

大多數文獻探討流廢標的影響因子皆著墨在廠商方面。本研究認為招標文件完整度不足，才是導致流廢標之主因。經由文獻回顧及深度訪談探討流廢標的影響因子、整理出設計圖說及發包預算書的錯誤樣態，並針對其因應對策及改善策略，歸納成檢核項目表，建立管控輔導模組。經實際案例的訪視及輔導並追蹤結果，提出改善策略及建立相關管控制度。近幾年來統計確實降低了流廢標之總金額、流標之次數及時間，節省許多成本。

一、緒論

1.1 現況說明

國內歷年列管一億元以上之公共建設計畫可支用預算，自 2008 年開始至目前，平均約為 3,650 億元，而以 2008 年為例，全國公共工程總預算金額約為 5,580 餘億元，而當年地方政府流廢標預算金額為 465.71 億元，約為全國總預算金額之 8.35%。而將近 1/10 之預算，因流廢標的問題，而導致預算執行率不佳，預算延遲進場，也間接影響經濟成長。並且於計畫執行時無形中增加或浪費許多成本，這些隱藏的問題值得去探討。

1.2 研究動機與目的

本研究將探討流廢標發生原因，經過綜整成檢核項目表。依據此檢核項目表，針對部分縣市主辦機關適時訪視並予以輔導協助。最主要目的是有效的降低各縣市政府流廢標比例，降低招標至決標次數及所需時間，節省重複辦理招標作業支出。除持續辦個案輔導(協助非工程專責之主辦機關解決廢標工程案件)外，亦一併協助地方政府建廢標檢討制度。並且提高規劃設計成果品質，增加招標文件之完整度，使標案能順利決標。

1.3 研究範圍

本研究範圍，以公共工程委員會「公共工程標案管理系統」2008 年至 2013 年間，流廢標案件之數量最多與流廢標金額最大之建築工程類案件為主。

1.4 研究方法與流程

本研究的研究方法是採用文獻回顧、深度訪談及案例探討的方式。

(1)文獻回顧：

回顧關於流廢標因子、招標文件及招標風險相關之文獻研究。

(2)深度訪談：

針對過去發生流廢標之縣市政府之主辦機關，以深度訪談方式進行案例討論，整理出該案件發生流廢標之實際原因、後續招標處理過程及該主辦機關之建議。

(3)案例探討

針對管控輔導模組，選擇即將進行發包作業之案例，進行檢視或輔導改善，並給予建議，並追蹤後續決標結果。並統計當年流廢標之次數及時間，藉此驗證此模組是否正確。

本研究進行的研究流程圖詳如圖 1.所示，其細節說明如下：

(1)蒐集資料：

蒐集公共工程委員會歷年流廢標之資料，包括公共工程流廢標率、流廢標件數、流廢標預算、流廢標工程類別…等。

(2)文獻回顧找出工程流廢標影響因素：

藉由文獻回顧，了解可能流廢標之原因。並對於公共工程採購方面做了解，並蒐集關於工程競標、廠商投標意願、標價分析、招標風險、營造工程物價指數等相關文獻來探討，取得可能的流廢標影響因子。

(3)深度訪談：

經由深度訪談，由發生流廢標案件之實際情形、檢討報告及後續處理情形。並了解流廢標之真正原因，部分著重於招標文件之完整度不足。

(4)錯誤樣態分析：

上述資料整理歸納分類後，建立錯誤樣態分析，分別為招標文件中之設計書圖說及單價分析、數量計算兩大錯誤樣態。

(5)綜整原因及因應對策：

整理流廢標原因及錯誤樣態分析後，再細分成六大類。列出每一類流廢標原因之因應對策，依據此對策再發展成檢核項目表。

(6)選擇個案訪視與輔導：

依據工程會統計，選擇流廢標次數較多的縣市政府主辦機關進行訪視與輔導，並給予改善建議，最後追蹤並紀錄此案改善的成效。

(7)研究結果：

統計當年度所有工程類標案的流廢標次數及時間，進而驗證此流廢標之原因及其因應對策是否朝正確之方向。

(8)結論與建議：

本研究所提出的建議檢核項目表單，可以提供各縣市政府主辦機關參考，於準備招標作業前進行自我檢視，並且提出後續可以進行的研究方向。

二、文獻回顧

2.1 流廢標原因

有關流廢標的原因，郭文達等於 1996 年建立一套工程投標決策輔助系統，以問卷調查、AHP 分析層級法及門檻權重 加與門檻值的方式建立其系統。該系統提出十六項有關決標之影響因子(魏金灶 2003) (張吳清俊 2004)。魏澤宇於 2009 年提出公共工程流標關鍵因子分別為，「工程施工困難度」、「預算是否合理」、「業主特殊要求」、「投資的風險」、「原物料價格」、「工期」、「專案地點」、「設計圖說」、「可運用的設備或材料資源」、「業主能力」、「契約條文是否公平合理」(魏澤宇 2009)。

2.2 工程執行與發包作業

公共工程之執行績效、施工品質及完工滿意度，甚至影響到政府形象及施政績效(潘坤宗 2008)。公共工程是否有效的執行，和經濟成長有極大的關係(李秉正，張其祿 et al. 2010)。公共工程其執行績效雖然很重要，但公共工程執行前發包作業，是否於第一次公告招標就決標，或流標後再次公告才決標，亦或是造成廢標之情形(黃銘弘 2006)，這些造成公共工程流廢標之情形，已屬於發包作業過程之風險(吳宗恩 2006)，無形中，增加了計畫執行的成本及造成國家資源浪費(謝明和 2003)。

2.3 公共工程會統計資料

根據工程會資料統計，2008 年全國總預算金額為 5,580 億元，而當年流廢標預算金額為 465.71 億元，約為全國總預算金額之 8.35%(工程會 2009)。公告招標之工程採購案件，於第一次流標後，主辦招標機關檢討原因後，再重新公告。若遲無法決標，應檢討流廢標原因，並採取改善措施(工程會技術處 2013)。繼續探討各縣市流廢標之情形可以發現，有若干縣市，發生流廢標多次以上，甚至有高達流標 13 次，第 14 次公告後才有廠商得標。其一再招標又流標，甚至廢標之情形，如此反而衍生花費更多行政作業時間，並造成預算的延滯執行，影響整體經濟發展(潘坤宗 2008)。

2.4 小結

大多數文獻探討流廢標的影響因子皆著墨在廠商投標意願低、無廠商投標或投標廠商數不足而造成流標，皆以廠商方面為出發點。本研究認為在主辦機關立場及規畫設計成果兩方面，是有很大的關係，故於招標文件之準備不周詳、不確實，完整度不夠，才是導致流廢標之主因。

三、建立管控輔導模組

3.1 案例專訪與分析

以上述文獻參考為依據，整理出約 15 項有關流廢標之因子，以此作為基礎，並於公共工程標案管理系統中，選擇縣市政府(非工程專責機關)流廢標次數較多專案，進行深度訪談，確實了解其流廢標的真正原因及後續辦理情形。經分析其

工程流廢標之原因，主要為下列五項原因：工項單價編列偏低、原編列預算不足、契約未訂定合理物價指數調整條款、未訂定合理之資格規格等招標條件、技術門檻較高等因素。並協助縣市政府非工程專責機關檢討流廢標問題之案例中，整理出流廢標原因與因應對策、設計圖說及施工預算書編製常見的缺失等，並期盼更多的專責工程機關亦能依本身專業或經驗提供更好的建議給各非專責工程機關參考或應用，俾提升公共工程規劃設計品質及效率。

無法決標工程之流廢標原因及後續辦理情形。根據統計資料整理出下列關鍵因子，分別為「預算書編制不合理」、「設計圖說不合理」、「設備或材料過於限制競爭」、「工期訂定不合理」、「契約條文及其他招標文件不合理」等五大項。

針對上述所歸納出來之流廢標關鍵因子，分別探討其產生之原因，並找出問題之所在，再尋求解決之因應對策，詳圖 2.流廢標之原因及問題。

3.2 錯誤樣態分析

規劃設計階段時其影響因子再整理後，根據招標文件及規劃設計兩部分，我們歸納出兩個錯誤樣態，也就是設計圖說常見的錯誤樣態(詳圖 3. 設計圖說常見的錯誤樣態)及單價分析及數量計算錯誤樣態(詳圖 4. 設計圖說常見的錯誤樣態)兩大常見的錯誤樣態分析。

針對招標文件品質不佳的問題：本研究發現在公告招標作業前，對於招標文件，雖然有辦理審查的動作，但卻未發現缺失，或是並無進行實質的審查。本研究建議的解決方式有推動專家協審及建立設計委託審查制度、辦理教育訓練或宣導、提供設計常見錯誤態樣及預防等資料供參酌，或請地方政府研擬輔導作為。

3.3 綜整流廢標問題的原因及因應對策

這些統計出來的流廢標的原因中，我們再歸納出產生流廢標問題癥結的所在，並嘗試列出所採取的因應對策，詳圖 5.綜整原因及因應對策。

有關預算書編制不合理的情況：部分詳細表未編列相關的費用、或編列的項目或計價單位不合理，甚至有部分單價遺漏、檢討預算單價、底價之合理性、是否參考最新市場價格，或公共工程價格資料庫、契約是否訂定合理之物價指數調整規定，這些都統一歸納成「預算書編制不合理」。

設計圖說部分：規劃設計不良、圖說標示不明確、有部分限制性情事其有違採購法之虞、或是有違反建築技術規則或相關法令規章及其他原因等。

材料設備方面：技術規範規定之合理性、在訂定材料設備規格時，有產生限制競爭之情形、招標文件是否要求或提及特定之商標或商名、專利、設計或型式、特定來源地、生產者或供應者、有無註明「或同等品」字樣、技術規範門檻是否過高等。

工期方面：履約期限訂定之合理性、工期是否過短造成成本增加，並影響投標

廠商的意願，履約內容是否明確、是否增加廠商承攬風險、等標期訂定之合理性。

其他招標文件不合理的情形如：廠商資格不當限制競爭之情形、是否對廠商有無正當理由之差別待遇、延遲付款、計價請款條件不合理等。

3.4 小結

文獻回顧收集現有流廢標因子，加上過去案例之深度訪談所得到實際流廢標原因，再經由錯誤樣態分析結果，綜整出各流廢標因子之因應對策，而建立檢核項目表。針對未來的標案，完整建立一個管控輔導模組。

四、個案訪視與輔導

本研究於縣市政府工程類流廢標比率統計最高的案例，主動進行個案的訪視。依據管控輔導模組，協助主辦機關針對投標文件，依檢核項目表，逐一檢視。是否有不滿足項目或補齊所缺少的招標文件資料。特別是針對招標文件中設計圖說或發包預算書，協助非工程專責主辦機關重新檢視，並確認業主需求是否明確在招標文件中清楚註明。所有招標文件內容檢視完成後，再進行公告招標作業。本研究亦追蹤此案例後續進行之結果，是否有決標，抑或是再修正相關的招標文件後，再重新招標。

同時請其他縣市政府填報無法決標工程之流廢標原因及後續辦理情形等，發現部分機關未確實瞭解流廢標之原因(如無廠商投標、未達 3 家投標等)，另亦有招標超過 6 次、甚至 10 次以上仍未決標之情形，影響執行效率，而其上級機關並無相關之管考或督導制度。同時亦發現部分主辦之工程案件大多未具備工程專業，且未辦理設計書圖及招標文件之實質審查，衍生設計品質不佳等問題。

有關主辦機關未確實瞭解流廢標原因的問題，及上級機關欠缺協助及管考制度的問題，本研究建議輔導成立流廢標專案小組、或請縣市政府研擬相關輔導措施及建置檢討流程等制度、同時彙整解決流廢標工程之案例報告提供參酌、有可能再回饋至設計階段時即應注意事項、請縣市政府於督導會報或管考會會議進行管控、請中央輔助部會辦理輔導、或辦理教育訓練及宣導講習。

五、研究結果

本研究對於縣市政府流廢標工程案件適時予以協助及輔導，並加速地方政府流廢標工程案件儘速完成發包，提升計畫效益，避免預算停滯執行而影響經濟景氣。根據流廢標問題所建議的因應對策，除持續個案輔導(協助非工程專責機關)解決流廢標工程案件外，亦一併協助地方政府建立流廢標檢討制度。

5.1 流廢標預算金額比率降低

經過輔導各縣市政府所屬非工程主辦機關，再次統計 2008 至 2012 年間，流廢標預算金額由 465.71 億元降至 2012 年的 199.85 億元，全國總預算金額之百分比亦由 8.35% 降至 3.74%，詳圖 6.流廢標金額比率趨勢圖。地方政府 廢標 額明顯確實有減少， 廢標之比 同時下降。本研究輔導地方政府建 管考機制的積

極作為，有效降低工程預算的延滯執行，減少相關機關 廢標案件之處 時間，並有效提升公共工程預算的執行效率。

5.2 招標至決標次數及所需時間減少

自 2008 年開始，本研究於標案管理系統中篩選 廢標件 或預算 額比較高之縣市政府所屬非工程主辦機關，再進 訪視及輔導，可發現有 廢標多次以上，未確實瞭解原因及研擬解決對策，一再招標又 標(或廢標)，反而衍生多 政作業時間之案 。經輔導後大多能產生改善措施或自行建立管控機制，並可有效 低不必要之時間延宕，詳下列表 1. 已輔導縣市政府 廢標案件之招標次 及時間比較表。經過本研究輔導縣市政府之平均招標次 由輔導前的 3.5 次下 至輔導後的 1.8 次。平均每一案件成功決標之招標時間由 82.8 天 低至 50.5 天，顯示各縣市之招標次 及招標時間均能有效下 。

經過輔導之縣市政府已有效改善流廢標情況後，部分縣市政府更強化其管控作業，將所轄之區公所或鄉鎮市公所主辦之工程案件納入督導範圍，應可再減少 必要之招標作業及時間，有效提升整體政府之採購效 。

六、結論與建議

6.1 結論

本研究經由文獻回顧及深度訪談找出流廢標的影響因子、整理出設計圖說及發包預算書的錯誤樣態，並針對上述列出因應及改善策略，歸納成檢核項目表，再經過實際各縣市政府主辦機關的個案的訪視及輔導並追蹤結果，部分縣市政府經過輔導後，甚至提出改善策略及建立了相關管控制度。近幾年來統計各縣市主辦機關所有工程類的標案，確實降低了流廢標之總金額、流標之次數及時間，節省了許多流廢標成本。根據錯誤樣態分析結果，事先預防投標文件上的疏失，同時也提高了規劃設計成果的品質。證明依據此研究結果，主辦機關於辦理公告招標作業前，事先防範有可能產生流廢標之原因，如此不僅可以加速順利決標，亦可節省成本無需再投入重複。

6.2 建議

為了整體招標作業能夠順利進行，建議將風險管理之概念導入。將發生流廢標的原因以風險因子來做為管控的基礎，分別計算流廢標因子之風險機率，並納入追蹤管控，是否可以降低風險發生之機率。於各風險因子定義清楚後，將風險對策分別釐清，後續依據風險管理的程序進行風險監控的管制。

透過地方政府流廢標工程案件之訪視輔導與協助地方政府建立檢討制度之過程中，除發現許多招標不順利的新問題與流廢標的新原因外，也發現規劃設計及招標文件品質不佳等普遍存在之問題，建議未來除持續協助地方政府健全流廢標檢討制度外，另一主要重點為提升招標文件品質，加強規劃設計階段之管理，

除落實契約中所規範之設計品質外，並需利用設計審查確保設計成果符合設計規範與主辦機關之實際需求，目標係藉由規畫設計品質提升，避免因前期階段之設計不當而影響後續進行之施工品質甚至成本及時間之浪費。

Previous literature on factors that result in tenders without a successful tenderer or nullified tenders predominantly focuses on suppliers. In this study, we believe that an incomprehensive invitation to tender document is the main reason for a tender without a successful tenderer or a nullified tender. After conducting a literature review and in-depth interviews to investigate factors that lead to a tender without a successful tenderer or a nullified tender, this study came up with a list of error patterns which were founded in design sketches and budgets for contracted out projects, developed corresponding countermeasures and strategies for improvement, designed an examination checklist, and established a control, management, and coaching module. Meanwhile, after visiting a few cases, giving them instructions and guidance, and following up these cases' subsequent development, strategies for improvement were proposed and relevant control and management mechanism systems were developed. As indicated by statistics in recent years, there has been a decline in the amount of money and time spent on tenders without a successful tender or nullified tenders and the total number of tenders without a successful tender or nullified tenders. A lot of costs have been saved.

Chapter I – Introduction

1.1 An Outline of the Current Situation

The government has been exercising control over the budget for public construction projects that are over NTD 100 million. From the year 2008 onwards, the average budget has been NTD 365 billion. The total budget for nationwide construction projects in 2008 exceeded NTD 558 billion. However, in the same year, the budget for the local government's tenders without a successful tender or nullified tenders was NTD 46.571 billion, accounting for approximately 8.35% of the total budget for public construction projects across the nation. Meanwhile, nearly 10% of the budget failed to be implemented effectively or the implementation was delayed due to the issue of tenders without a successful tenderer or nullified tenders. Consequently, this not only had an indirect impact on economic growth but also wasted a great deal of money or incurred extra costs in the course of carrying out a project. All these hidden issues are worth exploration and investigation.

1.2 Research Motivations and Purposes

This study centers on exploring factors that led to tenders without a successful tenderer or nullified tenders. An examination checklist was developed after factoring in all relevant data. With this examination checklist, this study wishes to visit, instruct, guide, and assist some cities/counties' contracting authorities. This study's main purpose is to effectively decrease the percentage of tenders without a successful tenderer or nullified tenders for all city and county governments, curtail the time duration and the times of an notice of invitation to

tender before a contract is awarded so that the expenses on having repeated invitations to tender can be reduced. Other than continuing to give instruction and guidance to selected cases (assisting contracting authorities that do not specialize in tendering for construction projects to solve nullified tenders for construction projects), this study is also aimed at assisting the local government to develop a review system for tenders without a successful tenderer or nullified tenders, improving the quality of design, having a more comprehensive invitation to tender document, and letting a contract to be awarded smoothly.

1.3 Research Scope

In terms of this study's research scope, the most frequent construction project tenders without a successful tenderer or becoming nullified and involving the largest amount of money as documented in the Public Construction Commission's "Public Construction Bidding Management System" between 2008 and 2013 were chosen as research subjects of this study.

1.4 Research Methods and Procedures

Research methods adopted by this study include literature review, in-depth interviews, and the case study method.

(1) Literature review:

Previous literature on the causes of tenders without a successful tenderer or nullified tenders, the invitation to tender document, and the risks associated with an innovation to tenders were reviewed.

(2) In-depth interviews:

this study arranged in-depth interviews with city and county governments' contracting authorities which had tenders without a successful tenderer or nullified tenders previously as an approach to discuss about these cases, came up with the real causes of tenders without a successful tenderer or nullified tenders, details about subsequent invitations to tender, and advice offered by the contracting authorities.

(3) The case study method

Based on a control, management, and coaching module, cases that were about to have a project contracted out were chosen for examination. Instruction, guidance, and suggestions were also given to these cases so they could make improvement. Also, this study followed up with the subsequent results of contract rewarding and performed statistical analysis of the time duration and number of tenders without a successful tenderer or nullified tenders in a chosen year so as to validate the exactness of the model.

A detailed research process flowchart is illustrated in Figure 1. More details about the research process are given below:

(1) Data Collection:

This study collected the Public Construction Commission's historical data on tenders without a successful tenderer or nullified tenders for public construction projects, including the percentages, quantities, budgets, types of construction projects, etc. of these tenders.

(2) Literature review was conducted to find out contributing factors to construction tenders without a successful tenderer or nullified construction tenders:

Literature review was conducted to understand the possible reasons for tenders without a successful tenderer or becoming nullified, as well as to gain an insight into public construction procurement. Further, relevant literature on tendering for construction projects, suppliers' interest in submitting a tender, an analysis of tender prices, the associated risks of an invitation to tender, and the construction cost indexes were collected and perused so as to find out possible contributing factors to tenders without a successful tenderer or nullified tenders.

(3) In-depth interviews:

In-depth interviews were conducted to find out the actual situation, the debriefing reports, and the subsequent handling of tenders without a successful tenderer or nullified tenders as well as to understand the actual reasons for the unsuccessful tenders. The in-depth interviews partially stressed on the incomprehensiveness of the invitation to tender document.

(4) Error pattern analysis:

The error pattern analysis commenced once the above data were systematized and sorted. The error pattern analysis mainly focused on the invitation to tender document's sketch design, unit price analysis, and how quantities of objects were counted.

(5) Consolidating the causes and corresponding countermeasures:

After the causes of tenders without a successful tenderer or nullified tenders were systematized and the error pattern analysis was performed, the causes were classified into six categories. The causes and corresponding countermeasures for tenders without a successful tenderer or nullified tenders in each category were listed out. An examination checklist based on the corresponding countermeasures was developed accordingly.

(6) Visiting and giving instruction and guidance to the chosen cases:

The researcher decided to visit and give instruction, guidance, and suggestions to city and county governments' contracting authorities that experienced a great deal of tenders without a successful tenderer or nullified tenders according to the Public Construction Commission's statistics. Further, the research also followed up with and

recorded these cases' improvement.

(7) Research results:

Statistical calculations on the quantity of tenders without a successful tenderer or nullified tenders and the time involved in these tenders were performed to verify the causes of these unsuccessful tenders and whether corresponding countermeasures are headed in the right direction.

(8) Conclusions and suggestions:

The examination checklist proposed by this study is a checklist that all city and county governments' contracting authorities can refer to for self-examination before entering the invitation to tender phase. Meanwhile, this study also proposed a direction for subsequent research.

Chapter II- Literature Review

2.1 The Causes of Tenders without a Successful Tenderer or Nullified Tenders

In terms of the causes of tenders without a successful tenderer or nullified tenders, a work team led by Guo Wen-Dar employed the questionnaire survey method, the analytic hierarchy process (AHP), the threshold value, and the accumulation of weighted threshold value to develop a decision support system for the construction project bidding process. This system suggested 16 factors that affect contract awarding (Wei Chin-Tsao 2003) (Chang Wu 2004). Wei Tse-Yu (2009) proposed that the key factors for a public construction tender having on successful tenderer might include “the difficulty of carrying out the construction project”, “whether the budget is reasonable”, “the relevant government agency’s special requirements”, “the investment risk”, “the costs of construction materials”, “the proposed construction schedule”, “the site of the construction project”, “the design sketch”, “the available equipment or material resources”, “the relevant government agency’s capability”, and “ whether provisions in the contract are impartial and reasonable (Wei Tse -Yu, 2009).

2.2 Contracting out and Implementing Construction Projects

The performance of an implemented public construction project, the quality of a construction project, and stakeholders' satisfaction with the construction project upon its completion may even have an impact on a government's image and political performance (Pan Kun-Tsung, 2008). There is a significant correlation between whether a public construction project is carried out effectually and economic growth (Li Ping-Cheng, Jang Chyi-Lu et al. 2010). Although the performance of an public construction project is of significant importance, the procedures before the commencement of a public construction project such as whether the contract of a contracted out project is awarded upon the first notice of an invitation to tender, awarded upon a subsequent notice after the initial tender ended without a successful tenderer, or whether there was a nullified tender as a result

(Huang Ming-hung, 2006) are also important. It is because the situations that result in tenders for public construction projects having no successful tenderer or becoming nullified have become risks in the course of contracting a construction project out (Wu Tsung-En, 2006). Imperceptibly, these risks have incurred additional expenses for carrying out a project and wasted a great deal of national resources (Xie Ming-He, 2003).

2.3 The Public Construction Commission's Statistics

According to the Public Construction Commission's statistics, the total budget for public construction projects nationwide in 2008 was NTD 558 billion. However, in the same year, the budget for tenders without a successful tenderer or nullified tenders was NTD 46.571 billion, accounting for approximately 8.35% of the budget for the entire nation's public construction projects (Public Construction Commission, 2009). After the first notice of invitation to tender for construction procurement was advertised and the tender ended without a successful tenderer, the contracting authority should have reflected on possible causes before posting another notice. In circumstances where it took too long before a contract could be awarded, the authority should have reflected on the causes of tenders without a successful tenderer or nullified tenders and employed corresponding measures to seek improvement (Department of Technology, Public Construction Commission, 2013). A further exploration of the situation of tenders without a successful tenderer or nullified tenders in various cities and counties revealed that several cities and counties had repeated tenders without a successful tenderer or nullified tenders. Even more so, there were tenders that ended without a successful tenderer for 13 times and only had a tender bid winner after the 14th invitation to tender. The repeated invitations to tender and repeated tenders without a successful tenderer or even nullified tenders only led to escalating expenses, wasted more time in subsequent administrative processing, postponed budget implementation, and even affected overall economic development (Pan , Kun-Tsung, 2008).

2.4 Interim Summary

Previous literature on factors that result in tenders without a successful tenderer or nullified tenders predominantly centers on suppliers alone, attributing tenders without a successful tenderer to suppliers' lack of interest in submitting a tender, no tender submitted, or not enough tenders submitted by suppliers. This study, however, believes that contracting authorities' stance and performance in planning and design plays an important role. As such, an incomprehensive, imprecise, and incomplete invitation to tender document is the main cause of tenders without a successful tenderer or nullified tenders.

III. Developing a Control, Management, and Coaching Module

3.1 Visiting and Analyzing the Chosen Cases

After referring to the above literature, this study put forward 15 factors that have resulted in tenders without a successful tenderer or nullified tenders. Based on the 15 factors, this study referred to the Public Construction Bidding Management System and had in-depth interviews with the city and county governments (authorities that do not specialize in tendering for construction projects) that had more tenders without a successful tenderer or nullified tenders in an attempt to know the real reasons for these unsuccessful tenders and the subsequent handling. As indicated by analysis, the five main reasons for construction project tenders ending without a successful tenderer or becoming nullified are underpriced construction specifications, originally insufficient budgets, no contract provisions on a reasonable price adjustment mechanism, no reasonable requirements on the supplier's qualifications, and a higher technological threshold. Further, this study also assisted city and county governments' contracting authorities that do not specialize in tendering for construction projects to scrutinize and reflect on cases of tenders without a successful tenderer or nullified tenders, sort out the causes for these unsuccessful tenders, corresponding countermeasures, and common problems in the design sketch and the budget for a construction project. In doing so, this study anticipates that more authorities that specialize in construction projects could make use of their expertise or experiences to give better practical advice to contracting authorities that do not specialize in tendering for construction projects so as to enhance the quality and efficiency of design and planning for public construction projects.

In terms of the reasons for construction project tenders without a successful tenderer or becoming nullified, in which a contract can not be awarded, and the situation of subsequent handling, this study came up with five key factors based on the collected statistical data. The five key factors are "an unreasonable budget", "an unreasonable design sketch", "excessive restrictions on competition in equipment or materials", "an unreasonable construction schedule", and "unreasonable provisions in the construction project contract and the invitation to tender document".

Based on the above-mentioned key factors that have led to tenders without a successful tenderer or becoming nullified, this study looked into the causes of each factor and where the problems were in order to look for corresponding countermeasures to solve the problems. Please refer to Figure 2 - the reasons for and problems of tenders without a successful tenderer or nullified tenders.

3.2 The Error Pattern Analysis

After factors that affect the planning and design phase were systematized, we came up with two error patterns pertaining to the invitation to tender document and the planning and

design phase. The two main types of error patterns are 1) the common error patterns in a design sketch (please refer to Figure 3- the common error patterns in a design sketch) and 2) the common error patterns in unit price analysis and counting quantities (please refer to Figure 4- the common errors in a design sketch). The two common types of error patterns were then analyzed.

In term of the issue of a substandard invitation to tender document, this study found that before a notice of invitation to tender was advertised, the invitation to tender document was either examined with no flaws detected or no substantial examination had been done. To address this issue, this study suggests the following solutions such as enlisting the help of experts to scrutinize the document, developing a system that entrusts the third party to check a design, organizing education, training programs, or promotional events, providing a list of common error patterns in design and preventive measures for relevant parties to refer to, or soliciting the local government to develop instruction and guidance measures.

3.3 Integrate the Reasons for Tenders without a Successful Tenderer or Nullified Tenders and the Corresponding Countermeasures

With the consolidated reasons for tenders without a successful tenderer or nullified tenders, we came up with several cruxes of the problem of tenders without a successful tenderer or nullified tenders and attempted to list some viable corresponding countermeasures. Please refer to Figure 5 for the consolidated reasons and corresponding countermeasures.

An unreasonable budget: some specification sheets failing to itemize relevant costs, having unreasonable items, having unreasonable unit prices, or even having unit prices that are omitted, all of which are placed under the “unreasonable budget” category. As such, it is a must to reflect on whether the budgeted unit price and minimum price are reasonable and on par with the latest market rates or the prices documented in the database of public construction costs as well as to check whether a contract has provisions on a reasonable price adjustment mechanism.

The design sketch: improper planning or design, unspecific captions for drawings, some restricted tenders being suspected of contravening the Government Procurement Act, the Building Technical Regulations, or relevant acts and regulations, and other reasons.

Materials and equipment: whether a technical standard or regulation is reasonable, restrictions on competition when material or equipment specifications are made, whether the invitation to tender document requests or mentions a particular trademark or trade name,

patent, design or type, a particular place of origin, manufacturer, or supplier, whether the phrase “or equivalent” is specified, and whether the technical standard or threshold is too high, etc.

The proposed construction schedule: whether the time frame for a contract to be fulfilled is reasonable, whether the proposed construction schedule is too short so that extra costs may be incurred, both of which may affect suppliers’ interest in entering a tendering competition, whether the contents of a contract are specific, and whether a supplier has to bear extra risks, and whether the deadline for receipt of tenders is reasonable.

Other unreasonable situations with the invitation to tender document: improper restrictions on competition and the supplier’s qualifications, whether preferential treatment is given to some suppliers for a valid reason, whether payments are delayed, and whether the price quotes and the conditions for a request of payments are reasonable.

3.4 Interim Summary

By conducting literature review, this study managed to gather existing contributing factors to tenders without a successful tenderer or nullified tenders. Moreover, the real reasons for tenders without a successful tenderer or nullified tenders were obtained through in-depth interviews with actual cases in the past. Additionally, results of the analysis of error patterns were employed to develop corresponding countermeasures to cope with these factors along with an examination checklist. Further, a comprehensive control, management, and coaching module was developed for the tendering process in the future.

IV. Visiting and Giving Instruction and Guidance to the Chosen Cases

After targeting at city and county governments’ construction project tenders that have the highest recorded percentages of ending without a successful tenderer or becoming nullified, this study took the initiative to pay these cases a visit. Further, based on a control, management, and coaching module, this study assisted the contracting authorities to scrutinize the invitation to tender document against an examination checklist to find out whether any item was not up to a standard and patch up the pieces that were initially missing on the invitation to tender document. Special attention was paid to the design sketch or the budget for a contracted out project in the invitation to tender document so as to assist contracting authorities which do not specialize in tendering for construction projects to re-scrutinize the invitation to tender document and confirm whether the requirements for the supplier were clearly specified in the invitation to tender document. Upon the entire contents of an invitation to tender document were scrutinized, the notice of an invitation to tender was advertised. This study also followed up with these cases’ subsequent results to see whether a

contract had been awarded or whether relevant invitation to tender documents were modified for a new tendering process.

Meanwhile, other city and county governments were invited to report the reasons why some construction project tenders with difficulty in contract awarding ended without a successful tenderer or became nullified as well as the situation of subsequent handling. It was found that some contracting authorities did not have a thorough understanding of the reasons for tenders without a successful tenderer or nullified tenders (such as no tenders were submitted by suppliers or less than three suppliers submitted a tender). There were also situations where a notice of invitation to tender was advertised for over six times or even over 10 times yet the contract still had not been awarded, which only encumbered the administrative efficiency. However, the higher authorities had no relevant management, control, and monitoring mechanism in place. Meanwhile, it was found that some contracting authorities for construction project tenders have no construction expertise and did not conduct substantial examination of the design sketch and the invitation to tender document, which only resulted in the issue of substandard design quality.

In terms of the issue of contracting authorities failing to fully understand the causes of tenders without a successful tenderer or nullified tenders, and the issue of higher authorities lacking a system for assistance, management, and inspection, this study suggests that instruction and guidance should be offered to starting an ad hoc group to handle tenders without a successful tenderer or nullified tenders. Alternatively, city and county governments could look into designing relevant instruction and guidance measures, establish a mechanism for the review of the tendering process, assemble and consolidate reports on solutions for tenders without a successful tenderer or nullified tenders as a reference work, possibly give feedback to the design phase and advice on matters that attention to should be paid to, exercise management or control at supervisory meetings or the supervisory and review committee's meetings, or solicit the central government to assist the central administrative authorities to organize guidance and instruction programs, education and training, and promotional seminars.

V. Research Results

This study gave timely assistance, instruction, and guidance to city and county governments' construction project tenders without a successful tenderer or becoming nullified, shortened the time for these initially unsuccessful tenders to be contracted out eventually, enhanced the beneficial results of a construction project, and prevented the happening of a budget impasse as it may affect the economy. In the suggested corresponding countermeasures for tenders without a successful tenderer or nullified tenders, continuous

instruction and guidance should be given to individual cases and assistance should be given to contracting authorities that do not specialize in tendering for construction projects so as to give solutions to tenders without a successful tenderer or nullified tenders. Meanwhile, assistance should be given to the local government to establish a review system for tenders without a successful tenderer or nullified tenders.

5.1 A Decline in the Budget for Tenders without a Successful Tenderer or Nullified Tenders

After giving instruction and guidance to city and county governments' contracting authorities that do not specialize in tendering for construction projects, statistical calculations were performed again. It was found that the budget for tenders without a successful tenderer and nullified tenders dropped from NTD 46.571 billion in 2008 to NTD 19.985 billion in 2012, accounting for 8.35% and 3.74 % of the national budget for 2008 and 2012 respectively. Please refer to Figure 6 - a run chart of the percentages of money involved in tenders without a successful tenderer or nullified tenders to the national budget. Apparently, there has been a decline in the percentages and the amount of money involved in the local government's tenders without a successful tender or nullified tenders. This study's conscientious effort to instruct and guide the local government to develop a management and control mechanism has effectively alleviated the situation of budget impasses in construction projects, curtailed the time that relevant authorities spent on handling tenders without a successful tenderer or nullified tenders, and effectively improved the efficiency of public construction project budget implementation.

5.2 The Curtailed Time Duration and the Times of an Advertised Notice of Invitation to Tender before a Contract is Awarded

This study chose to pay visit and give instruction and guidance to city and county governments' contracting authorities that do not specialize in tendering for construction projects, had the highest percentage of construction project tenders without a successful tenderer or nullified tenders, and those tenders that involved the largest amount of money as documented in the Public Construction Commission's "Public Construction Bidding Management System" since 2008. As a result, this study found that there were tenders without a successful tenderer or becoming nullified for several times yet repeated notices of invitation to tender were advertised without having a thorough understanding of the real reasons and there was no attempt to come up with a solution and countermeasure. Doing so, in turn, only wasted a lot of administrative time. After receiving instruction and guidance, most contracting authorities became able to come up with measures for improvement or self-designed a management and control mechanism and curtailed unnecessary time delay. Please

refer to Table 1- a comparison table of the times of advertising a notice of invitation to tender and the time required for contracting out a tender which previously ended without a successful tenderer or became nullified by the city and county governments that received instruction and guidance. As it turned out, those city and county governments initially had to advertise a notice of innovation to tender for 3.5 times on average in order to contract out a project. After this study's guidance and instruction, the number of times dropped from 3.5 to 1.8 on average. As for the time it took for each contract to be awarded successfully, the time duration was shortened from 82.8 days to 50.5 days. It indicated both the time duration and the times of an advertised notice of invitation to tender before a contract is awarded have been effectively slashed.

The situation of tenders without a successful tenderer or nullified tenders have effectively improved in the city and county governments that received instruction and guidance. Some city and county governments even reinforced the management and control mechanism as well as supervised and guided construction projects that were organized by district offices or city, town, and village offices under these city and county governments' jurisdiction. This may curtail more unnecessary invitation to tender procedures and time and effectively improve the results of government procurement.

VI. Conclusions and Suggestions

6.1 Conclusions

By means of literature review and in-depth interviews, this study found out the contributing factors to tenders without a successful tenderer or nullified tenders and came up with a list of error patterns which were founded in the design sketch and budget for contracted out projects, developed corresponding countermeasures and strategies for improvement, designed an examination checklist, visited and gave instruction and guidance to cases of contracting authorities in several city and county governments, and followed up with the results. After receiving instruction and guidance, some city and county governments came up with strategies for improvement and developed a relevant management and control mechanism. According to statistics, among all cities and counties' contracting authorities' construction project tenders in recent years, there has been a decline in the quantity of tenders without a successful tenderer or nullified tenders and there was less time and money involved too. As a result, the expenses incurred from these unsuccessful tenders have been significantly decreased. According to the results of the error pattern analysis, preventing negligence on an invitation to tender document preemptively has also enhanced the quality of the results of design and planning. Based on results of this study, contracting authorities may prevent possible causes of tenders without a successful tenderer or nullified tenders

preemptively prior to advertising a notice of invitation to tender. Doing so not only speeds up a contract to be smoothly awarded but also curtails expenses by avoiding repeated monetary inputs.

6.2 Suggestions

In order to carry out the entire invitation to tender process smoothly, this study suggests that the concept of risk management should be introduced to the process. In this way, reasons for tenders without a successful tenderer or nullified tenders can be considered as the risk factors that management and control can be based on. Meanwhile, the probability of the risk of tenders without a successful tenderer or nullified tenders should be calculated and included in subsequent management and control to see whether the risk probability can be reduced. After all risk factors are given a clear definition, corresponding strategies for all risk factors should be made clear so that subsequent risk monitoring, management, and control can be carried out by following a risk management process.

In the course of visiting and giving instruction and guidance to the local government's construction project tenders without a successful tenderer or nullified tenders as well as assisting the local government to develop a review system, we discovered a lot of new reasons for setbacks in the tendering process as well as new causes of tenders without a successful tenderer or nullified tenders. We also discovered some generally existing problems such as a substandard quality plan, design, and invitation to tender document. This study suggests that other than continuing to assist the local government to better the review system for tenders without a successful tenderer or nullified tenders, another key point is to improve an invitation to tender document's quality, reinforce management in the planning and design phase, fulfill the promised quality of design stipulated in a contract, and conduct a thorough examination of the design to ensure that the final design products comply with the design code and satisfy the contracting authorities' actual needs. The goal is to improve the quality of planning and design so as to prevent the possibility that improper design in the early phase may affect the quality of subsequent construction or even waste more time and money.