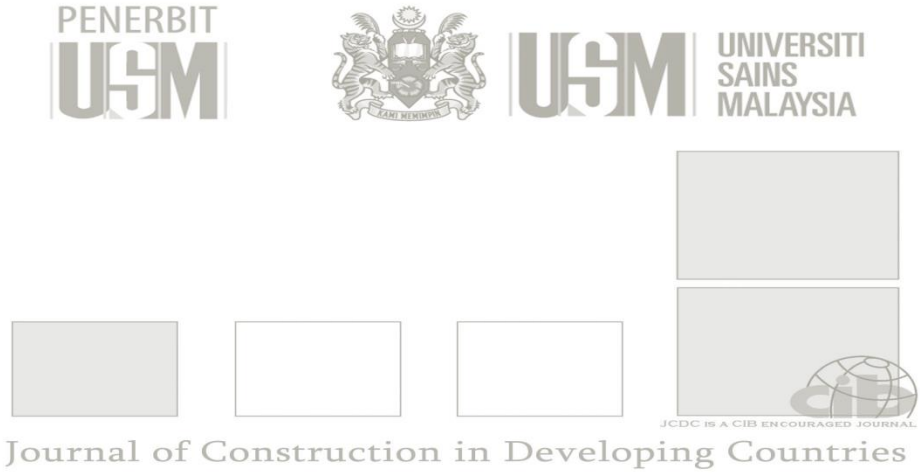

Manuscript Title	Collaborative Project Procurement in the Construction Industry: Investigating the Drivers and Barriers in Malaysia
Authors	Jeffrey Boon Hui Yap and Sin Ying Lim
Submitted Date	1-Oct-2021 (1st Submission)
Accepted Date	8-Feb-2022
DOI	https://doi.org/10.21315/jcdc-10-21-0157

Collaborative project procurement in the construction industry: Investigating the drivers and barriers in Malaysia

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Abstract

The traditional construction procurement approach engenders adversarial attitudes and the pursuit of individual organisation's gain has led to inefficiencies and poor project management. Previous studies suggest collaborative working in the construction supply chain may produce better outcomes. This paper examines the drivers and barriers to embracing collaborative procurement practices pertinent to the construction industry in the developing world; using Malaysia as a base of the study. Drawing on an empirical survey involving construction professionals (contractors, consultants and clients), the significance of the drivers and barriers are prioritised based on mean scores. The most significant drivers are better quality outcome, better cost control, better time control, effective problem solving and increased client satisfaction. As for the barriers, resistance to change current way of working, communication problem, incompatible personalities and organisational cultures, lack of top management support, and inadequate training and guidance rank the highest. Next, Kruskal-Wallis tests were selected to compare the results given by the three groups of respondents. All

the drivers are homogeneously perceived except for 'long-term relationship'. Homogeneous perceptions are observed for all drivers. Results from this study are expected to benefit both construction practitioners and researchers in the exploration, planning and implementation of collaboration-based project procurement arrangements.

Keywords:

Collaborative procurement, drivers, barriers, project management, construction industry

INTRODUCTION

Fragmentation has been widely criticised as a collaborative issue in the construction industry, affecting the supply chain in all aspects (Kim et al. 2021; Schöttle et al. 2014; Yap et al. 2020). These competing relationships with detachment behaviour and the lack of inter-organisational collaboration often resulted in project time and cost overruns, disputes, safety problems, client dissatisfaction, underperformance, sluggish productivity and many more. Moving towards collaborative working is considered a significant strategy for surmounting these issues as well as for efficiency improvements (Caniëls et al. 2019; Deep et al. 2021; Yap et al. 2021). Previous studies emphasise the need to adopt new ways of working to remain competitive and meet increasing customer expectations (Cao et al. 2015; Klakegg et al. 2021; Xue et al. 2018). The concept of collaboration was gaining increasing

acceptance due to the internationalisation demand, competition, and unpredictable risk within the business setting (Koolwijk et al. 2018; Memon et al. 2021; Zhang et al. 2020). Hughes et al. (2012, p. 1471) explain that "collaboration was often used in the literature as an umbrella term for alliancing, joint ventures, networking, and partnering". Considering this, organisations work together for knowledge and resource sharing to strategically improve construction productivity (Zhang et al. 2020). According to Hosseini et al. (2016), partnering which is a form of relational contracting has been widely used as a solution to avoid the competing objectives and controversies that have plagued the industry for too long. These terms (i.e., collaborative contracting, relational contracting, strategic alliances, partnering and integrated teamwork) are used interchangeably to describe collaborative construction contracting mechanisms throughout this paper. Despite the perceived benefits of the collaborative arrangement, the concept is still not fully developed in Malaysia as compared with other developed countries (Ali et al. 2010).

It is worth noting that the adoption of collaboration is beleaguered with several problems, such as mistrust, ineffective communication, adversarial relationships, and unnecessary disputes (Yap et al. 2021; Zhang et al. 2020). Traditional procurement remains the most commonly used method within the Malaysian construction industry (Shehu et al. 2014). Over the years, many researchers and construction practitioners have continued criticising the adversarial nature of this relationship. For example, Xue et al. (2010) underscore that it is difficult to establish collaboration between various parties

in a traditional way. The separation of the design and construction phase in traditional contracting practice hinders the integration between different parties by promoting a confrontational culture. This fragmented nature of the industry often leads to various problems such as claims, project delay, misunderstanding, low quality, dispute, poor communication as well as inefficiency and ineffectiveness of project performance (Mohd Nawi et al. 2014).

This study aims to appraise the drivers and barriers to adopting collaborative procurement practices pertinent to the construction industry in the developing world; using Malaysia as a base of the study. The study identified a list of drivers and barriers and prioritised them to uncover the significant motivating and impeding factors that influence collaboration-based procurement in construction projects. By taking cognisant of the drivers and barriers, construction stakeholders in developing countries may be able to rethink construction and develop policy that supports collaborative project procurement arrangements to achieve a defined and common business purpose.

DRIVERS FOR COLLABORATION

According to Camarinha-Matos et al. (2009), the word "collaboration" is derived from the Latin collaborate which means "to work together". It has been described as a process of joint creation involving a group of entities to enhance the capabilities of each other. Kalay (2001, p. 741) defines collaboration as "the agreement among specialists to share their abilities in a

particular process, to achieve the larger objectives of the project as a whole, as defined by a client, a community, or society at large". This further describes collaboration is needed when any single individual or organisation faces limited resources to accomplish a challenging task independently. Schöttle et al. (2014, p. 1275) relate collaboration as "an inter-organisational relationship with a common vision to create a common project organisation with a commonly defined structure and a new and jointly developed project culture, based on trust and transparency; to jointly maximise the value for the customer by solving problems mutually through interactive processes, which are planned together, and by sharing responsibilities, risk, and rewards among the key participants". In this vein, supply chain collaboration involves multiple parties engaging in a relationship with its emphasis on common goals - improved outcomes and benefits (Soosay and Hyland 2015). In construction, collaborative interactions involve co-ordination, co-operation and co-construction (Gomes and Tzortzopoulos 2020).

Table 1 presents the 12 drivers for collaborative practices in construction projects identified from published sources in the construction management domain to provide the theoretical underpinning.

Table 1. Literature map for drivers for collaboration in the construction industry

Ref	Drivers	(Ali et al. 2010)	(Ling et al. 2014)	(Lu and Yan 2007)	(Olsson and Espling 2004)	(Black et al. 2000)	(Hughes et al. 2012)	(Li et al. 2001)	(Ledger 2003)	(Beach et al. 2005)	(Chan et al. 2003a)	(Akintoye and Main 2007)	(Rahman et al. 2014)	(Tabish and Jha 2015)	(Xue et al. 2018)	Frequency
D1	Better quality outcome	√	√	√	√	√					√	√	√		√	9
D2	Better time control	√	√		√	√			√		√	√	√		√	8
D3	Better cost control	√	√		√	√			√		√	√			√	8
D4	Reduction of conflict	√		√	√	√		√		√	√					7
D5	Innovation	√	√	√						√	√	√			√	7
D6	Long term relationship	√	√				√	√		√	√					6
D7	Increased competitiveness		√	√		√	√	√								5
D8	Better safety performance	√	√							√	√			√		5
D9	Increased client satisfaction	√		√		√					√	√				5
D10	Risk sharing			√					√		√	√				4
D11	Effective problem solving	√							√	√	√					4
D12	New market opportunities		√	√		√						√				4

In project-based supply chains in the construction industry, collaboration is seen as a key catalyst to increase the efficiency, quality of production processes and project-based performance (Koolwijk et al. 2018; Ling et al. 2014; Xue et al. 2018). Contractual agreements are crucial in establishing trust and strengthening relationships that can move away from blame-culture between parties (Faris et al. 2019; Hosseini et al. 2016). Recently, Deep et al. (2021) conducted a systematic review of 110 articles to observe that the enablers of collaboration comprise trust, commitment and reliability. To develop a collaborative working relationship, project parties need to align their interests and integrate their specific capabilities to complete the project successfully; capitalising on affective trust, shared vision, open communication and collective problem solving (Ali et al. 2010; Lu and Yan 2007; Suprapto et al. 2015).

Ling et al. (2014) conducted a comparative study investigating the factors that drive the adoption of relational contracting in Beijing and Sydney to observe that this procurement approach led to good outcomes concerning cost, time, quality, satisfaction and competitiveness. Likewise in Norway, Hosseini et al. (2016) reported that project partnering brings higher performance than that traditional procurement methods; providing an opportunity for cost savings, innovation, risk sharing between parties and disputes reduction. In the UK, contractors and clients were more positive about partnering than consultants to bring significant benefits, particularly fewer adversarial relationships and increase end-customer satisfaction (Black et al. 2000). In another UK-based study, Akintoye and Main (2007) identified

15 reasons for collaborative relationships in construction and their factor analysis revealed 5 principal factors, viz risk-sharing strategy, access to innovation, response to market needs, resource-efficient production and client requirements.

BARRIERS HAMPERING COLLABORATION

In investigating the barriers and challenges of collaborative procurement in Australia, Ey et al. (2014) interviewed 17 industry professionals to observe several commercial-related inhibitions (e.g. losing competitive advantage against competitors, releasing control, sharing of identity, intellectual property rights protection issues, collaborative governance and complexity in context and implementation) and human-related inhibitions (e.g. trust, commitment and openness). In a Swedish study involving 87 professionals in client-based organisations, Eriksson et al. (2008) reported the most critical barriers as those attributable to cultural and organisational aspects. They further reported that procurement procedures are still aligned to competitive bidding even though new procurement procedures can promote increased cooperation for better outcomes. In Singapore, only a small fraction of projects adopted collaborative contracting whereby the leading barriers are problems of changing culture, lack of financial incentives and lack of legal structures (Zhang et al. 2020). In China, the implementation of partnering has faced some difficulties due to scepticism, lack of success stories and absence of a facilitator (Zuo et al. 2013). In a comparative study of Beijing and Sydney, Ling et al. (2014) found six and one significant barriers

respectively in the adoption of relational contracting practices. This finding implies that relational contracting is not suitable in economies with high levels of corrupt practices, lack of transparency and shady deals. For effective relational contracting, frank and open communication in a collaborative project environment are required.

A detailed background review reveals 12 significant barriers associated with collaboration and relevant to the construction industry. These are summarised in Table 2 in order of frequency of occurrence in the literature.

Table 2. Literature map for barriers hampering collaboration in the construction industry

Ref	Barriers	(Tey et al. 2012)	(Mohd Nawi et al. 2014)	(Ling et al. 2014)	(Fulford and Standing 2014)	(Zuo et al. 2013)	(Chan et al. 2003b)	(Eriksson et al. 2008)	(Ghassemi and Becerik-Gerber 2011)	(Kumaraswamy et al. 2005)	(Zhang et al. 2020)	(Ey et al. 2014)	(Kwofie et al. 2018)	(Olanrewaju et al. 2017)	(Ng et al. 2002)	Frequency
B1	Adversarial environment	√	√				√	√		√		√	√	√	√	8
B2	Communication problem	√					√					√	√	√	√	6
B3	Lack of top management support						√	√		√		√		√	√	6
B4	Incompatible personalities and organisational cultures	√							√	√	√	√	√			6
B5	Lack of legislative regulations					√		√			√	√		√	√	6
B6	Lack of financial support			√	√	√					√					4
B7	Uneven of risk-sharing	√					√			√				√		4
B8	Lack of commercial control			√				√				√			√	4
B9	Exclusion of key subcontractors							√	√	√					√	4
B10	Fragmentation of construction process	√	√						√				√			4
B11	Resistant to change current way of working								√		√			√		3
B12	Inadequate training and guidance			√			√								√	3

METHODOLOGY

A positivism paradigm using deductive reasoning was adopted to postulate the drivers and barriers of collaborative procurement practices in the construction industry. The variables were first identified from a comprehensive literature review as presented in Tables 1 and 2. A quantitative approach with a cross-section design using a field survey was selected to gather feedback from construction practitioners on this topic. The collected quantitative data were analysed using Statistical Package for Social Science (SPSS) Version 23.

Research Instrument

A structured self-completion questionnaire is an efficient instrument for collecting data from a large sample for reliable statistical analyses. The questionnaire contained three sections. Section A was used to collect the respondents' demographic profile, in terms of the type of organisation, job position and working experience. In Section B, the respondents were asked to specify their level of agreement on the drivers to adopt collaborative procurement practices in the Malaysian construction industry based on a five-point Likert scale (1 = strongly disagree; 5 = strongly agree). In Section C, the respondents rated the barriers that hindered collaborative procurement practices in the construction industry on a similar scale of agreement in Section B.

Data collection

The target population consisted of construction professionals from contractors, consultants and clients (developers). The sampling frame is the Greater Kuala Lumpur/Klang Valley region which is a thriving economic epicentre of Malaysia (Yap and Chow 2020). Convenience and snowball sampling techniques were adopted to administer the questionnaire via email and business-related social network viz. LinkedIn. Of 405 distributed, 151 valid responses were returned; attaining a reasonable response rate of 37.3%.

Table 3 summarises the background of respondents. All the respondents have attended tertiary education and the majority had over 5 years of construction-related experience. About 60% are in managerial and above positions. Overall, the background of the respondents reflects their credibility in providing reliable information on issues related to the Malaysian construction industry.

Table 3. Respondents' profile

Demographic characteristics	Categories	Frequency (N = 151)	Percentage (%)
Type of organisation	Contractors	57	37.7
	Consultants	45	29.8
	Clients (developers)	49	32.5
Job position	Executive	62	41.1
	Manager	42	27.8
	Senior manager	26	17.2
	Director/Top management	21	13.9
Education background	Postgraduate degree (PhD, Master)	15	9.9
	Bachelor's degree	130	86.1
	Diploma	6	4.0
Working experience	0-5	47	31.1
	6-10	39	25.8
	11-15	27	17.9
	16-20	21	13.9
	Over 20	17	11.3

RESULTS AND DISCUSSION

Ranking of Drivers for Collaborative Procurement

Cronbach's alpha is 0.879 for the 12 drivers appraised, which is better than 0.70 to establish internal consistency reliability (Hair et al. 2019). The mean scores and standard deviations were computed from the five-point agreement score used in the questionnaire to determine the order of significance of the drivers for collaborative relationships in construction. Given the p-value of the Shapiro-Wilk test is below 0.05, the data significantly deviate from a normal distribution. As Table 4 indicates, all 12 drivers have mean scores exceeding 4.0, which is regarded as extremely significant in the rating scale. Based on overall, the highly-rated drivers are "better quality outcome" (mean = 4.30), "better cost control" (mean = 4.24), "better time control" (mean = 4.23), "effective problem solving" (mean = 4.23) and "increased client satisfaction" (mean = 4.19).

Table 4. Mean and ranking of drivers for collaborative procurement

		Overall (N = 151)			Contractors (n = 57)			Consultants (n = 45)			Clients (developers) (n = 49)			Kruskal-Wallis	
Ref	Drivers	Mean	SD	Rank	Mea	SD	Rank	Mea	SD	Rank	Mea	SD	Rank	Chi-square value	p-value
D1	Better quality outcome	4.30	0.65	1	4.33	0.55	3	4.22	0.74	2	4.33	0.69	1	0.50	0.98
D3	Better cost control	4.24	0.77	2	4.26	0.67	6	4.29	0.73	1	4.16	0.92	7	0.22	0.90
D2	Better time control	4.23	0.72	3	4.42	0.57	1	4.16	0.71	4	4.08	0.84	8	5.32	0.70
D11	Effective problem solving	4.23	0.90	4	4.28	0.77	4	4.16	1.02	5	4.24	0.93	3	0.20	0.91
D9	Increased client satisfaction	4.19	0.83	5	4.26	0.64	5	4.11	0.98	7	4.16	0.87	6	0.09	0.96
D12	New market opportunity	4.16	0.76	6	4.18	0.74	7	4.11	0.78	6	4.18	0.78	5	0.32	0.85
D6	Long-term relationship	4.14	0.78	7	4.39	0.53	2	3.96	0.93	8	4.02	0.83	10	7.02	0.03*
D5	Innovation	4.07	0.74	8	4.09	0.74	12	3.93	0.81	10	4.18	0.67	4	2.42	0.30
D7	Increased competitiveness	4.05	0.86	9	4.11	0.82	10	3.96	0.95	9	4.08	0.84	8	0.61	0.74
D4	Reduction of conflict	4.05	1.05	10	4.11	1.05	11	4.18	1.01	3	4.02	0.90	12	2.73	0.26
D8	Better safety performance	4.03	0.879	11	4.16	0.73	8	3.87	1.01	11	3.86	1.10	11	1.61	0.45
D10	Risk sharing	4.03	0.941	12	4.12	0.78	9	3.69	1.24	12	4.24	0.69	2	4.84	0.09

Note: SD denotes standard deviation.
*The mean is significant at the 0.05 level of significance.

Time, cost, and quality, known as the "Iron Triangle", have been the most popular metaphor used to represent the success criteria of a project (Pollack et al. 2018). From this perspective, the successful completion of a project is highly dependent on how well these criteria are balanced. It is then understandable that project stakeholders are primarily concerned with these three parameters. Investigating the benefits of relational contracting practices in public projects, Ling et al. (2014) observed that such cooperative engagements engender collaborative working arrangements which then deliver improvement in quality through better design, reduction in engineering rework and safer working environment. Likewise, Lu and Yan (2007) asserted that the establishment of problem-solving procedures which are mutually agreed upon between partnered parties can lead to better technical performance. Collaborative culture could increase the learning curve and allow continuous improvement among team members which enhances the quality of a project (Olsson and Espling 2004). Comparable findings are also reported in Malaysia (Rahman et al. 2014), China (Xue et al. 2018) and the UK (Black et al. 2000).

Uncertainty of the deliverable and work environments usually leads to higher administrative costs (Lu and Yan 2007). Partnering helps to lower project costs as it allows sharing of development costs and technologies between stakeholders (Ling et al. 2014). Xue et al. (2018) underscore that cost performance (monetary benefits) is one of the critical incentives for stakeholder collaboration in China. Olsson and Espling (2004) reported that the partnering approach in the UK led to total cost savings ranging from 5-

30%. Such an approach provides better cost control by reducing rework, scheduled times, variation order; improving communication; eliminating blame culture and adversarial relationship; encouraging problem solving; promoting trust; as well as centralising project objectives (Ali et al. 2010).

Concerning time control, Ali et al. (2010) opine that collaborative engagement reduces the chances of project delay due to its well-planned project schedule, timely decision-making, reliable working programmes as well as early contractor's involvement at the design phase which can help to advise on constructability and optimise value engineering. Olsson and Espling (2004) reported time savings of 10-40%. Furthermore, collaboration would lead to improved communications, better coordination with simplified administrative procedures, reduced project delivery time and attainment of project objectives (Ledger 2003; Ling et al. 2014; Xue et al. 2018; Yap et al. 2021).

Collaborative contracting allows each member to jointly anticipate and shares information about the potential problems that may arise and devise reliable action plans to deal with those problems in the mutual best interests of the project (Chan et al. 2003a). Parties are encouraged to learn from each other and cooperate in problem-solving. Since there are various parties involved, it allows the exchange of thoughts and ideas from different perspectives which enables the parties to learn from each other to achieve an optimum result (Ali et al. 2010). Some of the contractors indicated that a partnering relationship allows them to make use of the specialist knowledge

and expertise of their partner, as well as technical competence and problem-solving ability (Beach et al. 2005).

Akintoye and Main (2007) observed that the most important driver identified by contractors in the UK for collaborative practices is "in response to customers' needs". Previous studies also found collaboration improves the satisfaction of the client as they are involved directly in the construction progress and well-informed of every single progress to ensure their full commitment to the project (Ali et al. 2010; Chan et al. 2004; Lu and Yan 2007). Early involvement enables contractors and suppliers to build a clearer vision of the client's needs and enables them to create value by meeting those needs more effectively (Beach et al. 2005).

Further, the Kruskal-Wallis ANOVA test affirms the consistency of the ratings of three professional groups, except for "long-term relationship". The contractor group rated this variable higher than their peers in consultant and client groups. This finding reflects that most Malaysian contractors are driven to collaborate to maintain long-term relationships with other construction parties. It is widely acknowledged that the construction industry is continuously evolving with the expansion of new business strategies and technologies. Moreover, the number of construction firms in Malaysia has been increased dramatically in recent times, creating fierce competition to win projects. This is further supported by Ali et al. (2010) concerning the numerous existing partnering arrangements in Malaysia comprising two or more local contractors as well as between local and international contractors. Collaborative partnering is needed for organisational growth

because it allows the partnered parties to look for future cooperation by sharing their knowledge, skills and vision (Li et al. 2001). Continued regular repeat business could be the catalyst to practise collaboration-based procurement between project stakeholders (Beach et al. 2005). In contrast, the consultants and clients do not seem to be influenced much by the intensely competitive nature of the industry.

Ranking of Barriers Hampering Collaborative Procurement

As part of the analysis, Cronbach's alpha for the 12 barriers evaluated is 0.828, which also satisfies the criterion for scale reliability (Hair et al. 2019). Similarly, mean scores and standard deviations are used to prioritise the barriers. Ranked in descending order of means, Table 5 summarises the overall SD and ranking as well as according to the professional groups (contractors, consultants and clients). Overall, the mean scores range from 3.71 to 4.25. The five most significant attributes are "resistance to change current way of working" (mean = 4.25), "communication problem" (mean = 4.17), "incompatible personalities and organisational cultures" (mean = 4.09), "lack of top management support" (mean = 4.09) and "inadequate training and guidance" (mean = 4.06).

Table 5. Mean and ranking of barriers hampering collaborative procurement

		Overall (N = 151)			Contractors (n = 57)			Consultants (n = 45)			Clients (developers) (n = 49)			Kruskal-Wallis	
Ref	Barriers	Mean	SD	Rank	Mea	SD	Rank	Mea	SD	Rank	Mea	SD	Rank	Chi-square value	p-value
B11	Resistant to change current way of working	4.25	0.72	1	4.28	0.59	1	4.18	0.89	1	4.29	0.71	1	0.12	0.94
B2	Communication problem	4.17	0.85	2	4.16	0.73	2	4.16	0.98	2	4.20	0.89	5	0.84	0.66
B4	Incompatible personalities and organisational cultures	4.09	0.82	3	4.02	0.64	4	4.04	1.00	5	4.20	0.84	4	3.09	0.21
B3	Lack of top management support	4.09	0.94	4	3.98	0.94	6	4.09	0.97	3	4.22	0.92	3	2.45	0.29
B12	Inadequate training and guidance	4.06	0.88	5	4.04	0.76	3	3.87	1.08	7	4.27	0.79	2	4.46	0.11
B10	Fragmentation of construction process	3.98	0.78	6	4.02	0.69	5	4.07	0.81	4	3.86	0.84	7	2.14	0.34
B7	Uneven of risk-sharing	3.91	0.91	7	3.89	0.86	7	3.73	1.05	9	4.10	0.80	6	2.79	0.25
B6	Lack of financial support	3.75	1.03	8	3.77	0.96	9	3.62	1.15	11	3.84	0.99	8	0.63	0.73
B1	Adversarial environment	3.74	0.85	9	3.68	0.78	11	3.87	0.73	6	3.67	1.03	12	1.62	0.45
B5	Lack of legislative regulations	3.74	0.92	10	3.68	0.87	12	3.73	0.96	8	3.80	0.96	9	0.45	0.80
B8	Lack of commercial control	3.72	0.88	11	3.72	0.86	10	3.71	1.01	10	3.71	0.79	10	0.35	0.84
B9	Exclusion of key subcontractors	3.71	0.93	12	3.82	0.78	8	3.60	1.12	12	3.67	0.90	11	1.10	0.58

Note: As Table 4.

Ghassemi and Becerik-Gerber (2011) opine that there is a cultural barrier within the industry as many companies are accustomed to the narrow leadership and are unwilling to move away from the traditional hierarchy. This is further supported by Olanrewaju et al. (2017), stating that many contractors fail to adopt collaborative working because they are comfortable with the current models. A similar result was found in Beijing where most of the clients from China are reluctant to deviate themselves from the conventional hierarchical position of control in their organisations (Ling et al. 2014). This is akin to Ey et al. (2014) asserting that clients are hesitant to move toward construction partnering because they are unwilling to give up some power which could weaken their position of authority on the project. Moreover, the diversity of cultures, languages and backgrounds amplifies the difficulty to implement a new initiative and alter existing working practices (Zhang et al. 2020). Unwillingness to accept new ideas and resistance to change is a personal dimension of social barriers in the construction business and project delivery (Kwofie et al. 2018). Nonetheless, the persisting adversarial setting in the construction industry may lead contracting parties to resist integrated project culture and to behave opportunistically (Rahman and Kumaraswamy 2008).

Ng et al. (2002) reported that most of the contractors who had experienced unsuccessful project partnering relationships in Australia indicated "lack of continuous open and honest communication" as one of the major barriers for partnering arrangement due to the adoption of ''win-lose'' mentality among project participants. This is in line with Ey et al. (2014)

where communication failure is the critical barrier that is often quoted by practitioners as the potential root cause of disagreement. To achieve successful collaboration, it is critical to establish effective communication channels. Regular meetings, for instance, are suggested as a good channel to improve communication effectiveness (Yap et al. 2017).

It is difficult for a diverse group of people to reorient themselves into the same team especially when the individuals had previously worked in different organisational cultures (Kumaraswamy et al. 2005). A multidisciplinary project team causes misalignment between technical interdependence and organisational independence (Tey et al. 2012). This further causes the clashes of culture that impede the development of relational contracting. In South Africa, Kwofie et al. (2018) further pointed out that personal dimensions of social barriers form a major inhibiter to collaborative working such as unwillingness to share information. In light of this, Baiden et al. (2006) suggest that each member has to fit themselves into a project team and see each member at the same level and are equally important to the project team. A recent study by Zhang et al. (2020) reported that "inherent difficulties in changing the organisational culture" is the biggest barrier for collaborative contracting within the Singapore construction industry. There are abundant factors that influence the organisational culture, changing the mindset is, therefore, a huge challenge for the industry.

According to Kumaraswamy et al. (2005), top management support is extremely important for the relational contracting approach, without this, contracting parties may not have any ideas about the potential benefits

involved and how it should be implemented. Undeniably, the intensity of support from the top management significantly affects the success of projects in any organisation (Olanrewaju et al. 2017; Yap and Chow 2020). In Hong Kong, Chan et al. (2003b) elucidate that even though upper management actively promotes the partnering arrangement, the concept is often not conveyed down the layers of management easily; leading to misunderstanding by team members from the lower hierarchical levels. When the senior management is solely providing lip service rather than actual commitment, the partnering relationship is doomed to fail. Furthermore, the discontinuity between the objectives/key performance indicators of senior management and project management hinders the knowledge sharing amongst the partnered parties (Ey et al. 2014).

A previous study in Beijing revealed that relational arrangement was not actively adopted by the practitioners due to their limited knowledge of the benefits of relational contracting (Ling et al. 2014). Lack of training and guidance causes the team members not to have a clear picture of the concept of partnering and hence hinder the implementation of the partnering approach (Chan et al. 2003b). Ng et al. (2002) also highlighted that inadequate information and guidance from the client form a significant barrier for collaboration working as the contractor failed to appreciate the requirements in achieving project partnering.

As the data is non-parametric (Shapiro-Wilk test's p-value < 0.05), Kruskal–Wallis test found no statistically significant differences in opinions between the

respondent groups; indicating perceived homogeneity in the barriers appraised.

CONCLUSIONS

In recent years, the Malaysian construction industry has been generally regarded as underperforming, inefficient, unproductive and wasteful. Effective collaboration has been promoted as an ideal solution for ameliorating poor project performance while minimising hostility within the construction industry. This study was therefore been carried out to explore the potential drivers and critical barriers to adopting collaborative procurement practices in construction projects. Following a detailed literature review, 12 drivers and 12 barriers were identified. A survey questionnaire was then employed to solicit 151 opinions from construction practitioners representing contractors, consultants and clients.

The first objective was to appraise the drivers for collaborative procurement practices in a project-based construction setting. The most significant drivers are better quality outcome, better cost control, better time control, effective problem solving and increased client satisfaction. The findings imply that the triple constraint of time, cost, and quality has been the prime concern for the respondents in cultivating construction collaboration. Additionally, the Kruskal-Wallis test revealed that there were significant differences in perception of the certain driver which is a long-term relationship by the respondent groups. It was believed that such

discrepancies were caused by divergent accountabilities of the groups in the construction projects.

The second objective was to examine the critical barriers hampering collaborative procurement practices in construction projects. From the mean scores, the most dominant barriers are resistance to change current way of working, communication problem, incompatible personalities and organisational cultures, lack of top management support, and inadequate training and guidance. The Kruskal-Wallis test showed that all respondent groups were having homogeneous perceptions on the potential barriers hampering collaboration in the construction industry.

The findings of this study contribute with some practical implications. This study identified the crucial drivers for embracing collaborative procurement practices and critical barriers that need to be overcome to make collaboration smoother and more effective for mutual benefits and win-win scenarios. It is worth highlighting that the construction industry focused too much on short-term competition rather than the long-term strategic alliance. This research also provides a clear picture that people and relationships are considered to be the core of collaboration. The continuity in relationships between companies, teams and individuals are essential to secure collaborative relationships within the construction industry. Additionally, the findings can guide construction practitioners and relevant authorities in devising effective strategies to promote the adoption of collaborative relationships in procurement. Albeit the empirical data were collected in Malaysia, the results should be applicable to the construction industry in other

developing countries. Despite different natural, economic, political and social backgrounds, developing countries have similar problems (Kang et al. 2018).

This study is not free from limitations. Although the use of the questionnaire survey enables a greater sample size for statistical analyses, it does not allow probing questions for construction practitioners to explain themselves further which may enrich the findings. Further studies using qualitative interviews and case study research to draw lessons from organisations that have successfully implemented collaborative practices are therefore needed for in-depth explorations. Given that the concept of collaborative procurement is still premature in Malaysia, it worth noting that the survey explored the perception of the construction professionals based in Malaysia but the respondents were not distinguished into *experienced* or *inexperienced* in collaborative construction projects and be subjected to personal bias. Nonetheless, the research findings are still useful to contribute meaningfully in improving the awareness of the potential drivers and understanding of the major barriers to overcome. This study appraised the aspects of collaborative project procurement in the context of Malaysia. A comparative study with other ASEAN/developing countries is needed for the triangulation of evidence. It is recommended that future research could explore devising a collaborative project procurement model, particularly for the construction industry in developing countries.

ACKNOWLEDGEMENTS

The authors gratefully acknowledge the contributions of the survey participants, who made this article possible by sharing their views, opinions and experiences. The authors would also like to thank the anonymous reviewers for their constructive and insightful comments, which have helped improve the quality of this paper.

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