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Zhang, Bing; Le, Yun; Xia, Bo; Skitmore, Martin

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1 **Mixed Perceptions of Business to Government (B2G) *Guanxi* in Tendering** 2 **and Bidding for Infrastructure Projects in China**

3 Bing Zhang¹; Yun Le²; Bo Xia³; and Martin Skitmore⁴

4 **Abstract:** *Guanxi* is the Chinese word for personal relationship or connections. Infrastructure
5 project procurement in China is dominated by the government, and the entire tendering and
6 bidding process is subject to administrative control in which business to government (B2G)
7 *guanxi* is thought to have a significant impact. To date, however, little is known of its impacts
8 and perceptions in infrastructure procurement. This paper aims to bridge this research gap by
9 a questionnaire of 149 contractor and consultants' perceptions of B2G *guanxi* in terms of its
10 importance, mode of establishment and impact on infrastructure bidding in China's eastern
11 coastal cities. The results indicate that over half of the respondents surveyed consider B2G
12 *guanxi* has important benefits for current practice while others hold different perceptions.
13 Four groups of perspectives are identified by K-means cluster analysis, ranging from a
14 low/moderate perception of B2G *guanxi* (48%) to passive-high/positive-high (52%). A
15 chi-square test suggests the differences between groups to be attributable to the types of
16 organization involved, with contractors and quantity surveying consultant organizations
17 placing significantly more emphasis on the benefits and establishment of B2G *guanxi*. Finally,
18 the current informal tendering and bidding processes in China are questioned as a
19 contributing factor and suggestions made for increased government and legislative
20 intervention leading to a greater emphasis by bidders on improving their technical and
21 management capacity in order to develop their competitive advantage in the market.

22 **Key words:** infrastructure projects, contractors, consultants, tendering and bidding, B2G
23 *guanxi*, cluster analysis.

¹ Post-Doctor, Research Institute of Complex Engineering and Management, School of Economics and Management, Tongji Univ., 200092; and Lecturer, College of Civil Science and Engineering, Yangzhou Univ., Yangzhou 225127, China, China. E-mail: 83zhangbing@tongji.edu.cn; glzhangbing@126.com

² Professor and Head of Dept. of Construction Management and Real Estate, Associate Director of Research Institute of Complex Engineering and Management, School of Economics and Management, Tongji Univ., Shanghai, China (corresponding author). E-mail: leyun@tongji.edu.cn

³ Senior Lecturer, School of Civil Engineering and Built Environment, Queensland Univ. Of Technology, Garden Point Campus, 2 George St., Brisbane, QLD 4001, Australia. E-mail: paul.xia@qut.edu.au

⁴ Guest Professor, Dept. of Construction Management and Real Estate, School of Economics and Management, Tongji Univ., Shanghai, China; and Professor, School of Civil Engineering and Built Environment, Queensland University. of Technology (QUT), Brisbane, Australia. E-mail: rm.skitmore@qut.edu.au

24 **INTRODUCTION**

25

26 Infrastructure investment in China currently accounts for 8.5 percent of its gross domestic
27 product (GDP) (Dobbs et al., 2013). During the *Twelfth Five-Year Plan* (2011-2015), the total
28 infrastructure investment was over Chinese Yuan Renminbi (CNY) 31 trillion (equivalent to
29 US\$ 4.79 trillion at April 2016), which is an increase of 1.44 times compared with the
30 *Eleventh Five-Year Plan* (2006-2010) (Xinhua Net 2012; Jiang and Zeng 2012). With the
31 rapid development of the infrastructure industry, the number of construction companies in
32 China increased rapidly to 81,141 nationally by 2014 (National Bureau of Statistics 2015).

33 The growth of the infrastructure market has led to fierce competition between architectural,
34 engineering and construction (AEC) firms (Li and Ling 2012). Considering most
35 infrastructure projects are funded by the government or government agencies, the informal
36 relationship or ties between business managers with government officials, in the form of
37 Business to Government (B2G) *guanxi* (Bu and Roy 2015; Qin and Deng 2016), is ranked as
38 one of the most important factors for their survival and expansion (Fang et al. 2004; Lu et al.
39 2008a). As a result, although not all successful bidders need B2G *guanxi*, it is widespread in
40 China, and its use in obtaining infrastructure projects has become an implicit necessity. As is
41 commonly said, ‘no B2G *guanxi*, no project contracts’.

42 Overall, B2G *guanxi* is a complex social construct with mixed perceptions. For one thing,
43 B2G *guanxi* provides a “lubricant” (Gold and Guthrie 2002; Hui and Graen 1998; Standifird
44 and Marshall 2000) that helps businessmen conduct operations to get through life - even
45 called “*guanxi* capitalism” (Lu et al. 2008b). As a result, many construction participants
46 believe that B2G *guanxi* is vital in the tendering and bidding process involved in
47 infrastructure projects (Zhang and Song 2013). For another, due to its generally private nature,
48 B2G *guanxi* has a notorious reputation in China, as it is often associated with the unethical
49 abuse of authority to obtain benefits. Consequently, B2G *guanxi* has a negative, as well as
50 positive influence, and different people have different opinions of their nature and extent
51 (Zhuang et al. 2008).

52 Thus, conducting tendering and bidding for infrastructure projects in China is different from
53 the west, especially considering the underdeveloped nature of legal institutions in China.
54 Therefore, B2G *guanxi* should not just be treated as a single phenomenon simply adjudged by
55 western standards. Nevertheless, due to lack of documented records, its role and people's
56 perceptions remain largely unknown to date. In response, this paper focuses on
57 relationship-related matters with government officials in China and aims to provide a
58 thorough understanding of bidders' attitudes toward B2G *guanxi* in the tendering and bidding
59 process of infrastructure projects. The findings reveal the different perceptions of different
60 parties to B2G *guanxi*, which help in understanding its mechanism in relation to the tendering
61 and bidding law in China and identifying future improvements.

62 **LITERATURE REVIEW**

63 *Guanxi* is a very ancient tradition embedded in the Confucian concept of life in China (Zhang
64 and Zhang 2006). It is an informal personal contact that is unique in Chinese society
65 (Standifird and Marshall 2000), its essence being a set of interpersonal connections
66 facilitating the exchange of favors between people (Bian 1997). *Guanxi* plays an important
67 role in Chinese society (Lin and Ho 2010), with beneficial effects on business (Hwang et al.
68 2009). It is identified as one of the most important success factors in doing business in China,
69 and regarded as a source of sustainable competitive advantage (Fan 2002a). As a
70 consequence, business people in China strive to establish business *guanxi* with potential
71 business partners knowing that business transactions will follow (Hwang et al. 2009).

72 Business *guanxi* can be generally classified into Business to Business (B2B) *guanxi* and
73 Business to Government (B2G) *guanxi* (Peng and Luo 2000). Compared with B2B *guanxi*,
74 B2G *guanxi* has attracted widespread public attention and is regarded as a key determinant of
75 business success in China (Luo 2007; Ren et al. 2009). According to the resource-based view,
76 it is also regarded as a relationship-special asset (Qin and Deng 2016), with some researchers
77 believing that it can provide a comparative advantage. As a result, B2G *guanxi* can help firms
78 generate larger monopoly rents, institutional exemptions, resource privileges, etc. (Luo et al.
79 2012). Furthermore, these financial-based benefits to firms from B2G *guanxi* can improve
80 economic and operational outcomes (Chen et al. 2015), making B2G *guanxi* one of the most

81 powerful regulators in the Chinese economy. In this way, business managers can increase
82 predictability in business deals, thwart the advances of business rivals, gain access to public
83 projects and pre-empt the high costs of arbitration (Li et al. 2011). In short, with the long
84 tradition in China referred to as rule by man instead of rule by law, having good B2G *guanxi*
85 is inevitably of vital importance (Fan 2002a; Qin and Deng 2016).

86 At the same time, however, the somewhat covert operation of B2G *guanxi* can make it of
87 dubious legal and ethical status. Because of government officials' control on massive
88 resources and the lack of formal institutions (Qin and Deng 2016), business people have to
89 cultivate and maintain close ties with Government officials in China (Hwang et al. 2009),
90 which requires a significant investment in effort, time and money (Fock and Woo 1998; Luo
91 and Chen 1997; Park and Luo 2001; Wang 2007). As a result, business managers make gifts
92 to government officials to establish B2G *guanxi* (Qin and Deng 2016) and invest effort into
93 people who can have an important influence on their business (Seligman 1999). Thus B2G
94 *guanxi* has been classified into rent-seeking and utilitarian relationships, and many Chinese
95 considering it a defensible practice to passively mitigate the risks of market uncertainty albeit
96 by unethical or related to unethical behaviors (Beckman et al. 2004; Fan 2002a).

97 B2G *guanxi* exists in all aspects of business, including the creation and approval of projects,
98 exporters, importers, fines and taxes, etc. (Warren et al. 2004), and the cultivation and
99 maintenance of B2G *guanxi* is an integral part of doing business, especially in the tendering
100 and bidding process of infrastructure projects (Tsang 1998), where it has long been
101 recognized as one of the major factors for success. The development and maintenance of B2G
102 *guanxi* has become a priority for many construction companies and their managers (Zhang et
103 al. 2017) to prevent risks in winning projects and enable smooth transactions (Hwang and
104 Blair Staley 2005; Luo et al. 2012; Warren et al. 2004; Yen et al. 2011). Hence B2G plays an
105 important role in the bidding and tendering process of infrastructure projects (Fan 2002a),
106 Ren (2012) even claims that B2G *guanxi* has become an unwritten rule for winning projects.

107 Overall, an extensive literature indicates a remarkable divide in perceptions. However, some
108 believe B2G *guanxi* should be viewed as a *panacea* as it is rooted in the traditional attitudes,
109 beliefs and values of Chinese society, while others consider its influence may be reduced with

110 the development of a market economy (Fan 2002a; Fan 2002b). As there is a lack of studies
111 examining B2G *guanxi* in the construction industry in China, especially in tendering and
112 bidding for infrastructure projects, a more detailed account is needed to fully understand its
113 influence and classification (Zhang et al. 2015). In response, this study aims to bridge the
114 research gap by deepening the understanding of B2G *guanxi* through a questionnaire of its
115 perceptions by people most concerned with the tendering and bidding processes involved in
116 infrastructure projects in China.

117 **RESEARCH METHODS**

118 The focus of this paper is on understanding bidders' perceptions of B2G *guanxi* in tendering
119 and bidding for infrastructure projects. To this end, a combination of qualitative and
120 quantitative approaches was employed, including semi-structured interviews and
121 questionnaire (Heinen 2010; Tan and Snell 2002). The research process consisted of four
122 steps. First, a thorough literature review was conducted aimed at identifying a list of potential
123 measures. Second, semi-structured in-depth interviews were engaged to collect opinion-based
124 data from target respondents having sufficient tendering and bidding knowledge, and
125 extensive hands-on experience of infrastructure projects, which could be refined and
126 developed into questionnaire measurement items. Third, a questionnaire was conducted to
127 solicit both contractors and consultant views and experiences. Finally, both cluster analysis
128 and a chi-square test was used to analyze the questionnaire data.

129 **Semi-structured Interviews**

130 The open nature of the semi-structured interview allows the introduction of new ideas
131 (Horton et al. 2004; Rose 1994), which is needed for the study due to the lack of guidance
132 and data in the existing literature. Semi-structured interviews were conducted with
133 experienced construction infrastructure bidders including consultants, i.e. architects,
134 engineers, project managers and supervisors, who all have to bid for public work in China, to
135 identify the measures needed. At the beginning of each interview, the interviewees were
136 provided with prepared briefing questions and findings from the literature review. Then they
137 were asked to identify suitable measures based on their knowledge and experience. After the

138 interviews were completed, content analysis was used to identify all the key points and the
139 main ideas that had emerged. Similar points were assembled, rephrased and then categorized
140 based on different themes.

141 The interviews were conducted with 9 interviewees comprising CEOs, vice CEOs and project
142 managers (see Table 1). All these hold senior positions, have more than 10 years working
143 experience and have been involved in more than 3 infrastructure projects in the past 5 years.
144 The reason for the combination of experts from different positions was to provide balanced
145 views and obtain a range of insights into B2G *guanxi*.

146 Please insert Table <1> here

147 Finally, a total of 10 items were identified to measure opinions of B2G *guanxi* in terms of its
148 importance, mode of establishment and impact on bidding. These formed the basis of the
149 questionnaire.

150 **Questionnaire Survey**

151 Questionnaire is widely used to collect professional views in construction management and
152 *guanxi* research (Deng et al. 2014; Lin 2011; Shan et al. 2015). The questionnaire comprises
153 two parts. Part one contains questions regarding personal profiles while part two contains
154 questions aimed at eliciting the respondents' perceptions of B2G *guanxi*. Respondents were
155 asked to evaluate their perceptions on a Likert scale, ranging from 1 (fully disagree) to 7
156 (fully agree).

157 To maximize the number of respondents, candidates were selected with the assistance of the
158 Shanghai Construction Consultants Association and Tongji University's Research Institute of
159 Complex Engineering and Management, both of which have extensive contacts with a variety
160 of construction enterprises. In order to ensure the reliability of the results, the target
161 respondents were those that had been involved in the tendering and bidding activities (for
162 construction or consultant work) for a number of infrastructure projects for at least the past
163 three years. All respondents were treated as anonymous.

164 A total of 211 questionnaires were distributed by e-mail and on-site distribution and 183 were

165 returned. Of these, 34 were discarded due to incomplete information or obvious
166 contradictions (Fang et al. 2006). The remaining 149 valid responses, representing a very
167 satisfactory response rate of 71%, were used for the analysis.

168 **QUESTIONNAIRE RESULTS AND DATA ANALYSIS**

169 Table 2 provides the detailed and summarized information of the respondents' background
170 and profiles. All respondents are working for contractor or consultant organizations and are
171 actively involved in tendering and bidding for public infrastructure projects. All are from five
172 big cities of east coast China, comprising Shanghai, Jinan, Hangzhou, Wuxi and Yangzhou,
173 where there are many infrastructure projects under construction. In addition, more than 70
174 percent of the respondents have more than five years' experience in the construction industry,
175 nearly 40 percent hold senior positions and 90 percent have a college degree or above. This
176 represents a reasonable cross-section of qualified respondents for a perception study of this
177 nature.

178 Please insert Table <2> here

179 Statistical analysis is used to provide descriptive statistics of the respondent's perception of
180 B2G *guanxi* and reveal any distinct groups of respondents providing similar answers. This
181 involves the use of cluster analysis – a method for grouping a set of objects in such a way that
182 objects in the same group are more similar to each other than to those in other groups.

183 Typically, reliability analysis is the first step with questionnaire data. Likert-scale data are
184 often averaged in order to obtain an overall subscale score, and working with overall subscale
185 scores assume that each item of the scale measures the underlying attribute to a similar extent
186 (Lust et al. 2013). The reliability analysis in this case refers to the stability and reliability of
187 the data, which is to test the extent to which multiple measurements of the same item are
188 consistent. This provides a Cronbach alpha (α) of 0.890 which, being larger than 0.6,
189 indicates that the whole questionnaire data are sufficiently reliable (Carmines and Zeller
190 1979).

191 The mean values of each question response are shown in Table 3. The scores are all larger
192 than 4.0, which indicates the importance of B2G *guanxi* for business and the positive role of
193 B2G *guanxi* in tendering and bidding. In particular, Q1 (*Having good B2G guanxi is*
194 *important*), Q3 (*Having B2G guanxi makes tendering and bidding activities easier*) and Q4
195 (*Having B2G guanxi can avoid risks*) have the highest average values of all the questions,
196 indicating the general importance of B2G *guanxi* in the construction industry.

197 Please insert Table <3> here

198 **Cluster Analysis of B2G *Guanxi* Perceptions**

199 Existing research suggests that it is possible to distinguish different types of *guanxi* (Fan
200 2002b) and a more detailed classification is necessary for a better understanding B2G *guanxi*
201 (Zhang et al. 2015); thus this study classifies B2G *guanxi* by K-means cluster analysis.
202 K-means cluster analysis is a popular data clustering algorithm that can be run separately
203 specifying k-cluster solutions in identifying significant differences between clusters with
204 respect to the clustering variables for selecting the appropriate number of clusters (Lord et al.
205 2015).

206 Of the several measures available for selecting the number of clusters, *k* is chosen to be
207 pre-specified within a range from 3 to 4 according to Farh et al. (1998), and the appropriate
208 number of clusters is found from the data (Pham et al. 2005). The result is shown in Table 4,
209 which indicates a four-group solution, with the ANOVA test showing that there are
210 statistically significant differences ($p < 0.05$) between the clusters. Table 5 shows the number
211 of cases (respondents) within each cluster.

212 Please insert Table <4> here

213 Please insert Table <5> here

214 According to the cluster center values in Table 4, four mixed perceptions including both
215 passive and positive aspects are identified, comprising low perception of B2G *guanxi*,
216 moderate perception of B2G *guanxi*, passive-high perception of B2G *guanxi* and
217 positive-high perception of B2G *guanxi* respectively. Of these, almost 48% is accounted for

218 by the low/moderate perception, and 52% is accounted for by the passive-high and
219 positive-high perception of B2G *guanxi*.

220 The low perception cluster of B2G *guanxi*, accounting for 4.7% of the total sample, indicates
221 that these respondents have a low-level recognition of B2G *guanxi*. They do not believe that
222 B2G *guanxi* is very important in their business activities in avoiding business risk or
223 promoting business development. Thus, they do not invest time and effort in establishing
224 B2G *guanxi* either through government officials' family members, their friends or in other
225 ways. The respondents of this cluster pointed out that there is a limited effect of B2G *guanxi*
226 on winning project contracts. Instead, winning contracts depends more on company capacity.

227 The cluster of moderate perception of B2G *guanxi* is the most common, containing 43.6% of
228 the respondents, indicates that these respondents recognize the importance of B2G *guanxi* for
229 infrastructure business. They believe that people should pay more attention to *guanxi*
230 especially B2G *guanxi*, because it is a part of the Chinese traditional culture. They prefer to
231 establish and maintain B2G *guanxi* in the process of working together with government
232 officials. Nevertheless, although they believe that B2G *guanxi* is important, they do not
233 perceive B2G *guanxi* as a decisive factor for success in tendering and bidding.

234 Both the passive-high and positive-high clusters of B2G *guanxi* perception show that those
235 respondents think highly of B2G *guanxi* in the infrastructure construction industry. Compared
236 with other factors such as technology capabilities, B2G *guanxi* is more prominent in
237 tendering and bidding process and has become a vital source of social capital that can be
238 accessed when there is a need for help and support. In addition, respondents in these two
239 cluster groups consider that B2G *guanxi* is almost the most important factor. They even
240 believe that bidding results are determined by the government officials in advance and that
241 the process of tendering and bidding activities is just a mere formality. Thus, B2G *guanxi*
242 becomes the tool for winning the contract and is regarded as a strategic mechanism to
243 overcome disadvantages. The difference between the passive-high and positive-high cluster
244 lies in the means of establishing *guanxi*. Unlike the passive-high cluster, respondents in the
245 positive-high cluster strongly agree in establishing B2G *guanxi* through government officials'
246 family and friends, intermediaries and working together with officials on infrastructure

247 projects.

248 **Comparison of different clusters**

249 Chi-square tests examine whether the distribution of clusters (perceptions) is affected by the
250 respondent's profile. As some cells have less than 5 observations, the appropriate method of
251 analysis is Fisher's Exact Test, as this can be used when sample sizes are small (Fisher, 1954).

252 Please insert Table <6> here

253 As Table 6 indicates, there are no statistically significant differences between clusters
254 according to respondents' working experience, position or education. In other words,
255 respondents with different experience levels, positions and education backgrounds have
256 similar opinions across all four clusters.

257 However, the organizations of the respondents significantly affect the result. As shown in
258 Table 6, the majority of respondents from contractors belong to cluster 4, which strongly
259 agrees with the importance and impact of B2G *guanxi*, while most respondents from
260 supervision companies are in cluster 2 (i.e. important but not essential). In short, project
261 management and supervisor consultants are more likely to have low to moderate perception
262 of B2G *guanxi* while contractors and quantity surveyors have a high perception of B2G
263 *guanxi*. This is understandable given the industry variance and severe competition in the
264 construction market of the infrastructure industry.

265 Compared with construction and quantity surveying, supervision and project management
266 organizations have only come into existence since 1988 and 2003 respectively. In general,
267 their personnel have rich construction project management experience and knowledge. There
268 are only 14,210 companies in the two types of organizations, which rely very much on their
269 reputation and capacity to win infrastructure projects, while the number of companies in
270 construction and quantity surveying organizations is almost 420,000 (National Bureau of
271 Statistics 2015). At the same time, establishing these organizations is comparatively easy.
272 Under these circumstances, in addition to improving their management capacity and technical
273 ability, relying on B2G *guanxi* to win infrastructure projects is one of the effective ways for a
274 firm's survival and development. Furthermore, due to overly severe competition in tendering

275 and bidding, construction and consultant organizations have to invest significantly in B2G
276 *guanxi* in terms of gifts, entertainment, etc. For example, it is reported that the five largest
277 construction companies spent CNY 2.23 billion (US\$ 350 million) in establishing and
278 maintaining B2G *guanxi* in 2012 (Ye and Zhou 2013). One respondent even pointed out that,
279 because of the competition, companies trying to win a CNY 100 million infrastructure project,
280 cannot succeed without spending more than CNY 7 to 8 million on B2G *guanxi*.

281 **CONCLUSIONS**

282 In China, infrastructure procurement according to the national tendering and bidding law was
283 enacted only as recently as 2000. Informal institutions such as B2G *guanxi* still play an
284 important role in tendering and bidding activities as well as laws and other formal institutions.
285 Some even claim that B2G *guanxi* is still the quickest way to win infrastructure projects even
286 with the increasing robustness of the Chinese legal system. However, despite the ample
287 literature relating to B2G *guanxi*, little is known about infrastructure bidders' perceptions of
288 B2G *guanxi*. The focal point of this paper is therefore to understand and compare these
289 different perceptions.

290 The findings indicate that bidders generally recognize the importance of B2G *guanxi* for their
291 business and the positive role of B2G *guanxi* in tendering and bidding. In particular, they
292 strongly agree that having good B2G *guanxi* is important, making tendering and bidding
293 easier and helping avoid risks. Additionally, the perception of B2G *guanxi* can be classified
294 into four clusters, ranging from the low to positive-high, with 52% of respondents belonging
295 to the passive-high and positive-high clusters. Finally, it is shown that, compared with project
296 management and supervision consultants, contractors and quantity surveying organizations
297 place significantly more emphasis on the importance of B2G *guanxi* in bidding and tendering
298 and working hard to establish B2G *guanxi*.

299 The research findings have a number of implications. First, the higher emphasis on the
300 importance of B2G *guanxi* by the contractor and quantity surveying respondents suggest that
301 the different perceptions of B2G *guanxi* between different organizations are mainly due to the
302 amount of competition involved and industry development level, especially the quality of
303 professional personnel. Second, given that the tendering and bidding laws have yet to be

304 effectively implemented, B2G *guanxi*, as social capital, is a substitute for formal tendering
305 and bidding institutional support, and resorting to B2G *guanxi* to win infrastructure instead of
306 improving the core competitiveness of companies is an effective solution for companies to
307 survive. Third, B2G *guanxi* is not just a mere value attitude; it reveals the complex
308 relationship between government officials and business managers.

309 Meanwhile, B2G *guanxi* may cause companies to overly concentrate on establishing and
310 maintaining B2G *guanxi* at the expense of paying attention to improving their core
311 competitiveness. This situation can be rectified through the cultivation of a fairer competitive
312 environment. Future research tracking such changes in infrastructure tendering and bidding
313 would help support this process.

314

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320

321

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Table 1. Background of interview experts

Experts	Organization	Position	Years of experience
A	Contractor	CEO	23
B	Consultant	CEO	17
C	Contractor	Vice CEO	11
D	Contractor	Vice CEO	13
E	Consultant	Vice CEO	12
F	Contractor	Project Manager	10
G	Contractor	Project Manager	36
H	Consultant	Project Manager	25
I	Consultant	Project Manager	11

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Table 2. Demographic Profile of Respondents

Profile	Categories	Frequency	Percent (%)
Experience	1-5 years	40	27.3
	5-10 years	48	32.0
	10-15 years	31	20.7
	Over 15 years	30	20.0
Position	Staff	91	61.3
	Project manager level	36	24.0
	Department manager level	11	6.7
	Top manager level	11	8.0
Education	High school or below	15	10.0
	Junior college	43	30.0
	Bachelor's degree	60	40.0
	Master's degree or over	31	20.0
Organization	Contractor	33	23.3
	Quantity surveying	14	9.3
	Supervision	43	28.7
	Project management	59	39.3

Table 3. Summary statistics of each item

Dimension	Question	Mean	Std. Deviation
Importance	Q1 Having good B2G <i>guanxi</i> is important	5.872	1.264
	Q2 Investing to establish and sustain B2G <i>guanxi</i> is worthwhile	5.436	1.337
	Q3 Having B2G <i>guanxi</i> makes business easier	5.779	1.251
	Q4 Having B2G <i>guanxi</i> can avoid risks	5.564	1.204
Mode of establishment	Q5 Establishing <i>guanxi</i> through government officials' family and good friends	4.987	1.236
	Q6 Establishing <i>guanxi</i> through working together on infrastructure projects	5.557	1.042
	Q7 Establishing <i>guanxi</i> through an intermediary	4.933	1.417
Impact on bidding	Q8 Determining whether or not to bid	4.919	1.383
	Q9 Obtaining bidding opportunities mainly because of the B2G <i>guanxi</i>	5.054	1.283
	Q10 It is important to cultivate and operate B2G <i>guanxi</i> in the tendering and bidding process	5.463	1.177
Cronbach's $\alpha=0.890$			

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Table 4. Final Cluster Centers and ANOVA

Question Items	Cluster				ANOVA	
	1	2	3	4	F ^b	Sig.
Q1 Having good B2G <i>guanxi</i> is important	2.00	5.35	6.63	6.67	124.78	0.00**
Q2 Investing to establish and sustain B2G <i>guanxi</i> is worthwhile	2.29	4.88	5.94	6.26	50.68	0.00**
Q3 Having B2G <i>guanxi</i> makes business easier	2.14	5.28	6.31	6.59	95.12	0.00**
Q4 Having B2G <i>guanxi</i> can avoid risks	2.43	5.17	6.13	6.20	49.32	0.00**
Q5 Establishing <i>guanxi</i> through government officials' family and good friends	3.14	4.95	3.38	5.66	33.64	0.00**
Q6 Establishing <i>guanxi</i> through working together on infrastructure projects	4.57	5.32	4.44	6.21	26.31	0.00**
Q7 Establishing <i>guanxi</i> through an intermediary	3.43	5.03	2.56	5.62	40.42	0.00**
Q8 Determining whether or not to bid	1.86	4.45	5.19	5.70	35.06	0.00**
Q9 Obtaining bidding opportunities mainly because of the B2G <i>guanxi</i>	1.71	4.75	5.13	5.74	41.50	0.00**
Q10 It is important to cultivate and operate B2G <i>guanxi</i> in the tendering and bidding process	2.57	5.11	5.50	6.16	43.16	0.00**

460 **Significant at 99% level

461 b. F means the value of variation between sample means divided by variation within the samples

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Table 5. Number of respondents in each cluster

Cluster	Number	Percent
1	7	4.70%
2	65	43.62%
3	16	10.74%
4	61	40.94%
total	149	100.00%

Table 6. Comparison of clusters distribution

Profile	Categories	Cluster				Fisher's Exact Test	
		1	2	3	4	Value	Sig.
Experience	1-5 years	1	17	5	17	10.005	0.319
	5-10 years	1	21	6	20		
	10-15 years	1	14	5	11		
	Over 15 years	4	13	-	13		
Position	Staff	2	43	11	35	9.672	0.299
	Project manager	2	14	5	15		
	Department manager	1	5	-	5		
	Top manager	2	3	-	6		
Education	High school or below	-	8	-	7	12.164	0.160
	Junior college	3	25	4	11		
	Bachelor's degree	3	20	10	27		
	Master's degree or over	1	12	2	16		
Organization	Contractor	-	9	6	18	27.425	0.000**
	Quantity surveying	1	4	1	8		
	Supervision	-	31	1	11		
	Project management	6	21	8	24		

466 **Significant at 99% level

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