provision of the FIDIC forms of contracts concerning DAB (Dispute Adjudication Board) is Cl. 20.4. It has to be noted that, the consulting engineer’s role as a quasi-arbitrator of construction disputes is now replaced by the DAB in all FIDIC forms of contracts.

7.3. Arbitration

Arbitration is a very common dispute settlement system in commercial contracts including construction contracts. If a certain legal matter is capable of being settled through arbitration, it is called arbitrable [36]. Even though there is a prevailing tendency to increase the use of arbitration as an alternative mode of dispute resolution to litigation for many legal issues, public policy (also called public order) dictates that the resolution of disputes emanating from certain legal relations should solely be entrusted to regular courts to safeguard the public interest [37]. In this regard, what appears to be contentious in several legal systems is the issue of arbitrability of administrative disputes emanating from administrative contracts. In the words of Thomas E. Carbonneau (2009), “*Arbitrability establishes*

the respective domains of law and arbitral adjudication; It is the essential dividing line between public and private justice” [38]. It is possible to understand that public justice refers to courts while private justice refers to the arbitration tribunal or the arbitrators. It follows from this that only public authorities have the power to exercise authority which would nullify acts of the government.

As per the provisions of the Civil Code of the Empire of Ethiopia, public work contracts are part and parcel of administrative contracts. Art.3132 of the Civil Code provides that a contract shall be deemed to be an administrative contract where if it is expressly qualified as such by the law or by the parties, or it is connected with an activity of the public services and implies permanent participation of the party contracting with the administrative authorities in the execution of such service, or it contains one or more provisions, which could only have been inspired by urgent considerations of general interest extraneous to relations between private individuals. Accordingly, public construction contracts (public works contracts) which are prescribed under Arts.3244- 3296 of the Civil Code are among the administrative contracts which are expressly prescribed in the law. So the issue is, are government construction contracts arbitrable in Ethiopia?

According to the Civil Procedure Code of the Empire of Ethiopia 1965, administrative contracts are not arbitrable. Article 315(2) succinctly reads: “*No arbitration may take place in relation to administrative contracts as defined in article 3132 of the civil code or in other cases where it is prohibited by law in the Civil Procedure Code*” [39]. But the relevant Civil Code Provisions concerning arbitration (Arts 3325-3346 of the Civil Code) do not prescribe an equivalent prohibitive provision. The prohibitive provision of the Civil Procedure Code has been a subject of contentious academic dialogue for a while and few academic works have also been published on it. In order to settle this contentious legal problem, academics and researchers have been urging the government to come up with a comprehensive arbitration law that will resolve the matter once and for all. Accordingly, a couple of months ago, the Government of Ethiopia came up with Proclamation No. 1237/2021, which is called the Arbitration and Conciliation, Working Procedure Proclamation which among other objectives is meant to foster efficient resolution of investment and commercial disputes (including construction disputes) [45]. Art. 7 of the proclamation enumerates non-arbitrable matters and under sub-article 7 of the same, it is provided that administrative contracts are non- arbitrable except where it is permitted by law. To the extent of the investigation of the researcher of this work, there is no any specific law which licenses a public agency to submit to arbitration of its disputes emanating from public work contracts in Ethiopia.

Concurrent to the above prescription of the Arbitration and Conciliation, Working Procedure Proclamation, Cl. 26.5 and Cl.26.6 of the SBD 2011 exclude the possibility of submitting disputes emanating from public work contracts to arbitration tribunals. The provisions state “*If the Parties fail to resolve such a dispute or difference amicably within twenty-eight (28) days from the commencement of such procedure, either party may require that the dispute be referred for resolution through the courts. . . and only those Public Bodies that are allowed by law to proceed to arbitration can do so*”. Despite the clear prohibition

of the laws, however, we have witnessed that, government construction disputes are being routinely settled by arbitration even in the absence of a specific law that mandates a public organ with the power to submit its construction disputes for arbitral settlement.

8. Conclusion

In this work, we have attempted to assess the causes and settlement mechanisms of construction disputes in the context of public work contracts in Ethiopia. It is emphasized that, even though disputes are inevitable as long as people are interacting in some way in construction contracts, a very frequent conflict may seriously hinder the progress of the intended project. Therefore, it is wise to understand the sources of disputes in construction contracts to reduce their chance of occurrence and when they ensue, parties need to design a proper method of settlement that is economically viable, swift, and one which does not curtail future business relationship of the parties.

Every construction project delivery system has its pros and cons and it is difficult to confidently prescribe a particular mode of contracting to uniformly apply for every kind of project. However, when it comes to susceptibility to disputes, the survey result shows that unsettled claims for money ($R_{II} = 0.794969$), unsettled claims for extension of time ($R_{II} = 0.777358$), delay ($R_{II} = 0.708176$) are the most significant direct causes of disputes while poor quality of work ($R_{II} = 0.469182$) is the least frequent cause of dispute in DBB mode of contracting. In DB projects, on the other hand, delay ($R_{II} = 0.533333$) and unsettled claims for extension of time ($R_{II} = 0.515723$) are the most frequent causes of disputes while unsettled claims for money ($R_{II} = 0.495597$) and poor quality of work ($R_{II} = 0.465409$) respectively are less frequent causes. The result thus proved that DBB projects are significantly prone to disputes as compared to DB projects.

Regarding the root causes of disputes, the qualitative data shows that an increase in the volume of work which results from a change in design attributable to errors and omissions in the original design, local community demand, overlooked site conditions, Owner and contractor induced contract variation requests are the most pressing reasons which fuel adversarial stances resulting in disputes especially in the DBB mode of contracting. As most public work contracts especially building projects are contracted in the DBB mode of contracting which separates the design contract and the work contract, it happens that design-related disagreements are very common. Even though commencing work with fully completed design specifications has several advantages, it may also hinder on-site resolution of design flaws as design adequacy risk is on the owner. When design defects are identified in DBB projects, the owner often uses its in-house staff or the contractor to make the necessary design modifications to carry on the work which often increases the volume of work which in turn results in an extension of the time and cost overrun. This complication is a source of frequent disagreement and conflict leading to disputes.

Concerning the DBB mode of contracting it is also important to strictly consider the technical and resource capacity of the firms at the time of bidding. It is found out from the

personal observation by the researcher of this work and also from the finding of this research that, most of the independent contractors who participate in bidding DBB projects have a very weak technical, financial, material, and human resource capacity to commence the project on time and also to complete it within the contract period. One engineer mentioned to the researcher that contractors often enter into a contract with a public agency with a low bid price and subsequently give numerous excuses related to design, construction material shortage, and volatility in price to compensate the low bid price they offered when they won the project. This often results in adversarial stances resulting in undue delay, revision of contract price, and detrimental conflicts. It is also understood that as DB projects often are fast-track projects, general contractors not only assume design adequacy risks but also witnessed to possess a better technical, financial and material capacity in many instances. Therefore, to reduce construction disputes especially in the DBB mode of contracting, among other solutions, it is important to reconsider the legal liability of design professionals for design adequacy and boost the capacity of general contractors in the country so that they will be able to execute and complete works in different modes of contracting.

Regarding the settlement of disputes arising out of public work contracts, there is a very sharp departure between the law and reality. The laws vividly establish that administrative contracts are non-arbitrable. Other than a simple amicable settlement of disputes, the laws and standard conditions of contracts applicable to public works do not allow the use of alternative dispute settlement systems. This stems from the assumption that the arbitrability of disputes is limited to private law. However, in many countries, including Germany, Switzerland, and Taiwan (China), it is established that arbitration can apply to claims derived from public law, and in particular, to rights conferred by contracts subject to administrative law. Therefore, the existing laws applicable to public work contracts need to be revised to conform to the existing practice and development of the sector.

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