Available online at www.sciencedirect.com

ScienceDirect

International Journal of Project Management 34 (2016) 494–507

International Journal of Project Management

www.elsevier.com/locate/ijproman

Selection and use of Alternative Dispute Resolution (ADR) in construction projects — Past and future research

Chia Kuang Lee [a,*], Tak Wing Yiu [a], Sai On Cheung [b]

[a] Faculty of Engineering, Department of Civil and Environmental Engineering, The University of Auckland, Private Bag 92019, Auckland 1142, New Zealand
[b] Department of Architecture and Civil Engineering, City University of Hong Kong, 83 Tat Chee Avenue, Hong Kong

Received 7 September 2015; received in revised form 17 December 2015; accepted 22 December 2015
Available online 14 January 2016

Abstract

Research on Alternative Dispute Resolution (ADR) selection and use has been gaining prevalent interest from project practitioners and researchers. This study presents a systematic review of the factors influencing ADR selection and use in construction projects for the last 32 years. A total of 446 articles from 21 construction project-related journals were identified and reviewed. Among these, only 13 articles focused on the factors influencing ADR selection and use. These 13 articles were then analysed, synthesized, and summarized in terms of the *research methods used*, *distribution across countries* and *citation influences*. The studies on the selection and use of ADR were mainly based on utility. Utility factors offer less conceptual basis to explain decision making. To address this deficiency, this study reclassified ADR selection and use with reference to Theory of Planned Behaviour (TPB) based framework. The potential development and research avenues of using the TPB framework were also discussed.

Keywords: Alternative Dispute Resolution; ADR selection and use; Theory of Planned Behaviour

1. Introduction

Conflicts are common in project based organizations, however it would escalate into disputes if not managed properly (Lu et al., 2015). When disputes are inevitable, project managers nevertheless need to handle and resolve them through various resolution processes (Cheung, 1999). Alternative Dispute Resolution (ADR) techniques have gained popularity as means to manage conflicts and disputes. ADRs are incorporated in standard form of project contracts as designated means to avoid and resolve project disputes (Jannadia et al., 2000, Chong and Zin, 2010). Common types of ADR to resolve construction project disputes include *Arbitration* (El-Adaway et al., 2009), *Adjudication* (Uher and Brand, 2005), *Negotiation* (Lu and Liu, 2014, Yiu and Lee, 2011, Murtoaro and Kujala, 2007), *Mediation* (Qu and Cheung, 2013), *Dispute Resolution Advisor System* (Cheung and Yeung, 1998), *Dispute Review Board* (Ndekugri et al., 2014), and *Mini Trial* (Stipanowich and Henderson, 1993). Literature of ADR has been growing over the last few decades for the novelty to both researchers and project practitioners.

To effectively promote and intervene the use of ADR in the construction industry, the factors influencing ADR selection and use need to be researched and fully understood. The investigation of the ADR selection and use factors would assist in decision making and offer practical guides for project practitioners (Chong and Zin, 2012). In response to this need, this study adopts systematic review techniques proposed by Khan et al. (2003), Ke et al. (2009), and Lu et al. (2014). Given the fact that the facet of the review only focus on ADR selection and use factors, the objectives of this paper are:

* Corresponding author. Tel.: +64 223728963.
E-mail address: chiakuang85@gmail.com (C.K. Lee).

http://dx.doi.org/10.1016/j.ijproman.2015.12.008
0263-7863/00/

1. To discover the general trend of dispute resolution related studies through a systematic review. The analysis shall cover *Time Span*, *Overall Journal Shares* and *Dispute Resolution Themes*.
2. To identify the factors influencing ADR selection and use. This section highlights *Research Methods*, *Citation Influences*, and *Distribution across Countries* pertaining to the reported studies.
3. To propose future research directions on ADR selection and use based on the results obtained from items 1 and 2 above.

2. Research methodology

To achieve objectives 1 and 2, a systematic review has been performed to provide evidence for synthesis (Tranfield et al., 2003). The overall systematic review process suggested by Khan et al. (2003), Ke et al. (2009), and Lu et al. (2014) is operationalized and presented in Fig. 1.

To start a systematic review, research questions need to be addressed unambiguously and specified order in *Step 1*: *Framing Questions for a Review* (Khan et al., 2003). Search keywords are required to be set in order to meet the requirements of study (Ke et al., 2009). To assure search range of the review, plural forms of search keywords are advisable (Lu et al., 2014). In *Step 2*: *Select Data Sources*, comprehensive and extensive search from relevant database and journals is required (Khan et al., 2003). Therefore, to capture as many relevant citations, journals in the appropriate domain of study need to be identified and selected (Lu et al., 2014). *Step 3*: *Perform Preliminary Search* involves preliminary search by using the search keywords within the defined specific domain of *Titles*, *Keywords*, and *Abstract*. These search keywords are inserted and entered into the identified and selected journal databases (Ke et al., 2009; Lu et al., 2014). The search needs to be rigorous, without any language restrictions, and subject to flow from the research questions as priori (Khan et al., 2003). Lu et al. (2014) and Ke et al. (2009) also suggested that this stage should use confined parameter search to ensure consistency. *Step 4 is*: *Assessing the Quality of Studies to ensure* academic rigor (Khan et al., 2003). This implies that acquired articles for analysis and synthesize should be subjected to assessed qualities. The qualities of the articles acquired from preliminary search need to be filtered. Understandably, preliminary search conducted in step 3 would yield broad spectrum of themes and mainstreams of articles. Therefore, visual examination of the content of the articles needs to be conducted (Ke et al., 2009). Next, In *Step 5*: *Summarizing the Evidence*, detailed review will be conducted to analyse and synthesize the remaining filtered articles, focusing on articles which are only related to topic of interests. It calls for extraction of articles which is aligned with research scope and foundation of the research (Lu et al., 2014). Normally, the data are summarized and synthesized in the form of tabulation by study characteristics, quality and effects of study. Statistical method may be used as appropriate (Khan et al., 2003). To achieve this, this step adopts synthesize outcomes done by Lu et al. (2014). This paper will first discuss generic research trends in the form of available *mainstreams* (*themes*), *overall time span*, *overall journal shares* and followed separately by *research methods*, *distribution across countries and citation influences* pertaining to the topic of interest. Finally, in *Step 6*: *Interpreting the Findings*, the data are synthesized and interpreted from the tabulation of the studies. Recommendations are made based on evidence of strength and weaknesses (Khan et al., 2003).

To achieve objective 3, the factors influencing ADR selection and use (the 'factors' hereafter) synthesized from systematic review must be first extracted and synthesized. The characteristics of the factors will be examined and clustered into their shared dimensions. Accordingly, any weaknesses and shortcomings identified in systematic review offers for potential research avenues by addressing research gap.

3. Results

3.1. Step 1: Framing Questions for a Review

Dispute resolution methods in the construction projects can be largely categorized into non-binding methods such as conciliation, executive tribunal, mediation, dispute review boards, dispute review advisors, mini-trials; while binding methods include adjudication, arbitration, expert determination, and litigation (Fenn et al., 1997, Cheung, 1999). In this study, the research question was: "What influences ADR selection and use?" With this, the search protocol was solely based on the following designated search keywords below to assure the criteria are maintained at a well-defined range:

"Dispute", "Disputes", "Dispute Resolution", "Dispute Resolution Selection", "Alternative Dispute Resolution", "Alternative Dispute Resolution Selection", "ADR", Alternative Dispute Resolution Adoption, "Alternative Dispute Resolution Choice", "Alternative Dispute Resolution Use", "ADR Selection", "ADR Adoption", "ADR Choice", "ADR Use", "Mediation", "Adjudication", "Conciliation", "Expert Determination", "Mini Trials", 'Dispute Review Board", "Dispute Review Advisors", "Negotiation", "Executive Tribunal", "Med-Arb", and "Litigation".

3.2. Step 2: Select Data Source

The journals were selected within the domains of building, property, built environment, architectural, engineering, design & construction project management journals to which ADR falls within their scope. In addition, journals which were listed in well-known database provider such as Taylor Francis Group, Emerald Insight, Science Direct, Wiley Online Publisher, IEEE Xplore Digital Library; as well as professional institutions such as the American Society of Civil Engineers (ASCE), the International Project Management Association (IPMA), and Project Management Institute (PMI). In Taylor & Francis Group Publications database, careful selection of journals under the subject of "Built Environment" was done. Under this domain, both "building project management" and "construction management" themes were explored. The aim and scope of the journals under these themes were investigated and analysed. The journals that were potentially relevant to the research of dispute resolution included (1) *Architectural Engineering and*

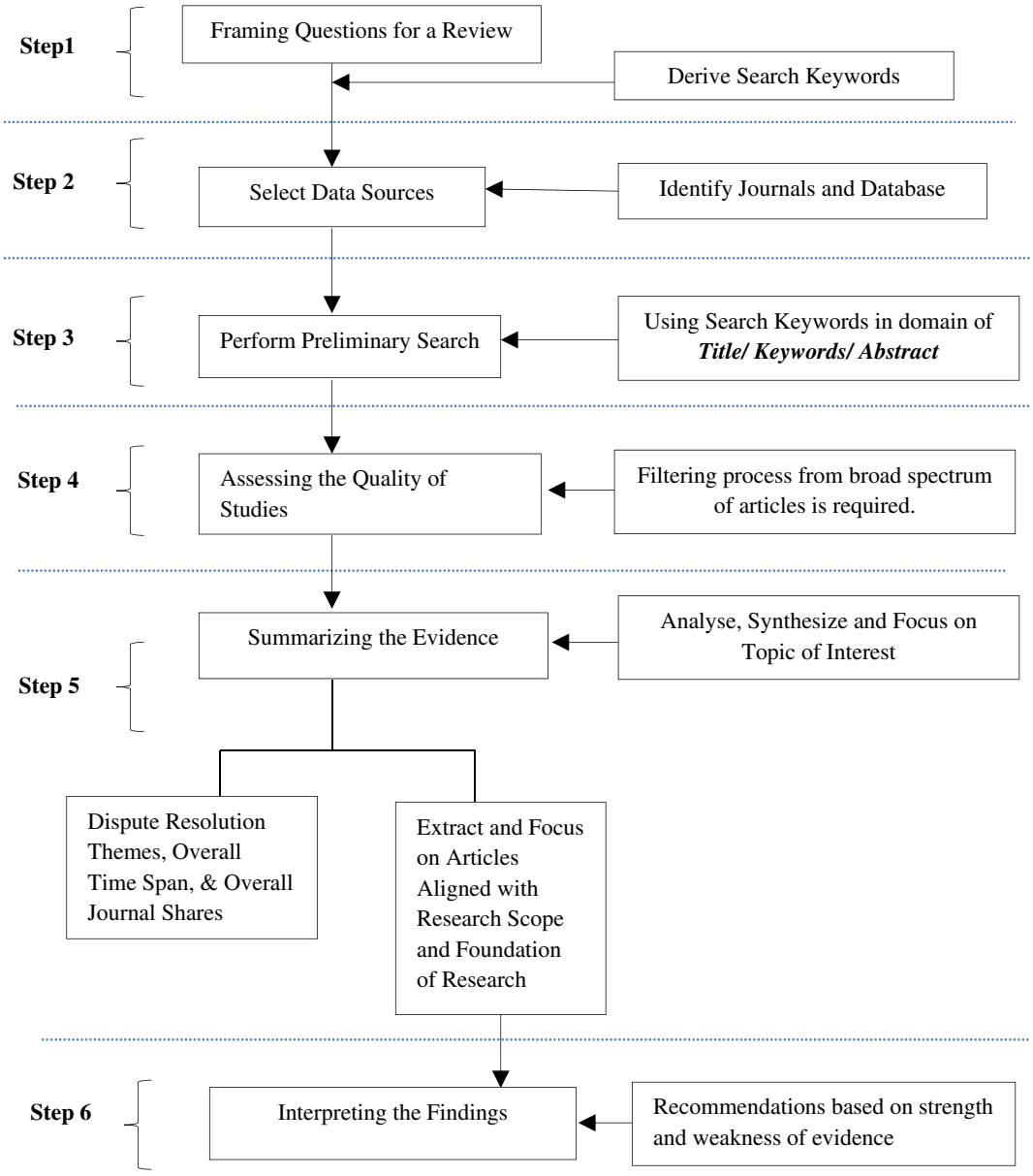

Fig. 1. Systematic review.

Design Management, (2) *Construction Management and Economics*, (3) *Engineering Project Organizational Journal*, (4) *Building Research and Information*, (5) *International Journal of Construction Education and Research*, (6) *Structure and Infrastructure Engineering*: *Maintenance*, *Management*, *Life-Cycle Design and Performance*, and (7) *Journal of Civil Engineering and Management*. Similarly, journals published by Emerald Insight Publisher were reviewed. Subjects under "Property Management & Built Environment" were explored, and the relevant journals identified were (8) *Engineering*, *Construction*, *and Architectural Management*; (9) *Construction Innovation*; (10) *Journal of Financial Management of Property and Construction*; and (11) *International Journal of Law in the Built Environment*.

As for Science Direct database, two journals were selected, namely (12) *Automation in Construction*; and (13) *International Journal of Project Management* [Endorsement of International Project Management Association (IPMA)]. With Wiley Online Library databases, (14) *Project Management Journal* — [*Endorsement of Project Management Institute* (*PMI*)], and (15) *Computer Aided Civil and Infrastructure Engineering* were enlisted.

The journals selected under the American Society of Civil Engineers (ASCE) library databases were: (16) *Journal of Construction Engineering and Management*, (17) *Journal of Legal Affairs and Dispute Resolution in Engineering and Construction*; (18) *Journal of Management in Engineering*; (19) *Journal of Professional Issues in Engineering Education and Practice*; (20) *Journal of Computing in Civil Engineering*. Lastly, within IEEE Xplore Digital Library, (21) *Engineering Management Journal* was selected. As a result, a total of 21 journals were selected as the sources for the purpose of this review.

3.3. Step 3: Perform Preliminary Search

In this step, preliminary search was keywords search (provided in Step 1 earlier) in a specific function of *Title* or *Keywords* or *Abstract*, into the 21 selected journal databases. There was no restriction imposed on the beginning date range to captivate the earliest published articles. The article searched includes those published up to year 2014. After preliminary search was done, a total of 927 articles have been retrieved in this step.

3.4. Step 4: Assessing the Quality of Studies

The purpose of this step is to assess the quality of studies. To achieve this, 927 articles retrieved in step 3 were subjected to a filtering process. This filtering process requires visual examination of all 927 articles in order to filter out non-scholarly papers such as "introduction", "editorial", "book review", "discussions and closures", "letter to editorial", "article in press", and "announcement". Accordingly, articles which were under these broad categories were filtered and excluded from detailed analysis. However, articles such as "Forum", "Case studies", "Features" and "Scholarly Paper" were maintained. After the filtering process, the numbers of articles that are related to ADR were reduced to 446 with details shown in Table 1.

3.5. Step 5: Summarizing the Evidence

Step 5 aims to analyse and synthesize the shortlisted 446 articles, as to derive and focus on theoretical explanation towards factors influencing ADR selection and use. To achieve this, all 446 project dispute-related articles were analysed. The review process was qualitative and based on careful interpretations. These articles were then organized and segmented into research interest and themes where deemed appropriate. The synthesized themes were: (1) Dispute Prevention; (2) Effects of Dispute; (3) Dispute & Dispute Resolution as Project Performance Indicator; (4) Legal Review; (5) Evolution of Alternative Dispute Resolution; (6) Predicting the Outcome of Dispute Resolution; (7) Predicting Project Dispute; (8) Dispute Resolution Case Studies; (9) Intrinsic and Transactional Costs in Dispute Resolution; (10) Negotiation; (11) Arbitration; (12) Adjudication; (13) Mediation; (14) Litigation; (15) Mini Trial; (16) Dispute Review Board; (17) Dispute Resolution Advisor; (18) Education in Dispute Resolution; and (19) Alternative Dispute Resolution (ADR) Selection and Use.

As noted from Table 2, the most popular theme was "Dispute Prevention" (140 articles, 31.3%), seconded by "Legal Review" (85 articles, 19.2%), followed by "Negotiation" (37 articles, 8.1%). On the other hand, the less favoured themes were "Effects of Dispute" (5 articles, 1.1%), "Education in Dispute Resolution" (5 articles, 1.1%), "Dispute Resolution Advisor" (2 articles, 0.5%), and finally with "Mini Trial" (1 article, 0.2%) being the least preferred. There were only 13 articles (2.7%) addressing ADR selection and use.

Based on these 446 articles, the trend of dispute resolution were further discussed in the form of *Overall Time Span* (Fig. 2 refers), *Overall Journal Shares* (Fig. 3 refers). Subsequently, the trend of 13 ADR selection and use articles was presented in the form of *Research Methods* and *Distribution across Countries* (Table 3 refers), and *Citation Influence* (Table 4 refers).

3.5.1. Overall time span

All 446 articles were tabulated and portrayed according to specified year within 1983 to 2014 in Fig. 2 above. Started at

Table 1
Total articles (before & after filter).

Journals	Before filter	After filter
Architectural Engineering and Design Management (*AEDM*)	5	2
Construction Management and Economics (*CME*)	120	45
Engineering Project Organizational Journal (*EPOJ*)	12	1
Building Research and Information (*BUILD RES INF*)	52	12
International Journal of Construction Education and Research (*IJCER*)	9	3
Structure and Infrastructure Engineering: Maintenance, Management, Life-Cycle Design and Performance (*SIE*)	2	1
Journal of Civil Engineering and Management (*JCEM*)	16	6
Engineering, Construction, and Architectural Management (*ECAM*)	41	23
Construction Innovation (*CI*)	13	3
Journal of Financial Management of Property and Construction (*JFMPC*)	7	2
International Journal of Law in the Built Environment (*IJLBE*)	31	21
Automation in Construction (*AUTOMAT-CONSTR*)	24	12
International Journal of Project Management (*INT J PROJ MANAGE*)	66	31
Project Management Journal (*PMJ*)	9	2
Computer Aided Civil and Infrastructure Engineering (*COMPUT AIDED CIV INF*)	9	3
Journal of Construction Engineering and Management (*J. CONSTR. ENG. M*)	196	95
Journal of Legal Affairs and Dispute Resolution in Engineering and Construction (*J. LEG. AFF. DISPUTE RESOLUT. ENG. CONSTR*)	88	58
Journal of Management in Engineering (*J. MANAGE. ENG.*)	89	45
Journal of Professional Issues in Engineering Education and Practice (*J. PROF. ISSUES ENG. EDUC. PRACT*)	95	62
Journal of Computing in Civil Engineering (*J. COMPUT. CIV. ENG.*)	34	13
Engineering Management Journal (*EMJ*)	9	6
Total	927	446

Table 2
Segmentation of articles according to themes.

Theme	Number of articles	Percentage %
Dispute Prevention	140	31.3
Effects of Dispute	5	1.1
Dispute & Dispute Resolution as Project Performance Indicators	18	4
Legal Review	85	19.2
Evolution of Alternative Dispute Resolution	14	3.1
Predicting the Outcome of Dispute Resolution	11	2.5
Predicting Project Dispute	8	1.8
Dispute Resolution Case Studies	15	3.4
Intrinsic and Transactional Costs in Dispute Resolution	9	2
Negotiation	37	8.1
Arbitration	10	2.2
Adjudication	21	4.7
Mediation	28	6.5
Litigation	12	2.7
Mini Trial	1	0.2
Dispute Review Board	12	2.7
Dispute Resolution Advisor	2	0.5
Education in Dispute Resolution	5	1.1
Alternative Dispute Resolution (ADR) Selection and Use	13	2.9
Total	446	100

one article in 1983, the annual average climbed to 3 before entering the 1990s. Although increased to 7 articles at 1990, the number of paper published was moderately maintained not more than 20 from the period of 1990 until 2005. The number of articles improved at 2006 and increased sharply to 35 articles a year later. The number of articles was at its peak of 38 in 2011, and dropped to 22 articles in the following year. At 2014, the number was maintained at 23, which was similar to year 2008. The trend overall showed a tremendous sharp increase of interest in dispute resolution beginning at the early 21st century.

3.5.2. Overall journal shares

Depicted in Fig. 3, the total journal shares of 446 articles were grouped according to their respective journals. Journal of Construction Engineering and Management (J.CONSTR.ENG.M) published the most articles (95 articles, 21%), followed by Journal of Professional Issues in Engineering Education and Practice (J.PROF.ISSUES ENG.EDUC.PRACT) (62 articles, 14.0%), and Journal of Legal Affairs and Dispute Resolution in Engineering and Education (J.LEG.AFF.DISPUTE RESOLU.ENG.CONST) (58 articles, 13%).

On the other hand, the three journals that published the least dispute related articles were Architectural Engineering and Design Management (AEDM) (2 article, 0.5%), Engineering Project Organizational Journal (EPOJ) (1 article, 0.2%), and Structure and Infrastructure Engineering: Maintenance, Management, Life-Cycle Design and Performance (SIE) (1 article, 0.2%).

3.5.3. Research methods and distribution across countries

Table 3 below shows the distribution of research methods in ADR selection and use themed articles. Most of the articles on ADR selection and use were in the form of empirical studies. 10 articles were in the form of empirical studies (38.5% interviews, 30.8% hybrid of surveys and interview, and 7.7% of pure surveys), while 3 articles were prototype (23.1%). The empirical studies varies across Hong Kong (5 articles), UK (2 articles), Malaysia (1 article), Singapore (1 article), and Taiwan (1 article).

3.5.4. Citation influences

Table 4 shows citation influence for ADR selection and use themed articles, based on Web of Science Database. For this study, citations (excluding self-citations) were used. Table 4 highly suggests Cheung's research team receives the highest citations and is among the frequent cited researcher. Based on citation report by Web of Science as of January 2015, the article entitled "Fundamentals of Alternative Dispute Resolution Processes" was separately cited 21 times, with an average of 1.5 cites per year.

3.6. Step 6: Interpreting the Findings

Based on the extracted 13 ADR selection and use articles, this step synthesizes the factors influencing ADR selection and use intensively. Accordingly, future research directions on

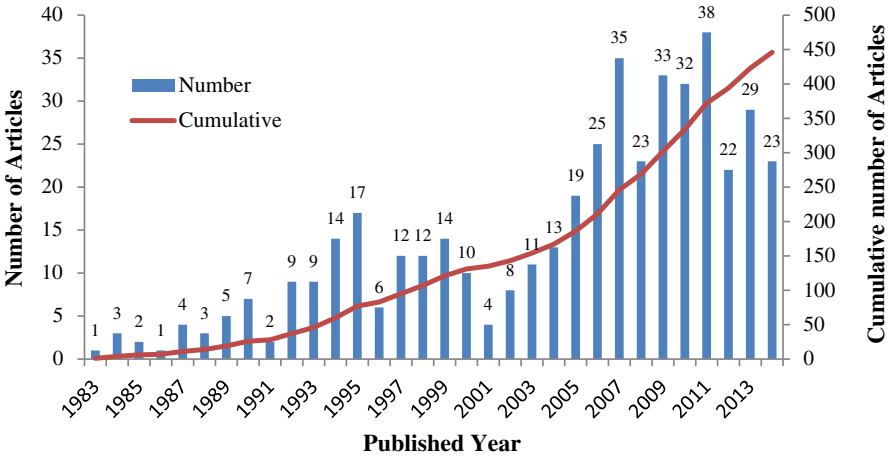

Fig. 2. Tabulation of 446 articles published: 1983–2014.

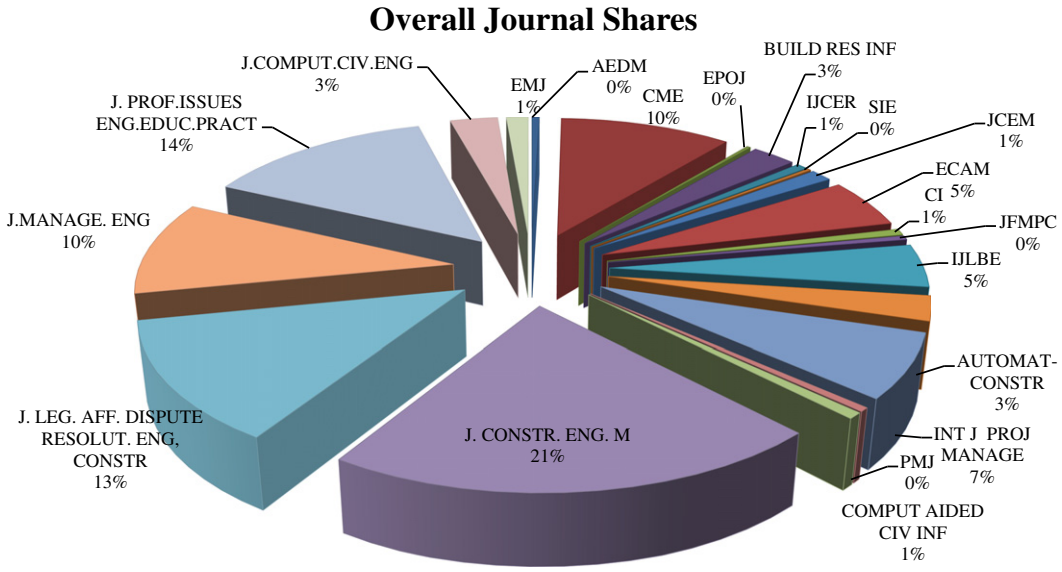

Fig. 3. Overall journal shares.

ADR selection and use were recommended based on the evidence of strength and weaknesses.

4. Discussions

Use of ADR is greatly affected by perceptions that would impede its attractiveness. Perception study by Brooker and Lavers (1997) revealed that the factors influencing ADR use include knowledge of ADR, agreement of both disputants in using ADR, confidence in ADR process, perception of relative advantage in time & cost, manipulation by legal practitioners and the use of ADR as a means of achieving delay.

In a later study, Brooker (1999) found that most construction project professionals are not confident in the advantages of ADR. Non-binding nature of ADR is the primary influential factor. On normative ground, when disputants are engulfed in legal issues, legal advisers such as lawyers are influential as referent groups in the use of ADR or otherwise. It was found that lawyers were unlikely to recommend ADR if the resolution process involved the use of delay by main contractors. Brooker's (1999) study was not the only one that suggests normative factors. According to Tsai and Chi (2009), people's intention and behaviour in managing disputes and preferences on resolution techniques are greatly influenced by cultural orientations. In the Asian Context, cultural orientations such as high power distance, feminity, and high uncertainty avoidance partially explain disputes escalate and mostly dealt through complex administrative routes.

Table 3
Distribution of research methods (ADR selection and use factors).

Method classification	Published articles	Percentage
Empirical		
Survey/questionnaire	1	7.7%
Interview	5	38.5%
Hybrid survey + interview)	4	30.8%
Modelling		
Prototype	3	23.1%

Research by Cheung (1999) attentively substantiated the critical factors affecting the use of ADR. The factors to be evaluated were in the form of attributes such as bindingness, cost involved, confidentiality, control over the proceeding, remedies, enforceability of decision, fairness, flexibility of proceedings, privacy, preservation of relationship, and width of remedy. On a subsequent study, Cheung et al. (2002) signified that the top ranked attributes include preservation of relationships, enforceability, neutrality, and consensus based on a pairwise calculation (Analytical Hierarchy Process). Based on the attributes as foundation of ADR use, Cheung and Suen (2002) developed a multi-attribute utility model to aid decision making and dispute resolution choice selection. The attributes were grouped in the form of "utilities" such as overall duration, relative cost, and flexibility in issues, strategy and agreement, confidentiality, preservation of relationship, binding decision and enforcement, degree of control by parties, and degree of control by third party. Perceived benefits and qualities of ADR such as preservation of relationship, neutrality, cost to obtain, fairness and speed were the top priorities of ADR features preferred by both users and neutrals e.g., mediators and arbitrators (Cheung et al., 2004). In another work by Chong and Zin (2012), the subtle factors influencing selection of ADR methods in Malaysian construction projects were combined into 7 dimensions, such as benefits of ADR process, outcomes of ADR, informal method of proceedings, traditional approach of proceedings, effect of proceedings, expert ruling, and reliable decision.

To facilitate decision making in ADR, several decision-making tools have been proposed. O'Reilly and Mawdesley (1994) developed a programme ("*CLARA T!*" — Claims, Litigation and Arbitration Risk Assessment Technique) to assist decision making during dispute resolution process by addressing the trade-offs between risk and opportunities. Disputes are put on trial when opportunities are perceived to outweigh the risks. Whether to

Table 4
Citation influence [Web of Science] (as of January 2015).

Authors/year	Article title	Total cites	Average citations per year
Cheung, S., Suen, H. and Lam, T. (2002)	Fundamentals of alternative dispute resolution processes in construction	21	1.5
Marzouk, M., El-Mesteckawi, L. and El-Said, M. (2011).	Dispute resolution aided tool for construction projects in Egypt	4	0.8
Chan, E., Suen, H. and Chan, C. (2006)	MAUT-based dispute resolution selection model prototype for international construction projects	4	0.4
Cheung, S., Suen, H., Ng, S. and Leung, M. (2004)	Convergent views of neutrals and users about alternative dispute resolution	4	0.33
Tsai, J. and Chi, C. (2009)	Influences of Chinese cultural orientations and conflict management styles on construction dispute resolving strategies	3	0.43

proceed with resolution highly depends on the perceived risks. Chan et al. (2006) developed a prototype model that helps decision makers in choosing litigation, arbitration, adjudication, mediation, expert determination, dispute resolution board, and mini-trial in international projects by drawing on multi-attribute utility technique. The selection factors were in a similar fashion with "utilities", however with two additions of contexts such as "reducing adverse effects of cultural system", and "different legal system". Following the importance of ADR in international projects, Gad et al. (2011) proposed a Dispute Resolution Method-Risk Matrix to aid decision making in ADR method based on risk factors, such as project specific risks and external risks. On the other hand, Marzouk et al. (2011) recommended a *Dispute Resolution Strategy Aid Tool* which draws on the consideration of parties' behaviour/relation/involvement, previous experience, mutual agreement on ADR methods, financial status, amount disputed, strength of facts, and complexity of disputes as the profound factors in decision making.

Choice of ADR also depends on the nature of claims being managed and handled, and the perception and faith rested on the perceived fairness, decision outcome of win and losses in claims. Unfavourable decision outcomes highly increases conflict intensities which in turn influence propensity to dispute (Aibinu et al., 2011). Aibinu et al. (2011) showed that perception of fairness and justice influenced 38% of conflict intensity level and altered 46% of contractor's tendencies and decision to dispute. Indirectly, "perceived fairness and outcomes" could be applied in ADR selection and use counterpart, where perception of and faith put on fairness and impartiality of arbitrators, mediators, and decision outcomes greatly influence their tendencies of choices in ADR itself.

4.1. Findings of the systematic review

The findings of systematic review depicting ADR selection and use is summarized in Table 5.

Based on the systematic review, the factors can be clustered into six (6) major dimensions (Table 5 refers). Among these, *Cognitive Instrument of Utilities* contains the most cited factors. It posits that all perceptions of usefulness, benefits, advantages, disadvantages, functionality and relative characteristics of ADR share the same traits and functions under the same cognitive instrument of utilities. The second largest pool of factors can be segmented into *Normative Influence*. This dimension denotes that ADR selection and use factors stem from social pressures and regulatory influences. Decision makers would have function and act under compliance to these social actors. Next, the third dimension is the *Cognitive Instrument of Risks*. *Perceptions of Risks* stem from uncertainties over the act of selecting and using that particular ADR; or the act of restraining from choosing ADR. Uncertainties over such consequences stem from one's evaluation on the impact and probabilities of any adverse or favourable consequences imposed internally and externally to the project. The fourth distinctive dimension deals with the *Cognitive Instrument of Disputes' Characteristics*. Under this dimension, disputants evaluate the amount and complexity of disputes. The decision to litigate, or instigate other means of ADR technique depends on the intricate nature and complexities of disputes. The evaluation of complexities can be readily accessible from the assessment of claims, such as monetary claim or time (extension of time) claim. The fifth dimension links to the perception of self-control and ability to carry out the behaviour. Factors such as agreement of disputants, parties' behaviour and mutual agreement imply that the decision of selecting and using ADR technique requires counterpart's agreement and mutual consensus, which is far beyond one decision maker's self-control and ability. Other factors such as financial status and strength of facts deal with the evaluation of self-efficacies in using a particular ADR. The existence of these factors does not promote selection and use; however the absence of these factors, such as mutual agreement or financial status would suggest predicaments for the decision maker. The final dimension segmented is the *Self-awareness Dimension*. It is argued that for selection and use to happen, the existence of ADR techniques need to be in the presence of the decision maker's knowledge. According to Rogers (2003), the level of knowledge acquisition and the level of familiarity with the operationalization of a system/innovation will influence rate of usage. Therefore, there is a plausible explanation for this dimension to influence usage, as the degree of knowledge on ADR will form various degree levels of feelings, attitudes and intention for use.

On several occasions, decision support technologies and tools by O'Reilly and Mawdesley (1994), Chan et al. (2006), Marzouk et al. (2011) and Gad et al. (2011), which have been developed to help disputants making informed ADR selection and use, actually stemmed from the basis of utilities of each ADR method. Most of these works strongly assumed decision making in ADR selection and use are largely based on the expected utility derivable from the ADR techniques. Aside of utility factors emphasized by most of the researchers, Marzouk et al. (2011)

Table 5
Overall summary of ADR selection and use factors.

ADR selection and use factors	Authors	Shared dimensions
Benefits of ADR process	Chong and Mohamad Zin (2012)	*Cognitive Instrument of Utilities*
Bindingness	Cheung (1999), Cheung and Suen (2002)	
Cost	Cheung (1999), Cheung and Suen (2002), Cheung et al. (2004), Brooker and Lavers (1997)	
Confidentiality	Cheung (1999), Cheung and Suen (2002)	
Confidence in ADR process	Brooker and Lavers (1997), Brooker (1999)	
Control over the proceeding	Cheung (1999), Cheung and Suen (2002)	
Enforceability of decision	Cheung (1999), Cheung et al. (2002)	
Effect of proceedings	Chong and Mohamad Zin (2012)	
Expert Ruling	Chong and Mohamad Zin (2012)	
Fairness	Cheung (1999), Cheung et al. (2004)	
Flexibility of proceedings	Cheung (1999)	
Flexibility in issues, strategy and agreement	Cheung and Suen (2002)	
Informal method of proceedings	Chong and Mohamad Zin (2012)	
Neutrality	Cheung et al. (2002), Cheung et al. (2004)	
Outcomes of ADR	Chong and Mohamad Zin (2012)	
Preservation of relationship	Cheung (1999), Cheung et al. (2002), Cheung and Suen (2002)	
Speed	Brooker and Lavers (1997), Cheung et al. (2004), Cheung and Suen (2002)	
Traditional approach of proceedings	Chong and Mohamad Zin (2012)	
Width of remedy	Cheung (1999)	
Lawyer's influence	Brooker (1999)	*Normative Influence*
Cultural orientations	Tsai and Chi (2009)	
Legal system	Chan et al. (2006)	
Perception of risk	O'reilly and Mawdesley (1994), Gad et al. (2011)	*Cognitive Instrument of Risks*
Amount disputed	Marzouk et al. (2011)	*Cognitive Instrument of Disputes' Characteristics*
Complexity of disputes	(Gad et al. (2011), Chong and Mohamad Zin (2012), Marzouk et al. (2011)	
Conflict intensities	Aibinu et al. (2011)	
Agreement of disputants	Brooker and Lavers (1997)	*Cognitive Instrument of Perceived Self-ability and Control*
Parties' behaviour/relation/involvement, previous experience, mutual agreement on ADR methods, financial status, strength of facts	(Marzouk et al. (2011)	
Knowledge of ADR	Brooker and Lavers (1997)	*Self-awareness Dimension*

managed to consider cognitive factors such as experience (satisfaction), and perceptions of parties behaviour; while Gad's works took into account of perceptions of risks in decision making.

From the systematic review, two research gaps in the field of ADR selection and use are identified:

1. The factors identified from the systematic review largely anchor on Cognitive Instrument of Utilities. According to Beach (1997), utility factors provide less explanatory influencing decision making and behaviour, as there are much more complex factors that influence decision making and behaviour rather than utility alone; and
2. The relationships among the factors are fragmented. The relationship and dynamics between *Cognitive Instrument of Utilities*, *Normative Influence*, *Cognitive Instrument of Risks*, *Cognitive Instrument of Disputes' Characteristics*, *Cognitive Instrument of Self Perceived Ability and Control*, and *Self-awareness Dimension* are unknown and unfamiliar.

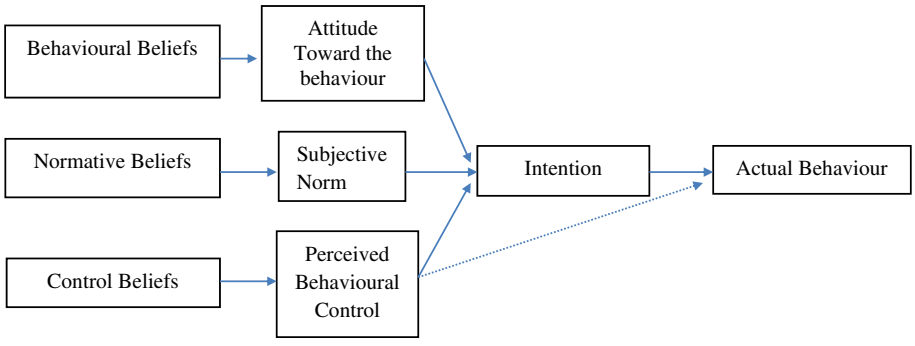

Fig. 4. Theory of Planned Behaviour.
Adapted from Ajzen (2006).

There is almost no behavioural model developed, nor any empirical investigations done to correlate these dimensions towards actual ADR selection and use.

To fill these research gaps, a conceptual framework with multi-dimensional constructs is needed to address and explain ADR selection and use behaviour. This conceptual framework should also clearly explain and model the factors influencing ADR selection and use systematically. With reference to behavioural theories, this study draws on Theory of Planned Behaviour (TPB).

According to TPB, actual behaviour can be jointly predicted by intention and perceived behavioural control. Intention is formed through the composition of attitudinal beliefs, normative beliefs, and control beliefs. Attitudinal beliefs are formed by weighing on the utilities of a given choice (Ajzen and Fishbein, 1969). This implies that, attitudinal beliefs posited by TPB itself would have solely addressed all utility factors of ADR selection and use. This provides a theoretical foundation to address the first research gap (overemphasized on utilities), by continuing to suggest two additional beliefs, i.e. normative beliefs, and control beliefs.

Theory of Planned Behaviour (TPB) assumes that actual behaviour is based on systematic decision (Ajzen, 1991). The dynamics influencing behaviour can be systematically mapped as: *attitudinal beliefs*, *normative beliefs*, and *control beliefs* distinctively and jointly influence *intention*, and *intention* thus predicts *actual behaviour*. In a similar fashion, the behaviour of ADR selection and use is assumed to be reasoned and deliberative. In view of that, this theory is appropriate to address the second research gap (fragmented relationships of ADR selection and use factors), with the possibilities of re-establishing and reclassifying the existing ADR selection and use factors into TPB constructs.

4.2. Future research directions for ADR selection and use: Theory of Planned Behaviour

TPB asserts that performance of a behaviour is functionally guided and is a joint function of intention (I) and perceived behavioural control (PBC) (Ajzen, 1991). Both intention (I) and perceived behavioural control (PBC) can be used to predict behaviour, however in certain situation only one of the two predictors prevail (Ajzen, 1991). Notably, when situation permits a person to have complete control over the performance of a behaviour, intentions alone are good predictors of behaviour; however when behaviour lacks complete control, perceived behavioural control can make significant contribution to the prediction of behaviour (Ajzen, 1991; Fishbein and Ajzen, 2010).

Intention is formed by a combination of attitude, subjective norms, and perceived behavioural control. Adapted from Ajzen (1991), Intention (I) can be mathematically represented as $I = (W_1)\ A + (W_2)\ SN + (W_3)\ PBC$, where I is intention, A is the attitude towards the behaviour, SN is subjective norms, PBC is perceived behavioural control, and W_1, W_2, and W_3 are the empirically determined weights.

In short, the more favourable the attitude and subjective norms, and the greater the perceived control over the behaviour, the higher would be a person's intention to perform that behaviour (Ajzen, 2006) (See Fig.4).

4.2.1. Intention

The most proximal predictor of behaviour is intention. Intention is an indication of how hard people are willing to try, or how much of an effort willing to put in performing a behaviour (Ajzen, 1991; Beck and Ajzen, 1991). According to Fife-Schaw et al. (2007), a person's decision to act is equivalent to the intention to act. In ADR selection and use, the strength of intention often refers to selection or the likelihood of a disputant to use ADR methods to resolve a dispute, and can appear in the form of questions such as "I have an intention to use ADR (e.g., mediation) to resolve this dispute"; "I would commit to use ADR (e.g., mediation) to resolve this project dispute", or even "I would likely to use ADR (e.g., mediation) to resolve this project dispute". Intentions capsulate the motivational factors that influence behaviour (Ajzen, 1985; Ajzen, 1991). Intentions and behaviour must be mutually compatible to each other.

4.2.2. Attitude

Attitude refers to the favourable/unfavourable feelings towards a given behaviour (Ajzen, 1991; Ajzen and Fishbein, 2000). Decision maker forms belief to a behaviour that generates his attitude towards those attributes of behaviour. Underlying the attitude, are structures of beliefs, which can be mathematically represented as: $\sum_{i=1}^{n} B_i a_i$, where it is the sum of beliefs about the consequences of performing a given act B_i (outcome of using ADR, in the form of question such as "Using ADR to resolve project dispute will improve time and cost"), times the evaluation of the consequences a_i (e.g.; desirability of using ADR in the form of questions such as "Using ADR and saving time and cost is *Good*/*Bad*") (Ajzen, 1991; Taylor and Todd, 1995). It is in accordance with Edwards (1954) "Decision Theory Model", which states that choosing an alternative is seen as a choice that maximizes average gain or minimizes average loss (Ajzen and Fishbein, 1969). This equation of maximizing the subjective expected utility or SEU can be well written as: $\sum_{i=1}^{n} SP_i U_i$, where SP_i is the subjective probability that certain result will follow with certain act, while U_i is the respective subjective values (Ajzen and Fishbein, 1969).

4.2.3. Subjective norms

Subjective norms can be defined as social pressure felt by the person with regard to that particular intended act, or not performing that action (Ajzen, 1991). It is derived by summing the product of normative beliefs (N_i) which represents the perceived importance of other people/group by the decision maker (for example the perceived likelihood that the decision maker's peers, or management team, or stakeholders would support, approve, or exert pressures on his decision in using a particular ADR in resolving project dispute), to M_i, motivation to comply, which refers to the motivation to comply with the perceived expectations of people/group (for example, in a

dispute situation, the disputant may feel a strong compelling pressures from management group to use ADR, however the disputant does not necessary feel to comply with the needs to use ADR. Overall, the equation can be written as: $\sum_{(i=1)}^{n} N_i M_i$. The function of this normative belief implies perceived opinions of other important people to the decision makers (Chen and Tung, 2014).

4.2.4. Perceived behaviour control

Perceived behavioural control (PBC) refers to the perception and confidence in their ability to perform the act. It fits with Bandura (1977) concept of self-efficacy (Ajzen, 1991). It refers to the perceived ease or difficulty in performing the behaviour (López-Mosquera et al., 2014). Similar with four sources of self-efficacy theory such as performance accomplishments, vicarious experience, verbal persuasion, and emotional arousal, PBC deals with beliefs based on past behaviour, previous experience, secondary information, and the availability of resource and opportunities. Less resource and absence of opportunity will attenuate the perceived control over the behaviour (Ajzen, 1991; Ajzen and Driver, 1991). PBC can be illustrated with the following equation (Ajzen, 1991): $\sum_{i=1}^{n} C_i P_i$, where C_i is the control belief while P_i is the power belief of that control factor in inhibiting or facilitating that behaviour. For example, a disputant might feel a lack of enough resources or experience in using ADR (C_i), and the disputant thinks that resource and experience level is very important towards ADR selection and use (P_i).With greater perceived control over the act, the greater the intention that person would act on it.

4.3. Potential application of Theory of Planned Behaviour (TPB) in ADR selection & use

With the application of TPB, the factors that influence ADR selection and use can be reclassified. TPB is equipped with the ability to predict and explain the fundamental cognitive pathways of decision makers in making choices. Explanatory power of TPB is not limited to self-oriented behaviour; it is also applicable in strategic decision making (Riemenschneider et al., 2003).

Various attributes can be associated with ADR selection and use. Those inherent utilities and advantages, complexity of disputes, comparative of transactional costs in ADR and existing project risks can be all re-classified under *attitude* construct of TPB.

Additionally, decision to use ADR could stem from social pressures from both internal and external stakeholders. Social influences which deal with local customs, cultural and legal system are influential towards ADR selection and use (Chan et al., 2006). For example, instead of arbitration, unpaid contractors would suspend works due to pressure felt by both management team and sub-contractors. "Pressures felt" from peer influence or team influences can be classified under *subjective norms* construct of TPB.

Nevertheless, as a disputant would like to choose arbitration to resolve project disputes; however due to lack of money and organization resources, these may serve as impediments for the disputant to use arbitration. Predicaments and facilitating factors for the disputant's behaviour in ADR selection and use can be classified under perceived behavioural control of TPB. Earlier works by Marzouk et al. (2011) also showed that past experience with ADR would influence ADR selection. This is consistent with the notion of "self-efficacy", which directly deals with self-perceived capabilities based on secondary information and past experience. It fits with and is suitable for a re-classification under *perceived behavioural control*.

TPB can be extended and decomposed into a model which can better understand antecedents of behaviour (Taylor and Todd, 1995). This requires decomposition of those attitudinal, normative, and control beliefs. In short, ADR selection and use is well equipped with the capacities and features to be empirically tested, extended and explained with Theory of Planned Behaviour. Table 6 gives the proposed reclassification of influential ADR selection and use factors into dimensions of beliefs in accordance to Theory of Planned Behaviour (TPB). This model is open for further importation of dimensions of beliefs that can suit the TPB model. Accordingly, the reclassifications proposed under TPB framework can be validated through empirical studies in the future.

4.4. Simulated scenario of Theory of Planned Behaviour in ADR selection and use

This section demonstrates the application of TPB in predicting and explaining ADR selection and use. Based on Table 6, ADR selection and use behaviour can be hypothesised in Fig. 5 below.

Notably, ADR selection is strongly linked to "intention", while ADR use is the same as "Behaviour" under the framework of Theory of Planned Behaviour. In simple form of explanation, disputant's combination of attitude, subjective norms and perceived behavioural control will form the decision and intention to use ADR (or known as the selection phase). With a high intention, and sufficient perceived control on the behaviour, the decision maker decides to select ADR and put the decision to implementation, and accordingly use the respective ADR.

4.4.1. Simulated dispute scenario: project payment dispute

Assume that there is a project payment dispute between a contractor and an employer. The employer refuses to honour the contractor even though the payment was due. To secure payment and remedy non-payment, the contractor has two distinctive options: Option A: ADR or Option B: Litigate. Intention (selection) for both Option A and Option B can be mathematically expressed below:

$$\begin{aligned}\text{Option A}: \text{Intention}_{\text{ADR}} = {} & (W_1)\sum_{(i=1)}^{n} B_i a_{i\ \text{ADR Use}} \\ & +(W_2)\sum_{(i=1)}^{n} N_i M_{i\ \text{ADR Use}} \\ & +(W_3)\sum_{(i=1)}^{n} C_i P_{i\ \text{ADR Use}}.\end{aligned} \quad (1)$$

Under Attitudinal construct, $B_{i\ \text{ADR Use}}$ is the belief about the outcome of using ADR; while $a_{i\ \text{ADR Use}}$ is the evaluation of the

Table 6
Proposed reclassification of ADR selection and use factors into TPB dimensions.

ADR selection and use factors	Possible reclassification into TPB dimensions
Benefits of ADR process, bindingness, confidentiality, confidence in ADR process, control over the proceeding, enforceability of decision, effect of proceedings, expert ruling, fairness, flexibility of proceedings, flexibility in issues, strategy and agreement, informal method of proceedings, expert ruling, fairness, flexibility of proceedings, flexibility in issues, strategy and agreement, informal method of proceedings, neutrality, outcomes of ADR, purpose of achieving delay, preservation of relationship, speed, traditional approach of proceedings, width of remedy, perception of risks; project specific risks and external risks; amount disputed, complexity of disputes; cost involved in ADR	Attitude
Lawyer's influence, cultural orientations, cultural and legal system	Subjective norms
Knowledge of ADR process, previous experience, financial status, strength of facts, parties' behaviour/relation/involvement, self-efficacies	Perceived behavioural control

consequences of using ADR. Under Normative Construct, $N_{i\ ADR\ Use}$ is the perceived likelihood important people would approve or reject use of ADR, while $M_{i\ ADR\ Use}$ is the motivation to comply with such expectations. Under Control Construct, $C_{i\mathrm{ADR\ Use}}$ is the control belief of using ADR, while $P_{i\mathrm{ADR\ Use}}$ is the belief that such control factor will inhibit behaviour of using ADR.

Similarly, litigation can be mathematically expressed as:

$$\begin{aligned}\text{Option B}: \text{Intention}_{\text{Litigation}} &= (\mathrm{W}_1)\sum\nolimits_{(i=1)}^{n} B_i a_{i\ \text{Litigation}} \\ &+(\mathrm{W}_2)\sum\nolimits_{(i=1)}^{n} N_i M_{i\ \text{Litigation}} \\ &+(\mathrm{W}_3)\sum\nolimits_{(i=1)}^{n} C_i P_{i\ \text{Litigation}}.\end{aligned} \tag{2}$$

$B_{i\ \text{Litigation}}$ is the belief about the outcome of litigation, while $a_{i\ \text{Litigation}}$ is the evaluation of the consequences of litigation. $N_{i\ \text{Litigation}}$ is the perceived likelihood important people would approve or reject litigation, while $M_{i\ \text{Litigation}}$ is the motivation to comply with such expectations. $C_{i\ \text{Litigation}}$ is the control belief of using Litigation, while $P_{i\ \text{Litigation}}$ is the belief that such control factor will inhibit behaviour of using litigation.

Assumptions: For the ease of demonstration and discussion, a number of assumptions have to be made.

Assumption 1. : Assume that the empirical weights W_1, W_2, and W_3 predicting intention for both ADR and litigation are the same, and all W_1, W_2, and W_3 share the same value (constant value).

Assumption 2. : There are no perceived behavioural predicaments or any inhibiting factors for both options. The Contractor has equally high sufficient resources and high self-efficacies for both Options A and B, and have the same perceived value of control for both Options A and B, with a fix total value of "30".

4.4.1.1. Calculation of intention. For option A, the contractor perceives the utilities of ADR is much higher, and thinks that ADR will most probably remedy this dispute more effectively. Therefore, $B_{i\ \text{ADR ADR}}$ is given an attitudinal belief value of "5", and the evaluation of the outcome a_i is "good", with an attitudinal evaluation value of "5". At the same time, the referents of the contractor are likely to support the contractor of using ADR. Therefore the probability of referents to approve such decision, $N_{i\ \text{ADR}}$ is given a normative value of "5", while the contractor's motivation to comply with these referents is high, $M_{i\ \text{ADR}}$ with a value of "5". Perceived control for using ADR is high, with a total value of $C_i P_{i\ \text{ADR}}$ = "30".

Hence, substituting these values in Expression (1),

$$\begin{aligned}\text{Option A}: \text{The Intention}_{\text{ADR}} &= (\mathrm{W}_1)(5)(5) + (\mathrm{W}_2)(5)(5) \\ &+(\mathrm{W}_3)30 = (\mathrm{W}_1)25 \\ &+(\mathrm{W}_2)25 + (\mathrm{W}_3)30 \\ &= \text{Empirical Constant}\ (25+25+30) \\ &= \text{Empirical Constant}\ (80).\end{aligned} \tag{3}$$

On the contrary, for Option B: the contractor perceives the utilities of litigation is lower, and thinks that litigation will take

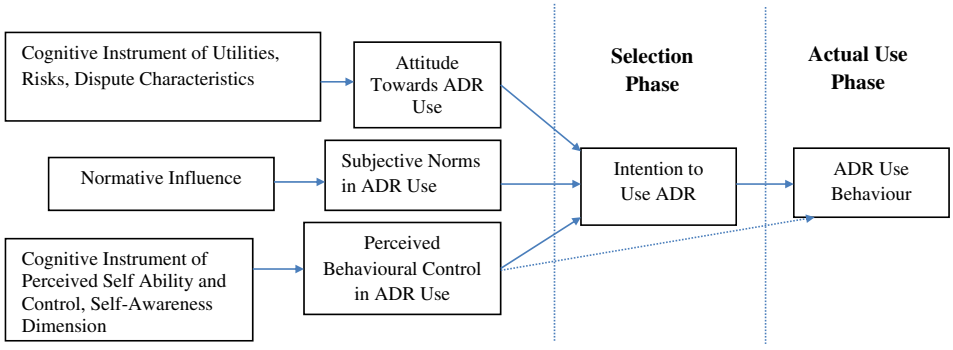

Fig. 5. Theory of Planned Behaviour in explaining ADR selection & use.

more time to resolve this dispute. Therefore, the outcome of litigation, $B_{i\ \text{Litigation}}$ is given an attitudinal belief value of "3", and the evaluation of this outcome is "moderate", with an attitudinal evaluation value of "3". The contractor's referents are less likely to support him using litigation. Hence, the probability of referents to support litigation decision, $N_{i\ \text{Litigation}}$ is given a value of "3", while the contractor's motivation to comply with such expectation $M_{i\ \text{Litigation}}$ is given a value of "3". Similarly with Expression (3) above, perceived behaviour control for using litigation is equally high, with a total value of $C_iP_{i\ \text{Litigation}}$ = "30"

Therefore, substituting these values into Expression (2),

$$\begin{aligned}\text{The intention}_{\text{Litigation}} &= (W_1)(3)(3) + (W_2)(3)(3) + (W_3)30\\ &= (W_1)9 + (W_2)9 + (W_3)30\\ &= \text{Empirical Constant } (9 + 9 + 30)\\ &= \text{Empirical Constant } (48).\end{aligned} \tag{4}$$

Difference between selection in ADR and Litigation is the difference between Expression (3) and Expression (4):

$$\begin{aligned}\text{Intention}_{\text{ADR}} - \text{Intention}_{\text{Litigation}} &= \text{Empirical Constant } (80)\\ &\quad - \text{Empirical Constant } (48)\\ &= \text{Empirical Constant } (32).\end{aligned}$$

With a higher intention to use ADR, the contractor is more likely to select and use ADR, relatively compared to the alternative choice B (Litigation).

5. Conclusion

The main purpose of this study is to synthesize the factors influencing ADR selection and use in construction projects, and accordingly propose future directions on ADR selection and use. To achieve this, this study has conducted systematic review of related articles published in 21 selected construction project-related journals. A systematic visual examination has been performed on all ADR related articles based on *Title*, *Article*, and *Abstract*, with the aim to synthesize the factors influencing ADR selection and use. Usable ADR related articles starts at 1983 and the range was set up to 2014. Between 1983 and 2014, 446 usable ADR related articles has been identified. The overall trend showed that the importance of ADR was obvious and has been growing consistently in three decades.

All 446 articles were segmented into 19 themes. It was found that "Dispute Prevention" marked the most discussed theme, with a staggering amount of 140 articles (31.3%). However, only 13 articles (2.9%) were found to be strictly related to ADR selection and use. Among these articles, 10 articles were carried out empirically while 3 articles were presented in the form of prototypes. Most empirical studies in ADR selection and use were conducted in Asian and Southeast Asian countries, such as Hong Kong, Taiwan and Singapore and Malaysia.

Based on systematic review, the existing factors influencing ADR selection and use were identified and segmented. Existing factors were further segmented into 6 shared dimensions, namely: Cognitive Instrument of Utilities, Normative Influence, Cognitive Instrument of Risks, Cognitive Instrument of Disputes' Characteristics, Cognitive Instrument of Perceived Self-ability & Control, and Self-awareness Dimension. However, the dynamics and relationship between these factors and dimensions are unknown.

Most of the selection and use factors are utility oriented. Since the dynamics are fragmented, there is a notable opportunity for the relationships to be conceptualized with theoretical constructs. To address this gap, this study utilizes Theory of Planned Behaviour (TPB). The existing 6 shared dimensions were re-classified under attitudinal, normative, and control constructs. Accordingly, existing attitude, subjective norms and perceived behavioural control in the TPB model were used to show the capabilities of this theory to map out their relationships. In the later section of the paper, a simulated dispute scenario based on project payment dispute was demonstrated to better explain the mechanism of TPB.

Despite the predictive capabilities of TPB, the application of this theory in the domain of dispute resolution is novel. This provides several possible directions for further research on ADR studies. To strive for better improvements, one key objective of furthering ADR research is to suggest how TPB can be used to predict and explain ADR selection and use in construction dispute cases.

Another feature of TPB research is the continuity of extension of TPB with additional variables that better predicts intention and behaviour. TPB has been undergoing evolution since Ajzen (1991) admitted its shortcomings. In one of the remarks, TPB actually welcomes inclusion of variables and predictors that can predict intentions. Works done by Taylor and Todd (1995) aptly demonstrated the predictive capabilities of decomposed model of TPB in understanding information usage. The researchers astonishingly showed that decomposition of TPB increased the explanation of behaviour intention and usage behaviour, in relation to the original TPB model.

According to a Meta review by Armitage and Conner (2001), inclusion of additional predictors on the original construct of TPB actually better explains the variation of intentions. Inclusions such as belief salience, habit/past behaviour, self-efficacy, moral norms, self-identity, and affective beliefs have shown considerable empirical support and evidence (Conner and Armitage, 1998).

It is expected that the development of model underpins the following:

(1) *Decomposition of Attitudinal Beliefs*: As attitude influences intention, the study of TPB would offer better insights on how decision makers feel (*good/bad/pleasant/unpleasant*) towards each dispute resolution method. Elicitation of attitudinal beliefs can be done to understand and explain each disputant's salient behavioural beliefs towards each dispute resolution method, given a free choice to choose between the alternatives such as mediation, arbitration, and adjudication. One important purpose of decomposing the attitudinal beliefs encompassing the beliefs about benefits, costs, risks of engaging in the behaviour of

ADR selection and use. For example, beliefs about the remedial capabilities (perceived benefits) of ADR in resolving disputes, would refer to settlement of disputes after using ADR; whereas beliefs about potential risks obligations, and associating costs (perceived disadvantages) in the ADR would concur on the possible perceived deterioration and drawbacks in using ADR. Such decomposition of beliefs should prominently deal with the belief of using ADR's capacities in resulting positive or negative remedial end states.

(2) *Decomposition of Normative Beliefs*: External pressures could stem from internal and external stakeholders such as management team, subcontractors, and labour force. These referent groups can be diversified into groups that overwhelm monolithic structures in normative beliefs.

(3) *Decomposition of Control Beliefs*: Decomposition of control beliefs could include beliefs on the notion of both personal and organization efficacies. As using ADR process requires adequate time, money and resources, insufficient resources would prove predicaments to disputants' capabilities in using ADR.

(4) *Inclusion of Additional Variables*: TPB welcomes additional variables. Previous studies showed that inclusion of variables are able to extend and explained greater variance in both intention, and behaviour.

In view of that, researchers can nevertheless pioneer an ADR selection and use model by drawing on TPB. It offers practical guides for both practitioners and scholars to better understand ADR selection and use from a measure of their intentions, attitudes, subjective norms and perceived behavioural control. It is hope that the application of TPB presented in this study is able to provide research directions for researchers to draw on TPB in expanding and understanding ADR selection and use. Optimistically, this would take both ADR and TPB studies to greater heights.

Acknowledgements

The authors would like to thank the New Zealand Aid Programme, administered by the New Zealand Ministry of Foreign Affairs and Trade for funding this study.

References

Aibinu, A.A., Ling, F.Y.Y., Ofori, G., 2011. Structural equation modelling of organizational justice and cooperative behaviour in the construction project claims process: contractors' perspectives. Constr. Manag. Econ. 29, 463–481.

Ajzen, I., 1985. From intentions to actions: a theory of planned behaviour. Action Control: From Cognition to Behaviour, pp. 11–39.

Ajzen, I., 1991. The theory of planned behavior. Organ. Behav. Human Decis. Process. 50, 179–291.

Ajzen, I., 2006. Constructing a TPB Questionnaire. Conceptual and Methodological Considerations Available: People.Umass.Edu/Aizen/Pdf/Tpb.Measurement.Pdf [Accessed 1 January 2015].

Ajzen, I., Driver, B.L., 1991. Prediction of leisure participation from behavioral, normative, and control beliefs: an application of the theory of planned behavior. Leis. Sci. 13, 185–204.

Ajzen, I., Fishbein, M., 1969. The prediction of behavioral intentions in a choice situation. J. Exp. Soc. Psychol. 5, 400–416.

Ajzen, I., Fishbein, M., 2000. Attitudes and the attitude–behavior relation: reasoned and automatic processes. Eur. Rev. Soc. Psychol. 11 (1), 1–33.

Armitage, C.J., Conner, M., 2001. Efficacy of the theory of planned behaviour: a meta-analytic review. Br. J. Soc. Psychol. 40, 471–499.

Bandura, A., 1977. Self-effiacy: toward a unifying theory of behavioral change. Psychol. Rev. 84, 191–215.

Beach, L.R., 1997. The Psychology of Decision Making: People in Organizations. Sage Publications, California.

Beck, L., Ajzen, I., 1991. Predicting dishonest actions using the theory of planned behavior. J. Res. Pers. 25 (3), 285–301.

Brooker, P., 1999. Survey of construction lawyers' attitudes and practice in the use of ADR in contractors' disputes. Constr. Manag. Econ. 17, 757–765.

Brooker, P., Lavers, A., 1997. Perceptions of alternative dispute resolution as constraints upon its use in the UK construction industry. Constr. Manag. Econ. 15, 519–526.

Chan, E., Suen, H., Chan, C., 2006. Maut-based dispute resolution selection model prototype for international construction projects. J. Constr. Eng. Manag. 132, 444–451.

Chen, M.F., Tung, P.J., 2014. Developing an extended theory of planned behavior model to predict consumers' intention to visit green hotels. Int. J. Hosp. Manag. 36, 221–230.

Cheung, S.O., 1999. Critical factors affecting the use of alternative dispute resolution processes in construction. Int. J. Proj. Manag. 17, 189–194.

Cheung, S.O., Suen, H.C.H., 2002. A multi-attribute utility model for dispute resolution strategy selection. Constr. Manag. Econ. 20, 557–568.

Cheung, S.O., Yeung, Y.W., 1998. The effectiveness of the dispute resolution advisor system: a critical appraisal. Int. J. Proj. Manag. 16, 367–374.

Cheung, S., Suen, H., Lam, T., 2002. Fundamentals of alternative dispute resolution processes in construction. J. Constr. Eng. Manag. 128, 409–417.

Cheung, S., Suen, H., Ng, S., Leung, M., 2004. Convergent views of neutrals and users about alternative dispute resolution. J. Manag. Eng. 20, 88–96.

Chong, H.Y., Mohamad Zin, R., 2012. Selection of dispute resolution methods: factor analysis approach. Eng. Constr. Archit. Manag. 19, 428–443.

Chong, H.Y., Zin, R.M., 2010. A case study into the language structure of construction standard form in Malaysia. Int. J. Proj. Manag. 28, 601–608.

Chong, H.Y., Zin, R.M., 2012. Selection of dispute resolution methods: factor analysis approach. Eng. Constr. Archit. Manag. 19, 428–443.

Conner, M., Armitage, C.J., 1998. Extending the theory of planned behavior: a review and avenues for further research. J. Appl. Soc. Psychol. 28, 1429–1464.

Edwards, W., 1954. The theory of decision making. Psychol. Bull. 51, 380–418.

El-Adaway, I., Ezeldin, A., Yates, J., 2009. Arbitral tribunal proceedings case study: Egyptian large-scale construction project. J. Leg. Aff. Disput. Resolut. Eng. Constr. 1, 147–153.

Fenn, P., Lowe, D., Speck, C., 1997. Conflict and dispute in construction. Constr. Manag. Econ. 15, 513–518.

Fife-Schaw, C., Sheeran, P., Norman, P., 2007. Simulating behaviour change interventions based on the theory of planned behaviour: impacts on intention and action. Br. J. Soc. Psychol. 46, 43–68.

Fishbein, M., Ajzen, I., 2010. Predicting and Changing Behavior: The Reasoned Action Approach. Psychology Press—Taylor and Francis Group, New York.

Gad, G., Kalidindi, S., Shane, J., Strong, K., 2011. Analytical framework for the choice of dispute resolution methods in international construction projects based on risk factors. J. Leg. Aff. Disput. Resolut. Eng. Constr. 3, 79–85.

Jannadia, M.O., Assaf, S., Bubshait, A.A., Naji, A., 2000. Contractual methods for dispute avoidance and resolution (DAR). Int. J. Proj. Manag. 18, 41–49.

Ke, Y., Wang, S., Chan, A., Cheung, E., 2009. Research trend of public–private partnership in construction journals. J. Constr. Eng. Manag. 135, 1076–1086.

Khan, K.S., Kunz, R., Kleijnen, J., Antes, G., 2003. Five steps to conducting a systematic review. J. R. Soc. Med. 96, 118–121.

López-Mosquera, N., García, T., Barrena, R., 2014. An extension of the theory of planned behavior to predict willingness to pay for the conservation of an urban park. J. Environ. Manag. 135, 91–99.

Lu, W., Liu, J., 2014. Research into the moderating effects of progress and quality performance in project dispute negotiation. Int. J. Proj. Manag. 32, 654–662.
Lu, Y., Li, Y., Skibniewski, M., Wu, Z., Wang, R., Yun, L., 2014. Information and communication technology applications in architecture, engineering, and construction organizations: a 15-year review. J. Manag. Eng.
Lu, W., Zhang, L., Pan, J., 2015. Identification and analyses of hidden transaction costs in project dispute resolutions. Int. J. Proj. Manag. 33, 711–718.
Marzouk, M., El-Mesteckawi, L., El-Said, M., 2011. Dispute resolution aided tool for construction projects in Egypt. J. Civ. Eng. Manag. 17, 63–71.
Murtoaro, J., Kujala, J., 2007. Project negotiation analysis. Int. J. Proj. Manag. 25, 722–733.
Ndekugri, I., Chapman, P., Smith, N., Hughes, W., 2014. Best practice in the training, appointment, and remuneration of members of dispute boards for large infrastructure projects. J. Manag. Eng. 30, 185–193.
O'reilly, M.P., Mawdesley, M.J., 1994. The evaluation of construction disputes: a risk approach. Eng. Constr. Archit. Manag. 1, 103–114.
Qu, Y., Cheung, S.O., 2013. Experimental evaluation of logrolling as an effective mediating tactic in construction project management. Int. J. Proj. Manag. 31, 775–790.
Riemenschneider, C.K., Harrison, D.A., Mykytyn Jr., P.P., 2003. Understanding it adoption decisions in small business: integrating current theories. Inf. Manag. 40, 269–285.
Rogers, E.M., 2003. Diffusion Of Innovations. Free Press, New York.
Stipanowich, T.J., Henderson, D.A., 1993. Mediation and mini-trial of construction disputes. Build. Res. Inf. 21, 162–166.
Taylor, S., Todd, P.A., 1995. Understanding information technology usage: a test of competing models. Inf. Syst. Res. 6, 144–176.
Tranfield, D., Denyer, D., Smart, P., 2003. Towards a methodology for developing evidence-informed management knowledge by means of systematic review. Br. J. Manag. 14, 207–222.
Tsai, J., Chi, C., 2009. Influences of Chinese cultural orientations and conflict management styles on construction dispute resolving strategies. J. Constr. Eng. Manag. 135, 955–964.
Uher, T.E., Brand, M.C., 2005. Analysis of adjudication determinations made under security of payment legislation in New South Wales. Int. J. Proj. Manag. 23, 474–482.
Yiu, T., Lee, H., 2011. How do personality traits affect construction dispute negotiation? Study of big five personality model. J. Constr. Eng. Manag. 137, 169–178.