

19 factor analysis, namely; knowledge limitation, operational and governance-related barriers,
20 coordinating difficulties, system and cultural barriers, and interface-oriented and outlook barriers.
21 This study contributes to deepening the understanding of barriers to ICJVs success and helping
22 ICJVs' front liners (i.e., top team managers) and policymakers in developing suitable measures
23 and policies to ensure successful implementation of ICJVs. It could also direct researchers toward
24 examining the influences of these barriers on ICJVs overall performance goals to devise clear-cut
25 frameworks, seeking their successful implementation in the future.

26 **Keywords:** International construction joint ventures; International joint ventures; Barriers;
27 Sustainable development; Construction industry

28 **Introduction**

29 International construction joint ventures (ICJVs) are a form of hybrid collaborative contracting,
30 created for undertaken Architectural Engineering and Construction (AEC) projects within a
31 location distinct from where at least one partner's headquarter is situated (Ozorhon et al. 2008a;
32 Hong and Chan, 2014). Interpreted from a range of theoretical perspectives, including resource
33 dependency, transaction cost, organizational learning, strategic positioning, etc., diversified
34 motivations drive ICJVs adoption. Thus, both developed and developing countries have profited
35 and are continuously benefiting from this hybrid collaboration arrangement (Ozorhon et al. 2007a;
36 Chan et al. 2020). Without ICJVs, numerous technically complex projects or large-scale
37 infrastructure projects worldwide would not have been successful (Tetteh and Chan, 2019).
38 Typical examples include the channel tunnel between the United Kingdom and France, the
39 expressway system in Bangkok, the Taiwan high-speed railway, the Three Gorges Dam in China,
40 and the Hong Kong-Zhuhai-Macau Bridge (Girmscheid and Brockmann, 2010; Liang et al. 2019).

41 While there are examples where ICJV has been successfully implemented, equally there are
42 cases where it has not been able to deliver as expected and failed. This is attributed to the complex
43 inter-organizational relationships, cultural and environmental complicatedness, and technical traits
44 that characterize ICJVs (Ozorhon et al. 2008a). Tetteh et al. (2019) attribute ICJVs success to
45 achieving their overall performance goals (i.e., perceived satisfaction – partners overall
46 satisfaction with ICJV performance; partner/company performance – the extent to which pre-set
47 organizational objectives are realized; project-based performance – the extent to which
48 predetermined project goals are achieved; socio-environmental performance – the extent to which
49 social and environmental performance of the ICJV has been realized; and performance of the ICJV
50 management – the extent of having control power in ICJV operation). Whereas there are several
51 studies on the possible risk factors influencing ICJVs success (Bing et al. 1999; Hwang et al. 2017),
52 few studies have directly or indirectly highlighted some potential problems, issues, and challenges
53 impeding ICJVs success (Alashwal and Ann, 2019; Lu et al. 2020). Besides, these studies were
54 conducted with some limitations. First, there is a lack of thorough review or empirical examination
55 on barriers to ICJVs success as a stand-alone concept and their criticality in ICJVs implementation.
56 A better and deeper understanding of the barriers is crucial for the development of holistic and
57 integrated strategies and robust action plans for successful future implementation. Second, these
58 studies neglected the fact that different types of barriers may have different criticality rates yet are
59 not isolated, but rather form multifaceted correlations in impeding ICJVs success. Thus, failing to
60 examine the interrelationships between the barriers means failure to identify the high-priority
61 barriers and develop suitable strategies to successfully implement ICJVs. Third, while there exist
62 homogeneities of barriers to ICJVs success, yet diverse criticalities in different locations, there
63 should be variations in the developments of action plans and analyzing the criticality of barriers to

64 ICJVs success from the standpoints of global experts representing both developed and developing
65 countries remains a significant missing view that is worth investigating. Thus, conclusions drawn
66 would contribute to the development of a more holistic approach in eliminating those barriers in
67 homogenous locations.

68 To address these limitations, this study aims to investigate the critical barriers to ICJVs success
69 from an international perspective. The survey was conducted to gather and analyze experts' views
70 from various countries and jurisdictions around the world by comparing their views on a contextual
71 comparative basis (i.e., developed and developing countries) to establish a common set of critical
72 barriers to ICJVs success. Barriers in this study represent potential factors known to occur and
73 with solely negative influence on ICJVs implementation. Thus, they are known with more
74 certainties and require immediate management response. It is also defined to include challenges,
75 difficulties, problems, obstacles, and issues impeding ICJVs success. The outcome of this research
76 is a comprehensive list of possible barriers to ICJVs success, whose significance is ascertained in
77 the empirical analysis. This study not only contributes to deepening the understanding of barriers
78 to ICJVs success but also important to ICJVs' front liners (e.g., top team managers) and
79 policymakers in developing strategic measures and policies to ensure successful implementation
80 of ICJVs. It could also direct researchers to conduct further empirical studies toward investigating
81 the influences of barriers on ICJVs overall performance goals to devise clear-cut frameworks,
82 seeking their successful implementation in the future.

83 **Barriers to ICJVs Success: Literature Review**

84 In practice, ICJVs are always not free of uncertainties and challenges despite their myriad benefits
85 and opportunities. As the most widely explored area in ICJV studies, many researchers have
86 published papers summarizing these complications as risks for convenience sake (Bing et al. 1999;

87 Zhao et al. 2013) few studies have pointedly outlined some potential problems, challenges, issues,
88 and obstacles to ICJVs success (hereafter, barriers). A comprehensive literature review of mostly
89 peer-reviewed articles enabled the identification of 36 potential factors impeding ICJVs success
90 as shown in Table 1. Among the factors, loss of management control, conflicting
91 interest/competing objectives, language barrier, incomplete contract terms with a partner, etc., are
92 well documented in prior research, and more applicable. Thus, this set of barriers factors have
93 received relatively considerable attention in previous studies around the world. According to Chan
94 et al. (2017), experts can respond well when they are familiar with the factors. The literature review
95 indicates that these barriers can be categorized into six main groups: lack of expertise and
96 confidence; lack of effective planning and suitable strategies; inter-organizational differences; lack
97 of experiential knowledge of ICJV's fundamentals, management difficulties, and conflicts among
98 entities. A careful analysis of the literature shows that barriers within each category are interrelated
99 or a barrier in one category can influence a barrier in the other, and vice versa. For example, poor
100 relationship management may create friction within both the internal and external ICJV teams, and
101 in turn, reduce the mutual commitment level of partners (Panibratov, 2016). Fig 1 shows the
102 conceptual framework for barriers to ICJVs success. These clusters share a similar ideological
103 concept with Hong (2014). They are discussed in the following subsections.

104 ***Lack of Expertise and Confidence***

105 The complex nature of large-scale infrastructure projects and the duration precision makes it very
106 difficult to select the most suitable ICJV partner (Chan and Suen, 2005). Meanwhile, the
107 capabilities of the parties involved play a significant role in completing the project successfully
108 and building stronger ties. Several studies have demonstrated that inappropriate selection of a joint
109 venture contractor (JVC) significantly impairs chances for the operation's survival (McIntosh and

110 McCabe, 2003; Liang et al. 2019). Zhao et al. (2013) reported that forming an ICJV with a
111 company lacking managerial expertise and confidence greatly impact ICJVs success. Because
112 large-scale infrastructure projects and the venture contract system normally bring trouble to the
113 entire construction process, it is, therefore, relevant to ensure that all parties to the venture are
114 competent and technically trained to effectively handle the complexities involved in the project
115 and the contract system. Other critical barriers include fear of legal action, lack of confidence about
116 experience and knowledge, etc.

117 ***Lack of Effective Planning and Suitable Strategies***

118 The drive of ICJVs toward achieving their set goals and objectives is through effective planning
119 and vice versa (Lee and Do, 2015). The project-based nature of ICJVs means time limitation. Thus,
120 there is a need for adequate planning and deliberations even at the pre-conception stage of the
121 venture-formation (Hung et al. 2002). Prior studies have recorded that lack of effective project
122 planning and budgeting significantly impede ICJVs success (Walker and Johannes, 2003). Shen et
123 al. (2001) confirmed this barrier as one of the difficulties facing Sino-foreign CJVs in China. Lee
124 and Do (2015) emphasized that the failure to carefully analyze international joint venture (IJV)
125 projects using appropriate protocols have caused completed and current ICJVs project failure.

126 ***Inter-organizational Differences***

127 The difficulties that ICJVs faces often find their genesis in the differences between parties involved
128 in location customs and legal requirements (Gunhan and Arditi, 2005). The lack of understanding
129 of the host country's statutory requirement and language frailty weakens the contractual regulations
130 and creates serious problems for the contract objectives from the inception. Therefore, it's seen as
131 a major barrier to the cause of failure in ICJVs (Ozorhon et al. 2008a). Complicated problems
132 occasioned by organizational cultures, differing policies and procedures among entities, and social

133 sense of superiority are among other factors that are known to impede ICJVs success. Ozorhon et
134 al. (2008a) found a strong correlation between organizational cultures and ICJVs success.
135 Likewise, Sridharan (1995) identified that cultural impact on JV organization is implicit and
136 manifests its presence through conflicts in a clash of cultures. Thus, the wider the cultural gap, the
137 more difficult it will be to create the necessary cohesion (Gale and Luo, 2004).

138 ***Lack of Experiential Knowledge of ICJV's Fundamentals***

139 It is well acknowledged in the literature that ICJVs are always successful when the fundamentals
140 of their administrative structures are right (Ozorhon et al. 2008b). Thus, the lack of understanding
141 and without knowing the ICJVs' administrative structures in areas such as communication,
142 contract terms, coordination, etc. often impede ICJVs success (Prasitsom and Likhitruangsilp,
143 2015). Sometimes, merely out of the intention of participating in a construction project, due to
144 time limitation leads to the ICJV parties not fully evaluating and understanding how well an ICJV
145 should be operated in a desirable manner, which results in their failure. The dearth of basic
146 knowledge of the essential terms of and key functions for the operation of ICJVs limits the
147 effectiveness of the parties to fulfill the overall goal of the ICJV.

148 ***Management Difficulties***

149 As one of the topical barriers affecting this hybrid arrangement, management difficulties, have
150 caused many ICJVs projects to fail (Girmscheid and Brockmann, 2010). The provenance of this
151 barrier is from the complex structures involving at least two partner firms commonly of different
152 cultures, either as competitors or as collaborators (Ozorhon et al. 2008b). Most often, there is a
153 boundless pressure on the parties to make rapid decisions following the project-based nature of
154 ICJV operations. According to Hung et al. (2002), such a limitation in time frequently results in
155 management difficulties. Panibratov (2016) reported that, in Russia, several ICJVs have failed to

156 achieve their goal due to management difficulties. Further, inflexible organizational structures that
157 fail to accommodate varying adjustments during the venture operation often leads to the
158 dissatisfaction of parties.

159 ***Conflicts Among Entities***

160 There is no conflict-free ICJV relationship (Gale and Luo, 2004; Ho et al. 2009). The complex
161 inter-organizational relationships – for example, partners’ opportunistic behavior, management
162 style, organizational culture, and policy often lead to conflicts during the operation of ICJVs,
163 which in turn results in an unsuccessful relationship (Han et al. 2018). Mostly, goal incongruences
164 among parties may originate from the disparity in the primary benefits expected by the parent
165 firms. As the venture agreement stipulates the overall goal of the partners, yet, in operation,
166 partners deviate from the original agreement due to their opportunistic behaviors which lead to
167 conflicts and consequently the venture failure. It is also important to note that, unfair distribution
168 (e.g. pain and gain) and execution of authority contribute significantly to the failure of ICJVs.

169 **Knowledge Gaps**

170 Overall, aside from the limited number of studies on barriers to ICJVs success, there is lack of
171 systematic research to classify those barriers. Thus, systematic classification based on empirical
172 studies and/or quantitative/statistical analyses is still lacking. A notable exception is Lu et al.
173 (2020) yet it did not analyze joint ventures in construction from an international perspective.
174 Moreover, it did not distinctively define the outlook and focused on a very few countries. The
175 coexistence of undefined factors presents theoretically flawed assumptions, hence failing to lead
176 to robust strategies and action plans for future implementation (Girmscheid and Brockmann,
177 2010). As such, there is a current need for studies that focus specifically on barriers to ICJVs
178 success, investigating the critical barriers impeding the successful implementation of ICJVs. The

179 knowledge of such critical factors can help ICJVs' management teams dedicate the required
180 resources to address them, thus minimizing or eliminating the barriers and improving the overall
181 ICJVs performance.

182 **<Please Insert Table 1 here>**

183 **<Please Insert Fig 1 here>**

184 **Methodological Framework**

185 ***Questionnaire Survey***

186 Grounded on a comprehensive literature review, a questionnaire survey capturing 36 potential
187 barriers to ICJVs success was developed. The intention of the survey was first to determine the
188 criticality of each barrier in the context of developed and developing countries/jurisdictions and
189 find out the level of agreement between experts from the academic domain and those from the
190 industrial sector and finally, cluster the critical barriers having similar underlying effect into for
191 easy identification and, perhaps more importantly, identify possible or anticipated future
192 discoveries. Using a questionnaire as an instrument for empirical data collection allowed for data
193 to be collected from 24 different countries/jurisdictions (including the US, Singapore, UK, Hong
194 Kong, Ghana, Thailand, China, Nigeria, Germany, Canada, etc.) and ensured respondents'
195 anonymity data confidentiality. The 7-point rating scale from 1 (strongly disagree) to 7 (strongly
196 agree) was adopted. The scale has the merits of providing respondents a broader explanation to
197 each barrier in terms of evaluation, making the dataset suitable for different statistical analysis and
198 reducing central tendency and leniency concerns in ordinal scales (Chan and Tam, 2000, p. 429;
199 Ameyaw and Chan, 2015, p. 194). Considerately, the factors were deliberately not grouped in the
200 questionnaire (i.e., lack of expertise and confidence; lack of effective planning and suitable
201 strategies; inter-organizational differences; lack of experiential knowledge of ICJV's

202 fundamentals, management difficulties, and conflicts among entities.) to ensure a clear and
203 impartial insight of the respondents on individual factors. A sample of the questionnaire is
204 provided in Appendix to have a better understanding of the survey. Before the final survey, a pilot
205 study was conducted to test the appropriateness and validity of the questionnaire (Chan et al. 2017).

206 The pilot study involved a team of two professors, a senior lecturer, two postgraduate research
207 fellow, and three JV managers on the Hong Kong-Zhuhai-Macau Bridge construction. The
208 population of the study comprised all international experts (both academics and industry
209 practitioners) with relevant practical knowledge and/or experiences in ICJV implementation.
210 Cabaniss (2002) defined an expert as someone qualified to hold a position or someone having an
211 exclusive expertise or skills that is indisputable by that person's leadership in professional
212 organization or someone with publications in a recognized journal. Since there was no central
213 global database for ICJV experts (sampling frame), a nonprobability sampling technique,
214 purposive sampling method, was employed to select relevant experts for this study. In purposive
215 sampling, sample selection is done contingent on a purpose (Brammah and Ndekugri, 2009); thus,
216 by targeting respondents with knowledge and experience in the issue under investigation. Due to
217 the difficulty of obtaining a large number of and diverse expertise in the construction domain,
218 purposive sampling has frequently been used in construction research (e.g., Choi et al. 2017; Chan
219 et al. 2017; Wuni and Shen, 2020). Experts were only eligible if (1) they had extensive research
220 experience and theoretically verse in ICJV implementation; (2) they had sufficient direct hands-
221 on ICJVs globally; and (3) they had been involved in at least one implementation of ICJV project.
222 While academic experts were identified from highly recognized journal papers with research titles
223 and overall content of publication containing terms which include but are not limited to
224 international construction joint venture, construction joint venture and international joint venture,

225 industry practitioners were identified from construction industry councils, institutes, international
226 bodies, associations worldwide (such as Hong Kong Construction Association, Turkish
227 Construction Association, etc.), and lists obtained through government agencies such as Ghana
228 Investment Promotion Centre. These statutory registered bodies effectively provided a proxy for
229 the population of the industry practitioners. The questionnaire was distributed via personalized
230 emails, attaching a Microsoft *Word* file, and providing a web link (produced by survey monkey)
231 to allow online responses. The total number of distributions cannot be determined, as potential
232 respondents, in the humble appeal were requested to distribute the questionnaire to any other
233 experts deemed appropriate (i.e., experts knowledgeable in the area under discussion). However,
234 approximately 300 questionnaires were distributed. As one of the most effective ways to enhance
235 the response rate, the respondents were informed in the survey that the outcome can be shared with
236 them (Li et al. 2011). Consequently, due to several constraints such as the busy schedule of experts,
237 123 responses were gathered worldwide. This could be regarded as representative and acceptable.
238 Besides, this response rate compares favorably with similar international surveys in the
239 construction management domain (see, for instance, Chan et al. 2017; Owusu and Chan, 2019;).
240 Likewise, this satisfies the central limit (minimum sample size of 30) of any group as
241 recommended by Sproull (1995) and Longnecker (2015). Fig 3 shows the responses obtained from
242 the various countries/jurisdictions. Most of the responses were gathered from the developed
243 countries with the highest response from Singapore, the US, Hong Kong, and the UK. The overall
244 research roadmap is depicted in Fig 2.

245 <Please Insert Fig 2 here>

246 ***Respondents' Profile***

247 Figs. 4 – 7 present the background information of the experts and distribution by
248 country/jurisdiction. Overall, experts from the academic sector constitute approximately 57%, and
249 nearly 65% are from developed countries/jurisdictions. The experts have specialties in areas
250 including architecture, quantity surveying, project management, and engineering, which account
251 for about 84%. Most of the experts had between 5-10 years (38.2%) and over 20 years (35.8%) of
252 experience in ICJV either by research and/or industry experience; only a few (9.8%) had less than
253 5 years of experience. Likewise, more than half of the experts (54.5%) have been involved in 3
254 ICJV projects, and 20.3% have been involved in more than 5 ICJV projects. These diversified
255 dispositions of experiences from both the developed and developing countries fuse well and render
256 the data more reliable and representative.

257 **Data Analysis**

258 Data collected were analyzed by using International Business Machines_Statistical Package for
259 Social Sciences (*IBM_SPSS*) software, version 23. First, the Cronbach's alpha coefficient (α) was
260 used to estimate the internal consistency between items in the test, that is, how closely related a
261 set of survey items are as a group (Cronbach, 1951). According to Nunnally and Bernstein (1994)
262 an α value of 1 indicates a strong internal consistency and reliability of the data and vice versa.
263 However, a threshold of 0.7 is acceptable (Santos, 1999; George and Mallery, 2016). The overall
264 alpha value is shown in Table 2. Further, the Shapiro-Wilk test was performed to determine the
265 data normality, and this aided the usage of nonparametric tests like the Mann-Whitney *U* test and
266 Spearman Correlation (SC) due to the nonnormal distribution of the data. Descriptive means,
267 normalization analysis, rank agreement analysis, and factor analysis were used to analyze the data.
268 The mean score (MS) and normalization analysis were used to determine how a barrier is more
269 critical than another in each context. Thus, the barriers were ranked and compared between the

270 groups using the MS and a normalized value of ≥ 0.50 (Adabre et al. 2020). To determine the level
271 of agreement between experts from the academic domain and those from the industrial sector on
272 the ranking of the barriers, the agreement analysis was used. Factor analysis (FA) was used to
273 cluster the barriers into underlying components. To better interpret the FA results and to determine
274 the correlation among the barriers as stated in the literature (see, Fig 1.), the Spearman Correlation
275 (SC) was employed.

276 ***Contextual Disparities Test***

277 The Mann-Whitney *U* test has been used in this study to assess the degree of association of
278 rankings of various barriers to ICJVs success from the perspective of experts in developed
279 countries/jurisdictions and developing countries/jurisdictions (Owusu and Chan, 2019). The test is
280 appropriate for determining any statistically significant differences between any two independent
281 groups providing their opinion on any continuous variable. The flexibility attached to employing
282 this method is that it requires no prior postulation on data distribution, and the number of
283 representative groups can be varied (Darko et a. 2017). Using the Mann-Whitney *U* test, the *H0* is
284 that "there are no significant disparities vis-à-vis the level of criticality of barriers in the two
285 countries/jurisdictions. The *H0* can, therefore, be rejected if the test value exceeds its critical value
286 at a significant level (0.05). Table 2 summarizes the results for the identical comparisons of the
287 barriers.

288 ***Rank Agreement Analysis of Barriers to ICJVs success***

289 As previously mentioned, the rank agreement analysis was conducted to determine the level of
290 consensus between the two groups of experts (i.e., the academic and the industry) on the ranking
291 of the barriers to ICJVs success. Previous studies, especially in the construction management
292 literature, this quantitative approach has been used to establish unanimity among different

293 categories of stakeholders and mostly among two groups. For example, Zhang (2005) used this
294 approach to measure the consensus between the academic sector and the industry sector on a list
295 of critical success factors (CSFs) for the Private-Public Partnership (PPP) in infrastructure
296 development. With this same method and focus, Adabre and Chan (2019) determined the results
297 from the two groups on sustainable affordable housing. Recently, Adabre et al. (2020) analyzed
298 the level of agreement among experts from developed countries and developing countries on the
299 critical barriers to sustainability attainment in affordable housing using the same method. This
300 merit the attention that agreement analysis is a suitable approach to determining a consensus
301 among at least two groups on a specific issue. It is a quantitative method that uses the “rank
302 agreement factor” RAF, which shows the average absolute difference in the ranking of the factors
303 between the two groups (Zhang, 2005). The higher the value of RAF is, the lower agreement
304 between the two groups. Thus, a RAF of zero is an indication of perfect agreement. With those
305 from the academic sector and the industry sector being the two groups under discussion, let the
306 rank of a barrier in the academic sector be R_{i1} and in the industry sector be R_{i2} and N be the number
307 of barriers (in the interest of brevity, only the barriers with normalized values ≥ 0.05 were
308 considered) and $j = N - i + 1$. Therefore, $(R_{i1} - R_{i1})$ of a barrier denotes the difference in ranks
309 obtained by the two groups. R_i of a barrier represents the sum of the ranks of the barrier from the
310 academic and industry sectors. According to Okpala and Aniekwu, (1988), the RAF is defined as:

$$311 \quad R_i = \sum_{i=1}^N R_{ij} \quad (1)$$

312 R_{ij} represents the sum of the ranks given to a barrier by the two different groups.

313 The mean value of the total ranks (R_{j2}) is given by

$$314 \quad R_{j2} = \frac{1}{N} \sum_{i=1}^N R_{ij} \quad (2)$$

315 The RAF is defined as

316
$$\text{RAF} = \frac{\sum_{i=1}^N |R_{i1} - R_{i2}|}{N} \quad (3)$$

317 The maximum rank agreement factor (RAF_{\max}) is given by

318
$$\text{RAF}_{\max} = \frac{\sum_{i=1}^N |R_i - R_{j2}|}{N} \quad (4)$$

319 The percentage disagreement (PD) is given by

320
$$\text{PD} = \frac{\sum_{i=1}^N |R_{i1} - R_{i2}|}{\sum_{i=1}^N |R_i - R_{j2}|} \times 100 \quad (5)$$

321
$$\text{PD} = 35.714 = 36\%$$

322 The percentage agreement (PA) is given by

323
$$\text{PA} = 100 - \text{PD} \quad (6)$$

324
$$\text{PA} = 64\%$$

325 <Please Insert Fig 4 here>

326 <Please Insert Fig 5 here>

327 <Please Insert Fig 6 here>

328 <Please Insert Fig 7 here>

329 <Please Insert Table 2 here>

330 Survey Results

331 *The criticality of Barriers in Overall Sample and Both Contexts*

332 The inferences made by the experts on the barriers genuinely prove that barriers to ICJVs success
333 are formidable and dynamic in contexts (i.e., developed and developing countries). Table 2
334 presents the experts' ratings for the barriers for both context and the combined results in the two
335 contexts. Overall, both countries believed that all the 36 barrier factors are critical given their high
336 ratings (i.e., MSs of 3.50, which is above the average of the ranking scale). However, based on the
337 calculated normalization values, 22 barriers factors were identified as critical, with normalization

338 values ≥ 0.50 . Among the 22 factors, the top five critical barriers include loss of management
339 control (b1), unstructured problems, issues, and risk management protocols (b25), inappropriate
340 partner selection process (b15), different organizational cultures (b5) and inconsistent project
341 objectives among entities (b13). Unsurprisingly, the criticality of these barriers is attributed to the
342 lack of attention given to management and organizational issues during the implementation of
343 ICJVs. Due to the uncertainties that naturally pervade at the launch of an ICJV irrespective of
344 contexts, parties may focus more on the contractual agreement, while neglecting or underrating
345 the management routine and operational aspects that define the venture process. These barriers are
346 most often traced directly to the partner selection process (Liang et al. 2019). For instance, while
347 companies give thorough and structured consideration to evaluating the financial and technical
348 strength of potential partners, their evaluation of their relationship aspects (i.e., organizational
349 cultures, company philosophy, etc.) tend to be superficial.

350 In the case of the developed world, the wide adoption of ICJVs puts a great emphasis on the
351 advancement of ICJV practice and studies (Tetteh and Chan, 2019). It is, therefore, not surprising
352 that most of the responses came from this location. When observed critically, in the developed
353 contexts, the leading barriers are more collective (from the ICJV than from individual partners.).
354 They are more of post-formation and organization stage barriers. This means that barriers that are
355 traced directly to the venture failure within the early stages are minimal. Unstructured problems,
356 issues, and risk management protocols (b25), difficulty in measuring ICJVs success (b6), and
357 management control challenges (b1) appeared as the top three barriers, respectively, with their
358 corresponding MS and normalization values at 6.00;1.00, 5.78;0.91 and 5.78;0.91. In the
359 developed context, the degree of similarity in terms of know-how and financial strength among
360 companies have a dual impact on their collaborative performance. Positively, the similarity-

361 attraction archetype and the theory of relational demography suggest that homogenous parties in
362 collaboration are known to experience fewer conflicts, higher performance and contribute to an
363 atmosphere of team effectiveness (Adobor, 2004). Conversely, excessive homogeneity may result
364 in faster accord on issues, which normally lead to indiscriminating acceptance of views; thus,
365 contribute to an atmosphere where the quality of decisions suffers. Such a situation may give rise
366 to unstructured management protocols and control, and other critical barriers such as poorly
367 formulated governance structure (b8), etc. The two least barriers are lack of preparedness to accept
368 company philosophy (b28) and fear of exposure of strength and weakness (b22), which are also
369 the only barriers with MSs below the average of the ranking scale 3.50, demonstrating the overall
370 criticality of the barriers considered in the survey.

371 The reverse is true in developing contexts. The failure rate of ICJVs in the developing
372 countries/jurisdictions is high due to numerous hindering factors (Tetteh and Chan, 2019, p. 7).
373 Aside from the loss of management control (b1) been the most critical barrier impeding ICJVs
374 success in the developing contexts with a MS of 6.40, conflicting interest/competing objectives
375 (b2), poorly formulated decisions in assigning limited resources (b14), inconsistent project
376 objectives among entities (b13) and lack of understanding and knowledge at the onset (b9) also
377 had mean values greater than 6.00, demonstrating a general criticality of the barriers. Literature
378 pronounces that the greater the socio-environmental dissimilarities, the greater the myriad of
379 operational and managerial challenges. Overall, the implication or inference that can be drawn is
380 that in this context, ICJVs are formed between the developed firms (mostly from the developed
381 world) and local companies. Thus, there is a wide dissimilarity gap (i.e., the difference in size,
382 organizational complexity, unequal venturing experience, and different perspectives on the details

383 of a venture's activities). These varied strengths erect barriers to the venture success right from the
384 inception to the stage deemed complete by the venture.

385 ***Individual Comparability***

386 As mentioned already, the Mann-Whitney *U* test has been used to identify any statistically
387 significant differences in the ranking of the barriers between the two contexts (i.e., developed and
388 developing). The results from the test indicate that these 10 barriers: b3, b6, b8, b11, b15, b23,
389 b25, b27, b33, and b36 have significant differences among the two contexts. The developed
390 contexts regarded these barriers as more critical than developing contexts. Particularly with barrier
391 b6 and b25, although the MS gap is marginal across the two contexts, yet the difference between
392 the normalized values and mean ranks is large. Whereas the developed context ranked b6 and b25
393 as second and fourth with a MS of 5.78 and 6.00, respectively, the developing context ranked b6
394 and b25 as fourteenth and tenth with a MS of 5.74 and 5.86, respectively. This justifies the
395 conclusion that although different countries may have homogenous barriers when implementing
396 ICJVs, the criticality of each barrier might be different due to context-specific characteristics. The
397 remaining 26 barriers showed no significant differences between the two contexts on their
398 rankings. This is as a result of the relatively close values of means among the two contexts for
399 those 26 barriers. It also confirms the suitable quality of the collected data and a rationally low
400 degree of diffusion resulting and reliable findings (Darko et al. 2017).

401 ***Agreement Analysis***

402 In the previous section, the percentage of agreement (PA) has been calculated for the barriers that
403 were deemed critical from the overall perspective (i.e., both the developed and developing
404 contexts) depending on the normalization values (≥ 0.50). In all, the PA for the 22 barriers is 64%,
405 which shows a relatively good agreement between respondents from the industrial sector and those

406 from the academic sector on their ranking of the barriers. This confirms the practical nature of
407 ICJV application and practical translation of ICJV research for continuous development and
408 implementation. Moreover, this gives a firm ground to ICJVs' front liners (e.g., top team managers)
409 to support and further explore how these issues can be minimized or eliminated through research.

410 **<Please Insert Table 3 here>**

411 ***Results of Factor Analysis (FA) with Spearman Correlation (SC)***

412 The FA and SC were conducted using the 22 critical barriers identified from the total sample.
413 Principal component analysis, with varimax rotation, was adopted. To determine the suitability of
414 the FA, the Kaiser-Meyer-Olkin (KMO) and Bartlett's test of sphericity was first assessed. An
415 acceptable KMO of 0.672 and a large value (566.855) of Bartlett's test of sphericity (see, for
416 instance, Adabre et al. 2020), and a high level of significance was obtained (see, Table 4).
417 Consequently, factor loadings ≥ 0.50 were considered appropriate, following previous studies
418 (Rahman, 2014; Chan et al. 2017; Adabre et al. 2020). Four factors (b14, b20, b30, and b35) were
419 deleted as their factor loadings and communalities were relatively below the threshold. Overall,
420 18 barriers were finally considered, from which five components are extracted based on a common
421 theme of their underlying barriers. The five components explain 63.777% of the total variance.
422 Thus, a model with these five components could satisfactorily represent the data from developed
423 and developing countries. The following paragraphs discuss the components in detail.

424 Component 1 (knowledge limitation) features three critical barriers (b9, b27, and b36)
425 reflecting more on the lack of understanding present in ICJVs implementation. Although b27 is
426 not directly related yet constitute a behavioral aspect that without a clear frame of reference can
427 undermine the venture foundation. As stated earlier, the lack of understanding of ICJVs
428 fundamentals and organizational structures in areas like managerial and operational aspects of the

429 arrangement can challenge the effectiveness of the venture and eventually lead to the failure of the
430 ICJV project (Munns et al. 2000). When contracting parties have little or no understanding of ICJV
431 operations, they may have no confidence and have reservations that ICJV relationships are too
432 cozy and unstructured. Such knowledge gaps may prevent parties from reaping the overall
433 performance goal of the collaboration. Lu et al. (2020) verified that mutual understanding among
434 parties in terms of their working style, professional field, culture, etc. is a prerequisite for a
435 successful ICJV. Further, a good understanding of the host/local building regulations or
436 requirements is key because the establishment of the venture operational standards and
437 performance is highly dependent on that. The correlation matrix in Table 5 displays some
438 significant relationships among some of the critical barriers as hypothesized in Fig 1. For example,
439 there is a significant correlation between ‘lack of understanding and knowledge at the onset’ (b9,
440 identified in Fig 1 as lack of experiential of ICJVs fundamentals) and ‘improper project feasibility
441 studies’ ($r = .390, p = 0.05$), and ‘improper project planning and budgeting’ ($r = .396, p = 0.05$),
442 which are both identified as lack of effective planning and suitable strategies in the literature; and
443 finally between ‘lack of understanding and knowledge at the onset’ (b9, lack of experiential of
444 ICJVs fundamentals) and ‘differing policies and procedures among entities’ (inter-organizational
445 differences) ($r = .421, p = 0.05$). overall, this factor was ranked fourth among the five components,
446 with a MS of 5.31.

447 Component 2 (Operational and governance-related barriers) consists of four factors (b25, b8,
448 b12, and b17) highlighting the working and governance-related issues of the venture. These issues
449 often occur as a result of deficient preparation and faulty assumptions of managers in ICJV.
450 Unstructured problems, issues, and risk management protocol (b25) is quite prevalent in most
451 business. The failure to systematically analyze and manage these factors separately and effectively

452 often causes extending complexities that lead to unsatisfactory performance or complete failure of
453 ICJVs. Also, formulated governance structures (b8) that fail to accommodate varying adjustments
454 during the venture operation often leads to the dissatisfaction of IJV parties (Hong, 2014). As
455 Ozorhon et al. (2008a) noted, lack of mutual commitment of parties (b12) in ICJVs breed
456 opportunistic behavior, which eventually deteriorate the overall performance goal of the venture.
457 Some significant correlations exist among the barriers. For example, in Table 5, there are
458 significant correlations between ‘poorly formulated governance structure’ (b8, lack of effective
459 planning and suitable strategies) and ‘high social sense of superiority’ (b27, lack of expertise and
460 confidence by ICJV contracting parties) ($r = .298, p = 0.05$); between ‘lack of mutual commitment
461 of partners’ (b12, lack of experiential of ICJVs fundamentals) and ‘improper project planning and
462 budgeting’ (b16, lack of effective planning and suitable strategies) ($r = .386, p = 0.05$), etc. This
463 component was ranked third with a total MS of 5.49.

464 **<Please Insert Table 4 here>**

465 **<Please Insert Table 5 here>**

466
467 Component 3 (Coordinating difficulties) consists of three factors (b13, b34, and b1) that relate
468 to issues over the respective roles and responsibilities of parties. Difficulties encountered normally
469 radiate from the unbalance power and responsibilities among parties (b34) and loss of management
470 control (b1) (Lin and Ho, 2012; Mohamed, 2003). It is important to mention that effective
471 coordinating of ICJVs requires distinct organizational arrangements and work processes.
472 According to Zhang and Zou (2007) role ambiguity causes apathy and conflict in an ICJV as people
473 trip over or blame each other. This factor appeared second with a MS of 5.50. There exist some
474 statistically significant correlations between ‘inconsistent project objectives among entities’ (b13,
475 conflicts among ICJV entities) and ‘improper project planning and budgeting’ (b16, lack of

476 effective planning and suitable strategies) and ‘high social sense of superiority’ (b27, lack of
477 expertise and confidence by ICJV contracting parties); between ‘unbalanced distribution of
478 authorities’ (b34, ICJV management difficulties) and ‘conflicting interest/competing objectives’
479 (b2, inter-organizational differences) ($r = .223$, $p = 0.01$); between ‘loss of management control’
480 (b1, ICJV management difficulties) and ‘friction created within ICJV’s internal management and
481 client organization and local people’ (b33, conflicts among ICJV entities) ($r = .256$, $p = 0.05$), etc.
482 These correlations are coherent because they emerge as a ripple effect on ICJV success. Therefore,
483 a systematic approach is needed to eliminate or minimize its effect.

484 Component 4 (System and cultural barriers) contains four factors (b3, b15, b16, and b6)
485 summarizing problems with organization and cultural differences in ICJVs implementation. This
486 component was ranked fifth. While this component is the least ranked construct with a MS of 5.24,
487 the underlying barriers have been reported in many studies to impede ICJVs success (i.e., b3 –
488 language barrier, and b15 – inappropriate partner selection) (Ozorhon et al. 2007a; 2008b; Zhao et
489 al. 2013). Cultural differences can lead to a myriad of operational problems. For example, it can
490 increase coordination and transaction costs (Ozorhon et al. 2008). Thus, ICJV front liners should
491 possess strong interpersonal skills to compensate for organization and cultural barriers. There have
492 always been difficulties when measuring ICJVs performance (b6) due to the long and complex
493 chain of management tasks coupled with the varied goals of parties involved (Tetteh et al. 2020).
494 Parties then fail to efficiently evaluate their venture performance due to the inadequate systems
495 and measures. In Table 5, there exist some positive correlations among the barriers as postulated
496 in the literature review.

497 Component 5 (Interface-oriented and outlook barriers) contains four factors (b33, b5, b11, and
498 b2) focusing more on poor coherence and opposing views in ICJVs implementation. This factor is

499 the top-ranked with a MS of 5.53, indicating the criticality of the underlying factors. The presence
500 of competition, goal incongruence, and opportunistic behavior among parties produce serious
501 coalition problems, which result in ICJVs failure (Sillars and Kangari, 2004; Hwang et al. 2017).
502 Therefore, friction among the internal and external team members (b33) and an unstable agreement
503 are bound to happen (b11). Getting a joint activity up requires a devoted effort from all parties to
504 the venture. Without joint objectives, parties would pursue their own goals irrespective of the
505 project goal, leading to numerous conflicts. As a result, this would get worsened, and eventually,
506 the relationship fails. Significant correlations exist among the barriers as hypothesized in the
507 literature review. For example, between ‘b33’ – conflicts among ICJV entities and ‘b1’ – ICJV
508 management difficulties ($r = .256, p = 0.05$); between ‘b11’ – conflicts among ICJV entities and
509 ‘b2’ – inter-organizational differences ($r = .239, p = 0.05$), etc.

510 **Limitations and Future Works**

511 While the study’s aim was achieved, certain limitations and future directions are imperative to
512 explain and provide, respectively. First, the number of responses received from both contexts are
513 relatively low, which could affect their generalizability. Likewise, given the mixed hands-on
514 experiences as projected; it is clear that developed countries have progressed more in the ICJV
515 implementation learning curve than developing countries, thus, the hands-on ICJV experience in
516 these two different contexts could influence the perception of the respondents. This should be
517 considered when interpreting the results of the study. Whereas future studies may employ larger
518 samples from both contexts to validate the findings, multiple case design by using secondary data
519 from literature could also be adopted to increase both the internal and external research validity.
520 This opportunity can support the collection of greater volume of evidences (internal validity),
521 which can drive to better “triangulation” of the results. Besides, with a larger sample size, more

522 rigorous statistical tools could be used to test the correlation among the various barriers to deepen
523 the understanding of the barriers that create multiple chains of complexity in ICJV implementation.
524 Regardless of the homogeneity of multiple barriers in different markets, more detailed studies on
525 the critical barriers in specific countries are needed because the findings cannot be attributed to
526 one specific country however serve as a frame of reference for more comparative analysis. Further,
527 future research work should focus on modeling the influences of the critical barriers to ICJVs
528 overall performance goals to devise appropriate and practical solutions for successful
529 implementation.

530 More importantly, the dynamic evolution of ICJVs equally means different barriers in different
531 stages of their progression. Therefore, future studies should consider categorizing the barriers in
532 stages of the ICJV lifecycle. This would assist practitioners to plan even before they enter ICJVs.
533 Also, through an empirical validation of these factors, the development of a more dynamic
534 management process that integrates the stagewise progression of ICJV lifecycle for the barriers;
535 using more robust computer modeling techniques such as system dynamics , and the use of
536 artificial intelligence techniques such as random forest, k-nearest neighbour, artificial neural
537 network, extreme gradient boosting, decision tree, etc. for stagewise predictions is probably a
538 promising research direction.

539 **Conclusions**

540 This research examined the criticality of barriers impeding ICJVs success. Through a
541 comprehensive literature review and questionnaire survey, data on barriers were collected from
542 123 ICJV experts from 24 different countries/jurisdictions around the world. Statistical analyses
543 revealed that 22 critical barriers impede ICJVs success. The top five critical barriers include loss
544 of management control followed by unstructured problems, issues, and risk management

545 protocols, inappropriate partner selection mechanisms, differing policies and procedures among
546 entities, and inconsistent project objectives. Mann-Whitney *U* test results showed that 10 barriers
547 (b3, b6, b8, b11, b15, b23, b25, b27, b33, and b36) have significant differences among the two
548 contexts. There was also a relatively good agreement between experts from the industrial sector
549 and those from the academic sector on their ranking of the critical barriers. Five components were
550 obtained through factor analysis, namely; knowledge limitation, operational and governance-
551 related barriers, coordinating difficulties, system and cultural barriers, and interface-oriented and
552 outlook barriers.

553 Albeit the limitations, the research findings have both theoretical and practical values.
554 Theoretically, it contributes to both ICJV and IJV literature by conducting a systematic review of
555 the barriers and empirically examining their criticality. As academic and industrial researchers
556 continue to develop frameworks and strategies for ICJV implementation, this study provides a
557 frame of reference for more applied measures to be developed. It could also direct researchers
558 toward examining the influences of these barriers on ICJVs overall performance goals. The
559 knowledge of such critical factors can help ICJVs' management teams dedicate the required
560 resources to address them, thus eliminating the barriers and improving the overall ICJVs
561 performance. Practically, this study contributes to deepening the understanding of barriers to
562 ICJVs success and helping ICJVs' front liners (i.e., top team managers) and policymakers in
563 developing suitable measures and policies to ensure successful implementation of ICJVs. It could
564 also direct researchers toward examining the influences of these barriers on ICJVs overall
565 performance goals to devise clear-cut frameworks, seeking their successful implementation in the
566 future.

567 **Data Availability Statement**

568 Some or all data, models, or code used during the study are available from the corresponding
569 author by request.

570 **Acknowledgment**

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577 shares a similar background and design with that of other papers produced and published from the
578 international survey. Acknowledgement is finally due to the editors and anonymous reviewers who
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580 **<Please Insert Appendix I here>**

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772 **Appendix I.** Sample of the survey questionnaire

773 Please indicate your level of agreement on each of the following barriers impeding ICJVs success. Use the
774 following scale: 1 = strongly disagree; 2 = disagree; 3 = disagree somewhat; 4 = neither agree nor disagree; 5 =
775 agree somewhat; 6 = agree; 7 = strongly agree.

776 Table 6. Barriers impeding ICJVs success

No.	Barriers	Level of agreement
		Low <<<----->>>High
1	Loss of management control	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
2	Conflicting interest/competing objectives	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
3	Language barrier	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
4	Incompetence of project management team of the domestic firm	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
5	Differing policies and procedures among entities (different organizational cultures)	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
6	Difficulty in measuring ICJVs success	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
7	Incomplete contract terms with partner	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
8	Poorly formulated governance structure	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
9	Lack of understanding and knowledge at the onset	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
10	Problems associated with relationship management	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
11	Unstable agreement for a limited time period	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
12	Lack of mutual commitment of partners	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
13	Inconsistent project objectives among entities	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
14	Poorly formulated decisions in assigning limited resources	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
15	Inappropriate partner selection	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
16	Improper project planning and budgeting	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
17	Improper project feasibility studies	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
18	Fear of legal actions	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
19	Poor spirit of cooperation	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
20	Lack of confidence about experience and knowledge from the local partners	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
21	Fear of exposure of strength and weakness	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
22	Lack of strategic planning for the ICJV operation	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
23	Blaming habits	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
24	Inadequate engagement of partnering firms due to their external workloads	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
25	Unstructured problems, issues and risk management framework	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
26	Lack of continuous improvement	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
27	High social sense of superiority	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
28	Lack of preparedness to accept company philosophy	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
29	Poor problem-solving culture	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
30	Reluctance in training local staff/No standardized training	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
31	Human resource management problems	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
32	Use of outdated skills and technologies	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
33	Friction created in ICJV's internal management and client organization and local people	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
34	Unbalanced power and responsibility between local and foreign partners	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
35	Difference in salary package between foreign and local employees	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7

36	Overseas partner's lack of understanding of local statutory requirements/building regulations	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
If there are any barriers omitted by this questionnaire, please list and rate them		
1	Click or tap here to enter text.	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
2	Click or tap here to enter text.	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7
3	Click or tap here to enter text.	<input type="checkbox"/> 1; <input type="checkbox"/> 2; <input type="checkbox"/> 3; <input type="checkbox"/> 4; <input type="checkbox"/> 5; <input type="checkbox"/> 6; <input type="checkbox"/> 7

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779 **Table 1.** List of barriers impeding ICJVs success

s/n	Barriers	References
b1	Loss of management control	Ozorhon et al. (2007a; 2008a), Lin and Ho (2012), Lu et al. (2020)
b2	Conflicting interest/competing objectives	Shen et al. (2001), Zhang and Zou, (2007), Ozorhon et al. (2008a), Lu et al. (2020)
b3	Language barrier	Williams and Lilley (1993), Drouin et al. (2009)
b4	Incompetence of project management team of domestic firm	Walker and Johannes (2003), Zhao et al. (2013)
b5	Differing policies and procedures among entities (different organizational cultures)	Ozorhon et al. (2007a), Ozorhon et al. (2008a), Lu et al. (2020)
b6	Difficulty in measuring ICJVs success	Mohamed, (2003), Ozorhon et al. (2010b), Almohsen and Ruwanpura, (2016),
b7	Incomplete contract terms with partner	Gale and Luo (2004), Ozorhon et al. (2010a), Zhao et al. (2013)
b8	Poorly formulated governance structure	Munns et al. (2000), Ho et al. (2009)
b9	Lack of understanding and knowledge at the onset	Munns et al. (2000), Maemura et al. (2018)
b10	Problems associated with relationship management	Zhang and Zou, (2007), Ho et al. (2009)
b11	Unstable agreement for a limited period	McIntosh and McCabe (2003)
b12	Lack of mutual commitment of partners	Gale and Luo (2004), Ozorhon et al. (2008a), Lu et al. (2020)
b13	Inconsistent project objectives among entities	Hwang et al. (2017), Lu et al. (2020)
b14	Poorly formulated decisions in assigning limited resources	Zhao et al. (2013)
b15	Inappropriate partner selection	Gale and Luo (2004), Liang et al. (2019)
b16	Improper project planning and budgeting	McIntosh and McCabe, (2003),
b17	Improper project feasibility studies	Zhang and Zou, (2007), Maemura et al. (2018)
b18	Fear of legal actions	Shen et al. (2001), Hwang et al. (2017)
b19	Poor spirit of cooperation	McIntosh and McCabe, (2003), Maemura et al. (2018)
b20	Lack of confidence about experience and knowledge from the local partner	McIntosh and McCabe, (2003), Zhang and Zou, (2007)
b21	Lack of strategic planning for ICJVs operations	Shen et al. (2001), Zhang and Zou, (2007)
b22	Fear of exposure of strength and weakness	Ling and Hoi, (2006), Ling and Gui (2009)
b23	Blaming habits	Williams and Lilley (1993), Maemura et al. (2018)
b24	Inadequate engagement of partnering firms due to their external workloads	Ozorhon et al. (2008a), Ozorhon et al. (2010a)
b25	Unstructured problems, issues and risk management framework	Lu et al. (2020)
b26	Lack of continuous improvement	Maemura et al. (2018)
b27	High social sense of superiority	Swierczek (1994)
b28	Lack of preparedness to accept company philosophy	Lu et al. (2020)
b29	Poor problem-solving culture	Lu et al. (2020)
b30	Reluctance in training local staff/No standardized training	Mansfield and Sasillo (1990)
b31	Human resource management problems	Drouin et al. (2009)
b32	Use of outdated skills and technology	Hwang et al. (2017)
b33	Friction created within ICJV's internal management and client organization and local people	Norwood and Mansfield (1999)

b34	Unbalanced power and responsibility between local and foreign partners	Walker and Johannes (2003), Lu et al. (2020)
b35	Differences in salary packages between foreign and local partners	Mansfield and Sasillo (1990), Sillars and Kangari (2004)
b36	Overseas partner's lack of understanding of local statutory requirements/building regulations	Lu et al. (2020)

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807 **Table 2.** Descriptive and Mann-Whitney *U* test statistics of the barriers to ICJVs success

s/n	Overall				Developed countries				Developing countries				Mann-Whitney <i>U</i> test statistics				
	Mean	SD	<i>p</i> -value	Rank	<i>N</i> -value	Mean	SD	Rank	<i>N</i> -value	Mean	SD	Rank	<i>N</i> -value	<i>U</i> stat	<i>W</i>	<i>Z</i>	<i>p</i> -value
b1	6.07	0.791	0.001	1	1.00 ^a	5.78 ^b	0.875	3	0.91 ^a	6.40	0.528	1	1.00 ^a	1133.000	3278.000	-4.090	0.000 ^a
b2	5.41	0.734	0.000	16	0.66 ^a	5.49	0.773	12	0.78 ^a	6.16	0.875	2	0.90 ^a	1324.000	3469.000	-3.038	0.002 ^a
b3	5.21	0.969	0.000	19	0.55 ^a	5.02	1.082	24	0.59 ^a	5.43 ^b	0.775	20	0.60 ^a	1631.000	3776.000	-1.366	0.172
b4	4.80 ^b	1.121	0.000	29	0.34	5.25	1.076	19	0.68 ^a	4.31	0.959	32	0.13	970.000	2681.000	-4.800	0.000 ^a
b5	5.84	0.900	0.000	4	0.88 ^a	5.65 ^b	0.891	9	0.85 ^a	6.05	0.867	5	0.85 ^a	1456.500	3601.500	-2.290	0.022 ^a
b6	5.76	0.714	0.000	7	0.84 ^a	5.78 ^b	0.838	2	0.91 ^a	5.74	0.548	14	0.73 ^a	1789.500	3500.500	-0.540	0.589
b7	4.60	1.206	0.000	32	0.24	4.91	1.320	28	0.54 ^a	4.26	0.965	34	0.11	1253.000	2964.000	-3.297	0.001 ^a
b8	5.59 ^b	0.808	0.000	12	0.75 ^a	5.66 ^b	0.871	5	0.86 ^a	5.52	0.731	18	0.63 ^a	1742.000	3453.000	-0.819	0.413
b9	5.59 ^b	0.612	0.000	11	0.75 ^a	5.23 ^b	0.425	20	0.68 ^a	6.00	0.530	6	0.83 ^a	635.000	2780.000	-7.101	0.000 ^a
b10	4.51	1.357	0.000	34	0.19	4.97	1.250	26	0.57 ^a	4.00	1.298	36	0.00	1133.000	2844.000	-3.931	0.000 ^a
b11	5.61	0.754	0.000	10	0.76 ^a	5.63	0.928	8	0.84 ^a	5.59	0.497	15	0.66 ^a	1790.000	3501.000	-0.529	0.597
b12	5.63	0.729	0.000	9	0.77 ^a	5.37	0.802	16	0.73 ^a	5.91	0.506	7	0.80 ^a	1077.000	3222.000	-4.528	0.000 ^a
b13	5.79	0.871	0.000	5	0.85 ^a	5.51	0.886	11	0.79 ^a	6.10	0.742	4	0.86 ^a	1177.000	3322.000	-3.788	0.000 ^a
b14	5.75	0.972	0.000	8	0.83 ^a	5.40	0.981	15	0.75 ^a	6.14	0.805	3	0.89 ^a	1101.500	3246.500	-4.180	0.000 ^a
b15	5.89	0.960	0.001	3	0.91 ^a	5.65 ^b	0.975	10	0.85 ^a	5.31	0.681	23	0.55 ^a	1666.500	3377.500	-1.244	0.213
b16	5.11	1.161	0.000	21	0.50 ^a	4.51 ^b	1.134	30	0.37	5.79 ^b	0.744	13	0.75 ^a	658.500	2803.500	-6.459	0.000 ^a
b17	5.23	1.023	0.000	18	0.56 ^a	4.94	1.074	27	0.55 ^a	5.55	0.862	17	0.65 ^a	1258.500	3403.500	-3.331	0.001 ^a
b18	4.73	1.438	0.000	31	0.31	4.34	1.735	33	0.30	5.17 ^b	0.819	25	0.49	1396.000	3541.000	-2.584	0.010 ^a
b19	5.01	1.134	0.000	23	0.45	5.74	0.756	4	0.89 ^a	4.19	0.907	35	0.08	426.500	2137.500	-7.638	0.000 ^a
b20	5.36	0.976	0.000	17	0.63 ^a	5.68	0.970	7	0.86 ^a	5.00	0.858	27	0.42	1097.000	2808.000	-4.228	0.000 ^a
b21	4.94	1.058	0.000	25	0.41	5.43	0.951	14	0.76 ^a	4.40	0.897	29	0.17	859.000	2570.000	-5.396	0.000 ^a
b22	4.54	1.450	0.000	33	0.21	3.49	1.541	35	0.05	5.43 ^b	0.565	19	0.60 ^a	692.500	2837.500	-6.249	0.000 ^a
b23	4.40	1.233	0.000	35	0.13	4.42	1.435	32	0.33	4.38	0.970	30	0.16	1796.000	3507.000	-0.467	0.640
b24	4.93 ^b	1.069	0.000	27	0.41	4.51 ^b	1.120	29	0.37	5.41	0.773	21	0.59 ^a	985.000	3130.000	-4.761	0.000 ^a
b25	5.93	0.765	0.000	2	0.93 ^a	6.00	0.935	1	1.00 ^a	5.86 ^b	0.511	10	0.76 ^a	1627.000	3338.000	-1.435	0.151
b26	4.79	1.118	0.000	30	0.34	4.45	1.358	31	0.35	5.17 ^b	0.566	24	0.49	1383.000	3528.000	-2.897	0.004 ^a
b27	5.18	1.033	0.000	20	0.54 ^a	5.03	1.274	25	0.59 ^a	5.34	0.637	22	0.56 ^a	1765.000	3910.000	-0.685	0.493
b28	4.14	1.148	0.000	36	0.00	3.43	1.330	36	0.00	4.71	0.459	28	0.30	905.000	3050.000	-5.252	0.000 ^a
b29	4.96	1.369	0.000	24	0.42	4.14	1.424	34	0.22	5.88	0.329	9	0.78 ^a	490.000	2635.000	-7.537	0.000 ^a
b30	5.10	0.979	0.000	22	0.50 ^a	5.12	1.305	23	0.63 ^a	5.07	0.368	26	0.45	1578.000	3289.000	-1.859	0.063
b31	4.93 ^b	1.110	0.000	26	0.41	5.45	1.046	13	0.77 ^a	4.34	0.870	31	0.14	805.000	2516.000	-5.259	0.000 ^a
b32	4.80 ^b	1.120	0.000	28	0.34	5.26	1.149	18	0.69 ^a	4.29	0.838	33	0.12	895.500	2606.500	-5.259	0.000 ^a
b33	5.46	0.880	0.000	15	0.68 ^a	5.35	1.096	17	0.73 ^a	5.57	0.534	16	0.65 ^a	1623.500	3768.500	-1.422	0.155
b34	5.52	0.970	0.000	13	0.72 ^a	5.22	1.038	22	0.67 ^a	5.86 ^b	0.760	11	0.76 ^a	1244.500	3389.500	-3.450	0.001 ^a
b35	5.50	1.003	0.000	14	0.70 ^a	5.23 ^b	1.235	21	0.68 ^a	5.79 ^b	0.522	12	0.75 ^a	1347.000	3492.000	-2.963	0.003 ^a

b36	5.77	0.982	0.000	6	0.84 ^a	5.66 ^b	1.163	6	0.86 ^a	5.90	0.718	8	0.79 ^a	1688.000	3833.000	-1.057	0.291
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Note: Overall Cronbach's alpha = 0.891; Normalization (*N*) value = (actual mean-minimum mean)/ (maximum mean-minimum mean); SD = standard deviation; SWT = Shapiro-Wilk test, which indicate a statistically significant data. Grouping variable = developed and developing countries; *W* = Wilcoxon *W*; and MWU = Mann-Whitney *U* at significant level of 0.05.

^bRepresents equal mean, wherein factors with low SD are ranked higher in that order

^aSignificant *p*-values and *N*-values

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836 **Table 3.** Agreement analysis on the ranking of the barriers to ICJVs success

code	Academic			Industry			Agreement		
	Mean	SD	Rank	Mean	SD	Rank	R_i	$(R_{i1} - R_{i2})$	$ (R_i - R_j) $
b1	6.31	0.468	1	6.30	0.696	1	2	0	21
b2	5.97	1.007	3	6.28	0.968	2	5	1	18
b3	5.53 ^b	0.503	11	5.19	1.257	15	26	4	3
b5	5.31 ^b	0.498	16	5.81	0.810	7	23	9	0
b6	5.79	0.447	7	6.09	0.791	3	10	4	13
b8	5.27	0.536	18	5.53	0.846	12	30	6	7
b9	5.49	0.558	14	5.45	0.798	13	27	1	4
b11	5.61	0.490	10	4.94	1.117	18	28	8	5
b12	5.76	0.600	8	5.58	0.663	11	19	3	4
b13	5.63	0.569	9	6.06	0.602	4	13	5	10
b14	4.51	0.775	22	4.06	1.183	22	44	0	21
b15	6.11	0.401	2	5.87 ^b	0.590	5	7	3	16
b16	5.31 ^b	0.468	15	5.15	0.841	16	31	3	8
b17	5.07	0.354	20	5.09	0.883	17	37	3	14
b20	4.87	0.635	21	4.23	1.219	21	42	0	19
b25	5.93	0.520	4	5.77	1.250	8	12	4	11
b27	5.50	0.737	13	4.68	1.566	19	32	6	9
b30	5.31 ^b	0.568	17	4.45	1.539	20	37	3	14
b33	5.53 ^b	0.675	12	5.43	1.029	14	26	2	3
b34	5.83	0.380	6	5.87 ^b	0.735	6	12	0	11
b35	5.90	0.542	5	5.62 ^b	1.228	10	15	5	8
b36	5.16	0.862	19	5.62 ^b	0.713	9	28	10	5
							$\sum_{i=1}^n (R_{ij}) = 506$	$\sum_{i=1}^n (R_{i1} - R_{i2}) = 80$	$\sum_{i=1}^n (R_{i1} - R_{i2}) = 224$

^bRepresents equal mean, wherein factors with low SD are ranked higher in that order

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843 **Table 4.** Factor analysis results

s/n	Component					$\bar{x} = \sum xi/n$
	1	2	3	4	5	
Knowledge limitation	1					5.31*
b9	0.736	-	-	-	-	5.23
b27	0.655	-	-	-	-	5.03
b36	0.631	-	-	-	-	5.66
Operational and governance-related barriers		2				5.49*
b25	-	0.737	-	-	-	6.00
b8	-	0.713	-	-	-	5.66
b12	-	0.655	-	-	-	5.37
b17	-	0.508	-	-	-	4.94
Coordinating difficulties			3			5.50*
b13	-	-	0.681	-	-	5.51
b34	-	-	0.630	-	-	5.22
b1	-	-	0.520	-	-	5.78
System and cultural barriers				4		5.24*
b3	-	-	-	0.716	-	5.02
b15	-	-	-	0.707	-	5.65
b16	-	-	-	0.656	-	4.51
b6	-	-	-	0.528	-	5.78
Interface-oriented and outlook barriers					5	5.53*
b33	-	-	-	-	0.690	5.35
b5	-	-	-	-	0.623	5.65
b11	-	-	-	-	0.607	5.63
b2	-	-	-	-	0.501	5.49
Eigenvalues	2.953	2.456	1.960	1.547	1.496	
Variance explained	24.586	11.166	8.908	7.031	6.799	
Cumulative variance (%)	24.586	33.494	47.890	53.659	63.777	
KMO measure of sampling adequacy						0.672
Bartlett's test of sphericity approximated Chi-square						566.855
Degree of freedom						231
Significance						0.000

Note: $\bar{x} = \sum xi/n$, where \bar{x} = mean, $\sum xi$ = summation of sampled values, n = number of variables or items in each component/construct.

Extraction method: Principal Component

Analysis Rotation Method: Varimax with Kaiser Normalization

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Table 5. Spearman Correlation (SC) Matrix of critical barriers

Code	b1	b2	b3	b5	b6	b8	b9	b11	b12	b13	b14	b15	b16	b17	b20	b25	b27	b30	b33	b34	b35	b36	
b1	r 1.000																						
b2	r .343 ^a	1.000																					
b3	r .110	.324 ^a	1.000																				
b5	r .370	-.133	.038	1.000																			
b6	r .072	.103	-.071	.240 ^a	1.000																		
b8	r -.096	.055	.031	-.065	.020	1.000																	
b9	r .200 ^b	-.125	-.042	.116	-.057	.217 ^b	1.000																
b11	r .271 ^a	.239 ^a	.116	.420 ^a	-.087	-.036	-.066	1.000															
b12	r .252 ^a	.017	.011	.121	-.162	.220 ^b	.134	-.022	1.000														
b13	r -.006	.038	-.082	-.040	-.031	.013	.224 ^b	.011	.125	1.000													
b14	r .032	-.077	.152	-.148	.240 ^a	.085	.401 ^a	.245 ^a	.332 ^a	.121	1.000												
b15	r .013	.021	.153	-.009	-.108	-.117	.421 ^b	.130	.086	.218 ^b	.258 ^a	1.000											
b16	r .132	-.164	.119	.087	-.001	-.043	.396 ^a	.118	.386 ^a	.299 ^a	.227 ^b	.186 ^b	1.000										
b17	r -.010	-.096	.150	-.067	.276 ^a	.042	.390 ^a	.066	.146	.155	.370 ^a	.362 ^a	.315 ^a	1.000									
b20	r .102	.014	-.106	.036	.031	-.051	.290 ^a	-.115	.011	-.024	-.133	.247 ^a	-.339 ^a	.318 ^a	1.000								
b25	r .030	-.122	-.174	-.155	-.089	-.129	.039	.104	.106	-.168	.179 ^b	-.049	-.209 ^b	.025	.069	1.000							
b27	r .041	.211 ^b	.014	.221 ^b	.125	.298 ^a	-.065	.167	.122	.204 ^b	.003	-.015	.016	-.118	.041	.098	1.000						
b30	r .074	.112	.098	.128	.050	-.161	.303 ^a	-.062	.181 ^b	.029	-.171	-.043	-.002	-.163	.337 ^a	.066	.023	1.000					
b33	r .256 ^a	.291 ^a	-.036	.257 ^a	.227 ^b	-.111	-.125	-.064	-.108	.185 ^b	-.056	.151	-.071	-.103	.040	.134	-.084 ^a	.412 ^a	1.000				
b34	r .312 ^a	.223 ^b	.138	.278 ^a	.320 ^a	.184 ^b	.132	-.142	.201 ^b	.070	.085	.032	.224 ^b	.047	.218 ^b	.240 ^a	-.105 ^a	.027	.056	1.000			
b35	r .084	.230 ^b	.058	.225 ^b	.108	-.033	.298 ^a	-.266 ^a	-.001	.009	.002	.069	.190 ^b	.230 ^b	.225 ^b	.108	.364 ^a	.026	.142	.231 ^b	1.000		
b36	r .298 ^a	.142	.085	-.103	.055	-.018	.289 ^a	.142	.085	-.103	.055	-.018	.089	.108	.116	.083	.072	.185 ^b	.108	.089	.156	1.000	

r = value for Spearman Correlation

p = value of significance

^a Correlation is significant at 0.05 level (2-tailed).

^b Correlation is significant at 0.01 level (2-tailed).