International Journal of Project Management 38 (2020) 64–74

Contents lists available at ScienceDirect

International Journal of Project Management

journal homepage: www.elsevier.com/locate/ijproman

Non-economic motivations for organizational citizenship behavior in construction megaprojects

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ARTICLE INFO

Keywords:
Megaproject citizenship behavior
Social value
Self-serving motive
Firm development
Political appeal

ABSTRACT

This study examined the primary non-economic motivations behind participating entities' organizational citizenship behavior in construction megaprojects, referred to as their megaproject citizenship behavior (MCB), in terms of altruism and observed practice. A questionnaire-based survey designed to test the effect of non-economic drivers on MCB revealed that the pursuit of social value and self-serving motivation, including firm development and political appeal, function as significant non-economic drivers of MCB. And the self-serving motivation to perform MCB is generally less significant than the pursuit of social value, and the relationship between self-serving motivation and MCB is partially moderated by the governmental connections of the megaprojects. In government-hosted construction megaprojects, when the governmental connections of the individual participating entity are as strong as those of the megaproject itself, MCB engagement is actually driven by the pursuit of firm development and political appeal even where the apparent driver is the pursuit of social value.

1. Introduction

Once an agreement has been reached and all the contracts signed, within an intra-organizational context, the management effectiveness of a megaproject depends primarily on a combination of the mutual altruistic collaborative behavior of all the parties involved and the amount of positive voluntary effort they are prepared to devote to the project (Smith, Carroll, & Ashford, 1995). These behaviors and efforts, described as informal cooperation by (Smith et al., 1995), include engaging in close collaboration contingently, keeping and maintaining a harmonious relationship encompassing professional networks, the spontaneous investment of extra time and resources, and the willingness to voluntarily work hard to achieve a successful outcome. This type of positive behavior is referred to as megaproject citizenship behavior (MCB) (Organ, 1988; Yang, He, Cui, & Hsu, 2018).

In terms of altruism, MCB involves actions that do not occur spontaneously and require the investment of time and resources by multiple different actors (Organ, 1988). This type of behavior, therefore, requires internal motivational drivers that deliver potential implicit value (Bolino, Klotz, Turnley, & Harvey, 2013; Li, Kirkman, & Porter, 2014; Organ, 1988). Driven by such an internal initiative, participants will devote their best efforts to deliver a project successfully and achieve beyond their expected performance even if their contracts lack an economic incentive (Heere & Xing, 2012; Anvuur & Kumaraswamy, 2015). In practice, the stakeholders of construction megaprojects tend to obtain intangible and immaterial value in the long run by sacrificing their own interests rather than behaving solely based on their short-term economic returns. For example, the I-495 and I-95 Express Lanes in the Washington, D.C., area are maintained by the Transurban Group through a public-private-partnership (PPP) contract. A transurban's *general manager* reported that they on occasion arranged for maintenance staff to repair sinkholes in contiguous I-395 Express Lanes that were not included in the PPP contract. The goodwill they gain as a result then puts them in good standing when they next seek to negotiate long-term cooperation opportunities with the Virginia Department of Transportation (VDOT)). In the South-to-North Water Transfer program and the Hongkong-Zhuhai-Marco bridge in China, the participants voluntarily compete with one another by highlighting their good site safety standards, high quality work, adherence to schedules, record of technological innovation, environmental protection and energy-saving operations, compliance with legal requirements, harmonious working practices, good citizenship, excellent service support, unity, and collaboration (HKZMB 2011; SHFTU and BSHEXCOR 2012). Those who win the competition are awarded diplomas and medals by the project

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https://doi.org/10.1016/j.ijproman.2019.09.006
Received 29 April 2018; Received in revised form 23 August 2019; Accepted 17 September 2019
Available online 23 December 2019

management bureau and their role is publicized on the official website; as a form of encouragement, the top winners may also be listed in bureau reports issued by the South-to-North Water Transfers Commission Office of the state council (Tang, Wan, & Zhang, 2013).

The participants in these examples tend to demonstrate MCB and their non-economic intentions by prioritizing the improvement of their project delivery and outcomes, as predicted by Müller, Turner, Andersen, Shao, and Kvalnes (2014). Although MCB that is driven by non-economic motivations has been observed in megaprojects, conflicting interests and even corruption among stakeholders have also been widely observed (Le, Shan, Chan, & Hu, 2014; Tukiainen, Aaltonen, & Murtonen, 2010). Consequently, previous studies have tended to focus on the economic interests of project stakeholders based on their "self-interest orientation." Given the failure of these studies to acknowledge immaterial motives, the non-economic motivations for MCB practice remain unknown. Recent work exploring the role played by altruism has broadened our understanding regarding the drivers of altruistic behaviors (Li et al., 2014; Podsakoff, Podsakoff, MacKenzie, Maynes, & Spoelma, 2014). Given the contextual complexity involved, however, the motivation behind MCB practice has not been explained directly using previous research (Blatt, 2008; Heere & Xing, 2012). Additionally, relatively little empirical research has been provided to interpret how MCB engagement motivation might be impacted by related megaproject contextual factors such as the governmental connection of participants and projects. This study aims to identify and determine the inherent non-economic motivations behind MCB by addressing the following research questions:

RQ1. Why do construction participants perform and engage in MCB? and.
RQ2. What are the characteristics of the primary drivers behind MCB?

This study aims to identify empirically what the participants actually aim for when they engage in MCB and then determine the related construction megaproject contextual factors that characterize MCB motives. In this way, the inherent logistic and dynamic features of MCB will be revealed.

2. Theoretical framework

2.1. Megaproject citizenship behavior

Essentially, OCB is altruistic behavior meant to benefit others or organizational well-being and is thus adapted to capture altruistic actions that positively affect organizations in myriad fields (Organ, 1988; Li et al., 2014). Accordingly, OCB could be used to depict the altruism in megaprojects. From the literature review, shown in Fig. 1, six main OCB types were summarized as help, compliance, conscientiousness, harmonious relationship maintenance, initiative behavior and dedication (Yang et al., 2018).

However, existing OCB research mainly explains the topics within a corporate and common project contexts and is not adaptable when applying them to complicated megaproject environment (Braun et al. 2013; Li et al. 2019). In megaprojects, governments always play an important role and affect stakeholders' behaviors (Boateng et al. 2015; Zhai, Ahola, Le, & Xie, 2017); megaproject management faces high uncertainty from social, political, economic, technical and environmental challenges (Boateng et al. 2015; Flyvbjerg, 2017); megaproject organizational field involves diverse stakeholders with various value expectation differing from general project (Eweje et al. 2012; Flyvbjerg, 2017); and relative to general projects, megaprojects comprise a complicated, multiorganizational, open social network consisting of stakeholders with complex inter-organizational relationships (Provan et al. 2014). These factors shape citizenship behavior in disparate formats than the permanent organization and general project do (Yang et al., 2018).

To descript citizenship behavior in megaprojects, megaproject citizenship behavior (MCB) was introduced by Yang et al. (2018). Based on the definition provided by Organ (1988), the discretionary positive behavior of stakeholders, which is not directly or explicitly recognized by formal contracts and management institutions, can facilitate the achievement of construction goals and hence is employed to describe MCB in this study. Fig. 1 and Table 1 shows the five types of MCB and their items identified in Yang et al. (2018).

According to Yang et al. (2018), contingent collaboration behavior (CCL) means willingness to flexibly assist others and collaborate without explicit description in formal contacts. It can include behavior such as providing others with possible convenience at an interface and between construction processes; Compliance behavior (PC) refers to voluntary compliance with and internalization of rules, norms, and procedures without supervision; Harmonious relationship maintenance (HRM) refers to behavior aimed at creating and preserving positive formal and informal connections with the internal and external stakeholders of a megaproject; Initiative behavior (IB) describes the task-related actions of voluntary creativity and innovation designed to improve project performance beyond the minimum requirement; Conscientious behavior (CB) refers to behavior where participating entities try to complete a task with maximum quality without monitoring.

In contrast with OCB, MCB presented obvious characteristics (Yang et al., 2018). For instance, it extends beyond considerations for project scope and is directed toward the whole megaproject social network, happens at inter-organizational level with continuous contingency and more flexibility, and shows concern for harmoniousness of inter-organizational relationships.

2.2. Motivation behind MCB

MCB invites some future recompense or value that is indirect and uncertain (Organ, 1997). Team altruism suggests that this type of value expectation involves dual motives, namely self-serving altruism that has

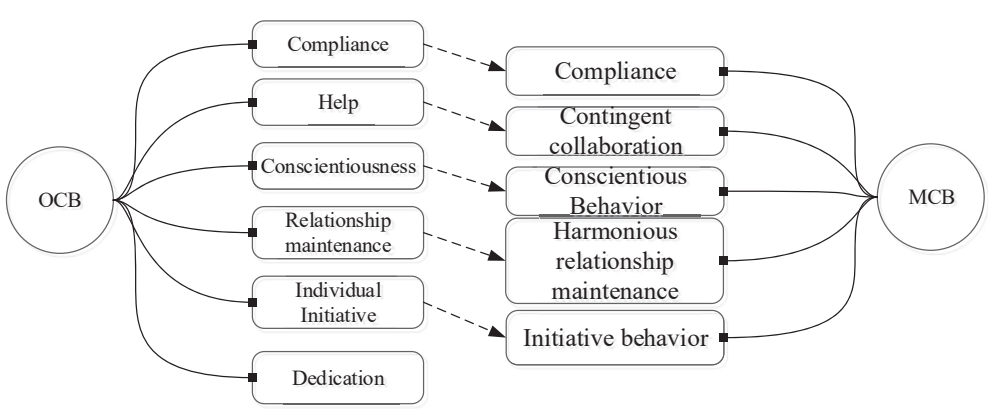

Fig. 1. Dimensions development relationship between MCB and OCB.

Table 1
Measurement of MCB, motivation, and government connection in construction megaprojects.

Construct	Code	Item	Factor Loading	Mean	SD
Compliance Behavior	PC1	Compliance with task schedule	0.848	4.38	0.650
	PC2	Compliance with managerial requirements	0.904	4.45	0.578
	PC3	Compliance with project objectives	0.871	4.41	0.618
	PC4	Compliance with governmental task-related requirements	0.770	4.48	0.648
Contingent Collaboration Behavior	CCL2	Making efforts to prevent the creation of problems for other participants	0.707	4.37	0.654
	CCL3	Help to address the challenges being faced by other participants	0.785	4.02	0.815
	CCL4	Sharing useful information	0.818	4.14	0.745
	CCL5	Offering support at the interface between various construction processes	0.808	4.25	0.709
	CCL6	Help to solve conflicts among participants	0.794	4.17	0.808
	*CB1	Willingness to accelerate the completion of tasks without additional payment	*0.453*	4.26	0.848
Conscientious Behavior	CB2	Voluntarily performing in accordance with higher requirements without the need for supervision	0.794	4.29	0.744
	CB3	Investing more resources to support the accomplishment of a task	0.880	4.28	0.782
	CB4	Providing active skills training for team members	0.853	4.21	0.721
	CB5	A positive attitude when attending meetings and activities	0.789	4.36	0.621
Harmonious Relationship Maintenance Behavior	HRM1	Maintaining a harmonious relationship with related government units	0.887	4.43	0.651
	HRM2	Actively building a harmonious relationship with local government units	0.697	4.23	0.710
	HRM3	Building a harmonious relationship with surrounding residents	0.833	4.06	0.848
Initiative Behavior	IB1	Offering suggestions for improving task efficiency and quality	0.625	3.98	0.805
	IB2	Sharing opinions that contribute to the implementation of the megaproject even without being asked to do so	0.762	4.07	0.847
	IB3	Actively adopting advanced managerial and technology methods	0.855	4.02	0.692
	IB4	Pointing out potential areas for improvement	0.760	4.05	0.733
Firm Development	FD1	Improved opportunities to participate in other megaprojects	0.756	4.25	0.725
	FD2	Further opportunities to cooperate with other participants	0.853	4.13	0.718
	FD3	Building honor and promoting an image	0.819	4.28	0.704
	#FD4	Receiving positive feedback from other participants	0.826	3.94	0.769
Political Appeal	PA1	Influencing national or regional economic policies	0.865	3.84	0.784
	PA2	Supporting the political development of top managers	0.717	3.80	0.820
	#PA3	Receiving greater access to restricted governmental resources	0.767	3.92	0.742
Social Value	*SV1	Boosting industrial trust and social identification	0.907	4.30	0.653
	SV2	Taking actions to help solve social problems and achieve social responsibility	0.835	4.06	0.788
	SV3	Influencing technological advances and development in the construction industry	0.767	3.91	0.847
Governmental Connection	*GC1	Gaining better connections with national government agencies	0.828	*2.57*	1.270
	GC2	Gaining better connections with provincial government agencies	0.837	3.31	1.072
	GC3	Gaining better connections with municipal government agencies	0.645	3.61	1.043
	GC4	Gaining better connections with county government agencies	0.698	3.43	1.255
	GC5	Gaining better connections with SOEs	0.785	3.87	1.022

Note: CB = conscientiousness, CCL = contingent collaboration, CR = composite reliability, FD = firm development, HRM = harmonious relationship maintenance, IB = initiative behavior, PA = political appeal, PC = compliance, SV = social value, SD = standard deviation, and GC = government connection. FD4 and PA3 were added by the interviewees. CB1 was deleted after obtaining a loading value of lower than 0.5, while SV1 was deleted after optimizing the Cronbach's α of SV.GC1 was removed from the questionnaire after obtaining a mean value of lower than 3.0. GC was calculated using the data of PGC, which was measured similarly as MGC.

some level of self-serving motive yet can still be construed as moderately altruistic, and pure altruism (Li et al., 2014). Self-serving altruism refers to the reciprocal expectation of an actor and his/her desire for a long-term value that reduces the actor's short-term wellbeing (Li et al., 2014), while pure altruism refers to the desire of an actor to focus his/her efforts on benefitting others (Hu & Liden, 2015). This means that a key criterion for evaluating MCB is the extent to which the behavior of an actor decreases his/her immediate benefits (Li et al., 2014).

MCB may be reduced to the inter-organizational behavior of participants representing firms that have made major achievements (Smith et al., 1995; Turner & Müller, 2003). Instead of calculating their economic gain and loss, these participants are significantly driven by the positive impact of their efforts on long-term social values (SVs) (De Dreu, 2006; Grant, 2013) such as social credentials, public recognition, and social wellbeing improvement (Chi et al., 2011; Li & Liang, 2015). Any MCB that contributes to the success of a national key project will thus also play a key role in achieving SVs (Chi et al., 2011). Therefore participating entities in megaprojects will pursue SVs that benefit their social identification and social wellbeing improvement. De Dreu, 2006.

MCB that decreases current profits to benefit others and the project as a whole may also generate long-term value that serves the interests of the participants (Li et al., 2014; Li & Liang, 2015). First, these participants may be aiming to receive certification for other high priority projects, thus benefitting their firm development (FD). Second, by engaging in MCB, these participants may also be pursuing a self-serving political objective. Bidding for large government projects tends to be reserved for participants with strong governmental connections (GC), so MCB serves as an excellent channel for building political appeal (PA) (Li, Yao, Sue-Chan, & Xi, 2011). The top managers of state-owned enterprises (SOEs) are often granted political appointments by government agencies in recognition of their contribution to the successful delivery of a major project (Flyvbjerg, 2014). GC may thus lead to satisfactory feedback from major decision-makers based on MCB, as well as generating added value by offering the participants access to "insider" information and extra resources (Chi et al., 2011; Li & Liang, 2015). Therefore, participants' PA refers to their desire for a higher level of governmental support, affiliation with the government, and political appointments.

Above all, drawing on team altruism, the OCB literature, and the specific context of construction megaprojects, this study posited that the motives behind MCB may be either social-value- or self-serving-related motives. We specifically focused on the roles of three motives, namely firm development (FD), political appeal (PA), and social values motivation (SV), in MCB engagement, both FD and PA motives are considered self-serving motivations (SSM).

Context influences the relationship between motivation and behavior (Hackman, 2002). The most obvious contextual factor is the universal governmental connections (GC) arising from both the participants and the construction megaproject itself in this study context (Liu, Zhu, Wang, & Huang, 2016), with one party slightly overlapping the other. As a result, the GCs of the megaprojects and participants were incorporated into the model for this study in order to examine how such factors moderate the driving effect of non-economic motives on MCB. Fig. 2 shows the study's research framework.

3. Hypothesis

3.1. The motivation of participants for MCB

The motives for showing OCB are, to a greater or lesser extent, altruistic as they involve sacrificing one's own time and resources and possibly accepting short-term losses to benefit others (Li et al., 2014). At the inter-organizational level, MCB tends to be more attentive and open to the needs of other participants (Anvuur, Kumaraswamy, & Fellows, 2012; Brion, Chauvet, Chollet, & Mothe, 2012; De Dreu, 2006).

First, due to the property of public goods, megaprojects may motivate participants to take social responsibility and make self-sacrifices for the public benefit (Cun, 2012; Shim & Faerman, 2017). Megaprojects are inherently imbued with great social significance and symbolism, so participants are proud of their involvement. This encourages them to promote the remarkable social value of the work their firms are doing, and as they are motivated by this sense of pride and reputational consideration they willingly exert additional effort in their pursuit of social value (Xing & Chalip, 2009). Secondly, those participants who are directly involved in megaprojects also receive many opportunities to demonstrate the strength and brand image of their firms, such that both brand effect and project experience may significantly contribute to the certification of these participants for other high priority projects and future developing potential for their parent organization (Xing & Chalip, 2009; Heere & Xing, 2012; Chi et al., 2011; Flyvbjerg, 2014). Megaprojects often impose high delivery requirements that can nurture excellent talents and introduce new technologies or management capabilities for future use (Liu, Zhao, & Wang, 2010). The desire of participants to maintain a favorable image and professional status can also outweigh their desire to receive short-term gain from their current opportunities (Turner & Müller, 2003). This means that those who pursue FD tend to engage in MCB as it supports their long-term strategic value (Batson et al., 2008; Hu & Liden, 2015). Thirdly, bidding for megaprojects is usually reserved for those organizations with good political appeal

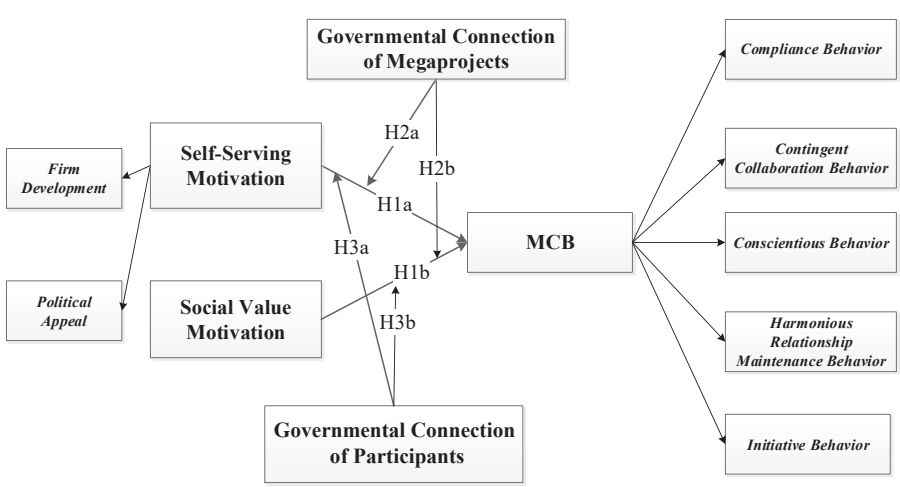

Fig. 2. Research framework.

satisfaction. Securing licensed restricted businesses, gaining access to those benefits controlled by governmental institutions or other state-owned organizations, and fulfilling political ambitions are also useful in the bidding process (Li et al., 2011; Jia & Zhang, 2013; Flyvbjerg, 2014). Above all, motivated not only by their social value but also by their self-serving desire for long-term FD and PA fulfillment, participants engage in MCB by reducing their short-term gains and accepting short-term losses (Grant, 2013; Hu & Liden, 2015; Li & Liang, 2015). These insights lead to the following hypotheses:

H1a. The SSM of the participants positively affects their MCB; and

H1b. The SV of the participants positively affects their MCB.

3.2. The role of GC in construction megaprojects

GC can be broadly defined as the connection between entrepreneurs (or firms or projects) and government agencies or officials (Li et al., 2011). This can also refer to formal/informal and active/dormant connections with SOEs, governments, and legislative entities at the national, provincial, municipal, county, and township levels (Li & Liang, 2015). Normally established by the government, GCs of a megaproject generate a significant *megaproject governmental connection* (MGC). The participants in GCs mostly comprise SOEs or successful NSOEs with important connections to specific government sectors, and many project managers take additional posts in semi-official institutes, thereby giving rise to the *participants' governmental connection* (PGC) (Liu et al., 2010). These two distinct types of GCs have important effects on the correlation between non-economic motivation and MCB.

4. GC of megaprojects

Government agencies or organizations are centrally responsible for distributing resources, making decisions, imposing sanctions, and issuing certifications (Li et al., 2011). Megaprojects with high GC tend to receive enormous benefits and develop a trustworthy status, thereby opening future opportunities for other megaprojects (Flyvbjerg, 2014). They also provide many public functions and receive extensive media attention that can help the parent company of the teams involved execute its social objectives and exert greater influence (Sun & Zhang, 2011), enhance its social value, achieve greater social identification (Chi et al., 2011), and receive additional political promotion and resource support (Flyvbjerg, 2014). To gain such long-term value, participants are willing to reduce their short-term gains by further engaging in MCB (Xing & Chalip, 2009). Based on the above reasoning, we propose the following hypotheses:

H2a. The GC of megaprojects positively affects the relationship between SSM and MCB; and

H2b. The GC of megaprojects positively affects the relationship between SV and MCB.

5. GC of participants

Participants with a higher GC generally see an advantage in their social status and influence (Liu et al., 2010). They are also more willing to give up short-term benefits and perform MCB actively to sustain this legitimate advantage (Li & Liang, 2015). Having a strong GC grant the participants easier access to policy makers, allowing the policy makers to observe their MCB, and supports their efforts to capture further megaproject opportunities and resource support (Jia & Zhang, 2013; Li et al., 2011). The top managers of participating organizations tend to be appointed by the government and have previously served as government officials (Hu, Chan, & Le, 2015), thereby enhancing their political expectation (Li & Liang, 2015). Participating in megaprojects offers these entities better opportunities to satisfy their political objectives (Li et al., 2011). We, therefore, propose the following hypotheses:

H3a. The GC of participants positively affects the relationship between SSM and MCB; and

H3b. The GC of participants positively affects the relationship between SV and MCB.

6. Research methods

6.1. Samples and data collection

A questionnaire-based survey was adopted as the primary data collection method. The questionnaire was developed using information derived from a literature review, a megaproject observation, and 26 semi-structured expert interviews (Yang et al., 2018). Following several pioneering studies on OCB (Farh, Zhong, & Organ, 2004) and project management (Le et al., 2014; Liu, Shen, Li, & Shen, 2004), we improved the comprehensiveness and reliability of our constructs for MCB and motivation measurement by conducting a pilot study involving 14 experts structured interviews. These 14 experts were interviewed to further identify any ambiguous expressions in our questionnaire and test the validity of the related constructs (Yang et al., 2018). Based on the feedback from these experts, we revised our questionnaire and disseminated this instrument to our target respondents.

Only Chinese mainland construction megaprojects were considered in the survey. Following Smith et al. (1995), we only invited those managers playing one of three key roles in the implementation stage, namely owners, constructors, and designers. These managers were asked to rate the extent of their MCB engagement on a Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). With the help of our interviewed experts, two of the Chinese authors organized a 5-min training session to orient the invited managers about the research topics either in person or by using the communication system platforms of the targeted firms and megaprojects. Finally, 191 responses were obtained from 210 trained managers through personal visits, an additional 117 responses were collected from 200 trained managers and examined online using WeChat. Some respondents were contacted more than once to interpret their responses further and to retrieve additional information about their targeted projects.

To ensure the quality of the responses, the selected respondents were asked about their background information, including their project experience and position. Only those respondents who were willing to answer these questions were invited to participate in the survey. Overall, a total of 308 responses were obtained from 410 managers initially contacted, for a 76% response rate. After omitting those responses with incomplete information about the key variables, containing many consistent answers, or the corresponding projects that were not yet in the implementation stage, 260 responses were deemed usable for this analysis. These respondents included 70 owners, 144 constructors, and 46 designers from 151 megaprojects. Among these responses, 34.6% were collected using an online system, while the remaining 65.6% were collected through personal visits. ANOVA was used to compare the two types of responses and no statistically significant differences were identified.

6.2. Measurement

Based on the findings of the MCB study (Yang et al., 2018), we measured MCB by aggregating five different aspects of the participants' behavior, namely PC, CCL, CB, HGM, and IB, as shown in Table 1. These aspects had Cronbach's α values of 0.87, 0.805, 0.848, 0.746, and 0.833, respectively, and all exhibited a favorable internal consistency. MCB itself obtained a KMO value of 0.911, which is considered acceptable for factor analysis (Norusis, 2008). CB1 was deleted from the list of measurement items after obtaining a loading value lower than 0.5 (Hair, Black, Babin, Anderson, & Tatham, 2010); thereby, resulting in a final list of 20 items. The five aforementioned dimensions explained 61.00% of

the variance. An internal consistency test of the summated factor produced a satisfactory Cronbach's α of 0.905.

MCB motives were measured based on the behavioral intentions of the participants, which in turn were divided into two categories, SSM and SV. These motives were primarily based on a detailed review of the literature on team altruism motivation (Li et al., 2014; Li & Liang, 2015) and the observations of 26 industrial experts working on construction megaprojects. To improve the contextualization reliability of our work, the literature review results were not presented during the interviews. Two Ph.D. students categorized the 35 motives reported by the experts into 8 categories based on comprehensive content analysis. They then revised the statement of the items and added new two categories, namely, ED4 and PA3, based on the literature review. Table 1 lists 10 statements, among which 7 are for SSM and 3 are for SV; all have been retained in the questionnaire following the agreement of more than 50% of the experts. After the factor analysis, SV1 was removed from the questionnaire to improve the Cronbach's α of SV and SSM to 0.80 and 0.778, respectively, both of which satisfied the consistency requirements. SV and SSM explained 83.094% of the variance, while PA explained only 65.257%. SV and SSM had KMO values of 0.751 and 0.652 respectively.

We measured GC based on the measured connection between the top managers in private firms and high officials in the national government (Li & Liang, 2015). Given the importance and spatial relationship of infrastructure megaprojects with local economic development, as shown in Li et al.'s (2011) investigation of Chinese GC distribution channels, we assessed GC based on the association of participants with SOEs and with government organizations at the national, provincial, municipal, and county levels in the Chinese administrative system. During the pilot interviews, most experts argued that the informal governmental association in megaprojects was too ubiquitous to be considered. This point was supported by Li et al. (2011). Informal GC was therefore examined by modifying those items related to the extent of GC and by taking into account whether it involved current or past positions connections. The informal ties were also operationalized as reflective constructs from two sides, namely participants and the megaprojects themselves. GC obtained a KMO value of 0.80. GC1 was removed from the final list of questions after obtaining a mean value of less than 3.0 and a Cronbach's α of 0.827 despite satisfying the consistency requirements. After several iterations of theoretical analyses, interviews with experts, case studies, and pilot interviews, all items in the questionnaire showed a favorable content validity when compared with the reviewed literature and the contextual practice in construction megaprojects (see Table 1).

To separate the influence in the three motivation constructs (i.e., SV, FD, PA) caused by megaproject context, three control variables were added to check for the link between MCB and MCB non-economic motivations. According to 40 expert interviews, participants' motivation behind MCB will be different for their different parent company ownership type. As the first control variable, project team property was operationalized as a variable reflecting the parent company ownership behind the surveyed project participating team (1 = state owned enterprise; 2 = private enterprise; 3 = foreign-owned enterprise; 4 = others). Regarding two other control variables, owners, constructors, and designers have different value orientations, and therefore will hold different motivation choice. Team role was chosen as the second control variable and measured by specialized role of the participant in megaproject implementation (1 = owner; 2 = constructor; 3 = designer); more administrative power in megaprojects will lead to higher government intervention and as a result, participants will present more altruistic motivation behind MCB, therefore management unit was measured as a variable indicating the direct or indirect role of government in megaproject governance through legislation and regulations (1 = construction headquarter; 2 = management authority l; 3 = SPV (Special Purpose Vehicle); 4 = project division; 5 = others).

Table 2
Measurement items and loadings.

Measurement Item Code	CB	CCL	FD	HRM	IB	PA	PC	SV	GC	T-Value (>1.96)
CB2	**0.7956**	0.4924	0.2724	0.4806	0.4575	0.2816	0.4804	0.4165	0.1401	32.467
CB3	**0.8500**	0.5018	0.3053	0.5067	0.4264	0.3142	0.5095	0.4496	0.1717	42.361
CB4	**0.8519**	0.5039	0.2505	0.5865	0.4952	0.2781	0.4776	0.4318	0.1684	47.299
CB5	**0.7885**	0.5349	0.2749	0.5255	0.4670	0.2533	0.5119	0.4475	0.1925	30.293
CCL2	0.4544	**0.7062**	0.1949	0.4275	0.3378	0.2390	0.4046	0.2712	0.1322	18.297
CCL3	0.4468	**0.7863**	0.2496	0.4474	0.3961	0.2514	0.3500	0.2957	0.1804	36.421
CCL4	0.5155	**0.8189**	0.2383	0.4157	0.4633	0.3152	0.4226	0.3915	0.1216	38.114
CCL5	0.4617	**0.8066**	0.2021	0.3561	0.4174	0.1762	0.4281	0.2694	0.1609	22.406
CCL6	0.5387	**0.7942**	0.2008	0.4419	0.3592	0.2363	0.4417	0.3084	0.1407	33.066
FD1	0.2026	0.119	**0.7471**	0.1776	0.1918	0.1168	0.1602	0.3636	0.0222	19.852
FD2	0.2917	0.2966	**0.8539**	0.2450	0.2598	0.2601	0.1930	0.3647	0.0758	34.986
FD3	0.2650	0.1480	**0.8144**	0.2000	0.3138	0.2698	0.2294	0.4788	0.0547	29.661
FD4	0.3093	0.2877	**0.8349**	0.2359	0.3349	0.2883	0.2077	0.4757	0.0930	29.525
HRM1	0.5167	0.3959	0.1869	**0.8213**	0.3891	0.1781	0.4201	0.3288	0.2071	34.725
HRM2	0.6152	0.4903	0.2516	**0.8875**	0.4010	0.3125	0.4273	0.3634	0.3261	67.447
HRM3	0.4020	0.3999	0.2075	**0.7093**	0.3740	0.1207	0.2999	0.3216	0.1770	15.303
IB1	0.3917	0.3544	0.2716	0.2615	**0.7498**	0.1835	0.3546	0.4154	0.1494	18.212
IB2	0.4301	0.3812	0.2177	0.4071	**0.7653**	0.1809	0.3555	0.4308	0.1269	24.339
IB3	0.4935	0.4551	0.3435	0.4444	**0.8859**	0.3489	0.3811	0.5156	0.1441	59.302
IB4	0.5081	0.4487	0.2909	0.4273	**0.8581**	0.2502	0.3939	0.4702	0.1377	47.134
PA1	0.3735	0.3247	0.1913	0.2657	0.3389	**0.8712**	0.3310	0.5267	0.2074	26.084
PA2	0.1625	0.1852	0.2660	0.1519	0.1463	**0.7092**	0.1252	0.1381	0.2899	10.623
PA3	0.1805	0.1586	0.3268	0.1484	0.1307	**0.7621**	0.1100	0.3241	0.2482	12.055
PC1	0.4549	0.4306	0.1671	0.4052	0.3517	0.2425	**0.8419**	0.3509	0.1771	37.313
PC2	0.5636	0.4312	0.2097	0.3904	0.3934	0.2605	**0.9029**	0.3563	0.1188	60.161
PC3	0.5363	0.4870	0.2025	0.3923	0.4249	0.2492	**0.8729**	0.3824	0.1364	42.979
PC4	0.4829	0.4252	0.2496	0.4314	0.3678	0.2096	**0.7752**	0.3306	0.1623	21.561
SV2	0.5011	0.3908	0.4237	0.4238	0.5070	0.4227	0.4042	**0.9080**	0.2480	40.025
SV3	0.4124	0.3296	0.4022	0.3481	0.4785	0.5165	0.3344	**0.8366**	0.2310	20.476
GC2	0.2477	0.1957	0.0142	0.2912	0.1503	0.2542	0.1683	0.1849	**0.8407**	23.871
GC3	0.1685	0.2282	0.0845	0.2806	0.1383	0.2189	0.1963	0.2441	**0.8347**	8.399
GC 4	0.0654	0.0180	0.0557	0.1331	0.0707	0.2245	−0.0019	0.0949	**0.6373**	10.178
GC 5	0.0129	0.0555	0.0862	0.1672	0.0873	0.1691	0.0188	0.0551	**0.6840**	11.042

Note. CB = conscientiousness, CCL = contingent collaboration, FD = firm development, HRM = harmonious relationship maintenance, IB = initiative behavior, PA = political appeal, PC = compliance, SV = social value, and GC = government connection.

Table 3
Descriptive statistics, measurement validity, and construct correlations.

Measurement Items	Mean	SD	AVE	CR	R^2	CB	CCL	FD	HRM	IB	PA	PC	SV	GC
CB	4.28	0.59	0.7442	0.8927	0.6940	**0.8627**								
CCL	4.19	0.59	0.6748	0.8880	0.6282	0.6185	**0.8214**							
FD	4.15	0.59	0.6537	0.8865	0.8078	0.3354	0.2774	**0.8085**						
HRM	4.24	0.60	0.6678	0.8497	0.5812	0.6393	0.5328	0.2679	**0.8172**					
IB	4.03	0.63	0.6706	0.8886	0.5796	0.5618	0.5052	0.3457	0.4787	**0.8189**				
PA	3.85	0.62	0.6357	0.8258	0.5000	0.3429	0.3119	0.2998	0.2608	0.3011	**0.7973**			
PC	4.43	0.53	0.7277	0.9118	0.6291	0.6021	0.5231	0.2444	0.4757	0.4542	0.2835	**0.8531**		
SV	3.98	0.75	0.8303	0.8761	N.S	0.5311	0.3940	0.5187	0.4181	0.5627	0.4762	0.4187	**0.9112**	
GC	3.55	0.86	0.5916	0.8691	N.S	0.2049	0.1873	0.0812	0.2994	0.1696	0.2944	0.1735	0.2413	**0.7691**

Note: AVE = average variance extracted, CR = composite reliability, and SD = standard deviation. The bold values are significant at the 0.01 level.

7. Data analysis and results

7.1. Descriptive analysis and measurement validation

The data were analyzed using SPSS 20.0 and Smart PLS 2.0 M3. For the limitation of construction megaproject samples, partial least squares (PLS), and a component-based structural equation modeling (SEM) technique that was appropriate for small sample size and non-normal datasets (Ringle, Sarstedt, & Straub, 2012) were adopted to validate the measurements. Given that Smart PLS 2.0 M3 could not be used to test the three-way interaction for moderator effect, we used SPSS 22.0 to test all hypotheses.

Tables 2 and 3 present the results of the analysis of the measurement models. We assessed the internal consistency, convergent validity, and discriminant validity of all measurements, measuring the internal consistency by estimating the composite reliability of the measurements. As shown in Table 3, all the assessed constructs had composite reliabilities exceeding the threshold of 0.7 (Nunnally, 1978). The average variance extracted (AVE) reflects the convergent validity of the measurements, so any AVE exceeding a threshold of 0.5 indicates that at least 50% of the variance in the items can be accounted for by their respective constructs. Convergent validity was further assessed by evaluating the factor loadings of the measurements. The standardized factor loading of each item on its corresponding construct was significant and exceeded the advised criterion of 0.70, thereby indicating the absence of a cross-loading problem (Table 2). All square roots of the AVE (diagonal values on the correlation matrix in Table 3) were greater than the absolute value of the respective inter-construct correlations (off-diagonal values), thereby indicating that the constructs satisfied the discriminant validity requirement.

Table 4
Hierarchical regression results[a].

Variables	Control Model	Main Effects		Moderation	
	M1	M2	M3	M4	M5[b]
Step 1: Control variables					
Team role	0.117^{+}	−0.088	−0.080	−0.075	−0.082
Project team property	−0.142*	−0.103^{+}	−0.101^{+}	−0.092^{+}	−0.095
Management unit	−0.003	0.03	0.036	0.043	0.031
Step 2: Independent variables					
SSM		0.295***	0.381***	0.396***	0.406***
SV		0.39***	0.278***	0.272***	0.204***
Step 3: Moderator variables					
PGC			−0.027	−0.030	−0.040
MGC			0.111	0.118	0.102
Step 4: Two-way interaction					
SSM * PGC				−0.185*	−0.194*
SSM *MGC				0.172^{+}	0.168^{+}
SV * PGC				0.043	0.035
SV * MGC				−0.056	−0.054
Step 5: Three-way interaction					
SSM * MGC* PGC					0.122*
R^2	0.044	0.379	0.387	0.401	0.409
F-value	3.916**	31.038***	22.757***	15.086***	14.273***
ΔR^2		0.335	0.008	0.014	0.009
Adjusted R^2	0.033	0.367	0.370	0.374	0.381

[a] N = 260, the standardized coefficients are reported. *$p < 0.05$; **$p < 0.01$; ***$p < 0.001$;+$p < 0.1$.

[b] The result of the first four steps in the second regression was the same as that for the first four steps in the first regression.

7.2. Hypotheses test

Two regression analyses were conducted to assess the moderation on the relationship between each motive and MCB: the results are presented in Table 4. The first analysis (M1–M4) included all variables and the two-way interaction term, while the second analysis included the three-way interaction term (M5) when the two-way interaction was significant in the first regression. The two stages of the regression process demonstrated a dynamic relationship between motivation and MCB. As the data in Table 4 shows, after gradually including the variables into the regression process, the explanation power of the models was improved along with their increasing R^2. In this process, the variance inflation factor (VIF)of the variables amplified from 1.59 to 3.10, thereby indicating that the regression was not influenced by multicollinearity (Cohen, Cohen, West, & Aiken, 2003).

8. Motivation behind MCB

We then examined the relationship between the three control variables and MCB. As M1 in Table 4 shows, these variables contribute significantly to the interpretative power of the model ($\Delta F = 3.916$, $df = 260$, $p < 0.01$) and explain 4.4% of the variance in MCB. In addition to the management unit, several single control variables were significantly related to MCB in the regression. These variables include participants' property ($\alpha = -0.142$, $p < 0.05$), management unit ($\alpha = -0.003$, N.S), and participants' roles ($\alpha = 0.117$, $p < 0.1$). We then entered the variables for SSM and SV into the model; the results are presented in M2 of Table 4. Both SSM and SV were significantly related to MCB ($\alpha = 0.295$, $p < 0.001$, and $\alpha = 0.39$, $p < 0.001$, respectively), thereby supporting H1a and H1b. M2 explained 37.9% ($R^2 = 0.379$) of the variance in MCB over and above the control variables and the main effects of the independent terms.

9. Moderation testing

As shown in M4 of Table 4, the interaction between PGC and SSM of the participants is significantly related to MCB ($\alpha = -0.185$, $p < 0.05$), thereby rejecting H3a. The interaction between PGC and SV of the participants is not significantly related to MCB ($\alpha = 0.501$, $p = 0.617$, N.S), thus also rejecting H3b. The interaction between MGC and SSM is marginally significantly related to MCB ($\alpha = 0.172$, $p < 0.1$, $p = 0.062$), consequently supporting H2a. The interaction between MGC and SV is not significantly related to MCB ($\alpha = -0.608$, $p = 0.544$, N.S), thereby

rejecting H2b. M4 explains a significant amount of the variance over and above the control variables and the main effects of the moderator terms ($\Delta F = 15.086$, $df = 260$, $p < 0.001$). Based on the above direct moderation analysis, the pursuit for SV behind MCB is not influenced by either type of GC, while SSM is negatively affected by both PGC and MGC, as the co-efficiency for H3a is negative with an absolute value that is larger than that for H2a. Therefore, SSM should gradually become weaker than SV and the co-efficiency of the SV-MCB link should remain stable in M4.

To further explore the concurrent effect of two moderators on the SSM–MCB link, we tested for a three-way interaction between two kinds of GC and SSM. The three-way interaction term, which was input into the second hierarchical regression (see M5 in Table 4), was significant at the 0.05 level with a co-efficiency value of 0.122. These two moderators synchronously intensified the MCB driven by SSM but had no effect on the SV–MCB link. Comparing M5 with M2 under the effect of the two kinds of GC, the coefficient between SSM and MCB increased from 0.295*** to 0.406***, while that of the SV–MCB link decreased from 0.39*** to 0.204***. This result is inconsistent with M4. Given the assumption made by Li et al. (2014) that one motive may shift to another, we inferred that SV changed into SSM when both PGC and MGC simultaneously functioned as moderators, so the driving power of SSM on MCB was partly accomplished through the role of SV. This finding further indicates that the influence of SSM on MCB may be partially mediated by SV.

10. Mediator testing

To understand further how motivation drives MCB, we conducted two Pearson's correlation analyses to test the mediating effect. The analysis results (not reported in this paper[1]) revealed that when the driving effect of SV (or SSM) is excluded, the direct influences of SSM ($\alpha = 0.517$, $p < 0.001$) or SV ($\alpha = 0.567, p < 0.001$) on the engagement of MCB were still significant. Combined with the results of the original model, shown in Table 4, the effect of SSM on MCB engagement is partly mediated by SV, providing additional support for H1a and H1b. The research model in Fig. 1 was then adjusted to the final model shown in Fig. 3, which summarizes the results of this study.

11. Discussion

This study contributes to the literature on megaproject organizational behavior by (a) characterizing the motives of participants (owners, contractors, and designers) engaging in MCB, (b) identifying the heterogeneous dynamic effect of different motives on consequent MCB engagement practices, and (c) identifying the dynamic transition mechanism between two motives under the influence of a contextual factor, namely government connections. Our findings will help researchers explore the behavioral complexity and inherent non-economic intent of participants to engage in MCB.

11.1. The non-economic motivation for MCB

The two categories of altruistic motives are separately associated with subsequent MCB engagement practices. Despite their use of traditional project management theory to analyze the underlying motivations for stakeholders' actions empirically, previous studies of behaviors in the construction industry have tended to hone in on opportunistic or operationalized short-term economic interests as the sole drivers of such behaviors. Given this bias, it is not surprising that these studies reject the idea that non-economic motives with no clear agreement guarantee could result in high levels of positive behavior that substantially benefit other parties and the megaproject as a whole, or only lead to ceremonial action for show (e.g., Davies, Dodgson, & Gann, 2016; Le et al., 2014). By considering team altruism and OCB from organization behavior science, in this study, we were able to identify and compare the roles played by SV motives in improving social wellbeing and identification (by taking social responsibility and supporting an excellent public image) and SSM motives to secure opportunities for long-term FD (in terms of brand effect and more project opportunities) and PA (by building government resource support and political promotion).

Our results show that the effect of SV motives on subsequent MCB engagement practices is much more substantial than that of the FD and PA motives. This may be for two reasons. First, this study was conducted in China, where Confucianism consider the social benefit to be more important than self-interest (Leung, 2012; Li & Liang, 2015). According to the Confucian social model proposed by Li and Liang (2015), Confucian values make people with the willing to contribute to the greater well-being or do good deed (Li & Liang, 2015). This Confucian social orientation is to promote general social welfare improvement as the ultimate way to be greatness (Fu et al., 2010; Li & Liang, 2015). For instance, give back to society, enhance social good, contribute to positive social change, and maintain society harmony (Li & Liang, 2015; Lin & Ho, 2010). They feel an obligation to contribute to the greater good of society. As a result, the prosocial motive that drives participating entities to benefit the collective and the broader society were stronger than the pro-self motive.

Second, participants face high requirements and specificity when taking on construction megaprojects, and as a consequence, relatively few firms have the qualifications and experience needed to conduct specific types of megaprojects (e.g. high-speed railways). This means that these firms may be given enhanced project opportunities in certain periods or areas. In contrast to their self-serving motive, these participants view the successful delivery of megaprojects as their social responsibility to provide public goods in place of the government to some extent. Although the owners, constructors, and designers may vary in their capacity to generate influence, these parties are all highly motivated to engage in MCB. To gain long-term non-economic value, stakeholders may be willing to sacrifice their short-term interests and accept some losses for the benefit of the project. Among the three kinds of motives, the PA motives in particular support the argument made by Chi et al., (2011), who contended that the government assumes the dominant role and that SOEs act as the main participants in most construction megaprojects.

Driven by long-term value, MCB actually provides the participants with a strategy that helps them prepare to face future uncertainties. To achieve such value, these participants voluntarily comply with the requirements of the megaproject and the host government and are willing to work overtime when necessary, set high implementation standards for their work, and develop a creative task plan and new construction technology without supervision or payment. They also maintain a positive and harmonious formal and informal relationship with other participants and government sectors, provide assistance to other parties at the interface, share resources and valuable information, and invest additional resources to support the project implementation.

11.2. Dynamic transition mechanisms for different types of motivation

By investigating the complex influence of GC on the relationship between MCB engagement motivations and practices, this study reveals the dynamic transition mechanisms involved in different types of motivation and highlights the role of megaproject contextual factors in shaping MCB engagement processes. Specifically, SV partly mediates the SSM–MCB link, indicating that the positive MCB engagement driven by SV is in fact driven at least partly by the desire for additional opportunities for long-term FD and PA. This finding suggests the existence of a transition mechanism between SV and SSM that includes opportunities

[1] We conducted additional analyses in Smart PLS 2.0M3 and SPSS via a four-step method to ensure the robustness of the mediating effect presented above and found similar results. The effect of SV on MCB engagement was also found to be partly mediated by SSM. Given the space constraints, these findings are not reported here but are available upon request from Qinghua He.

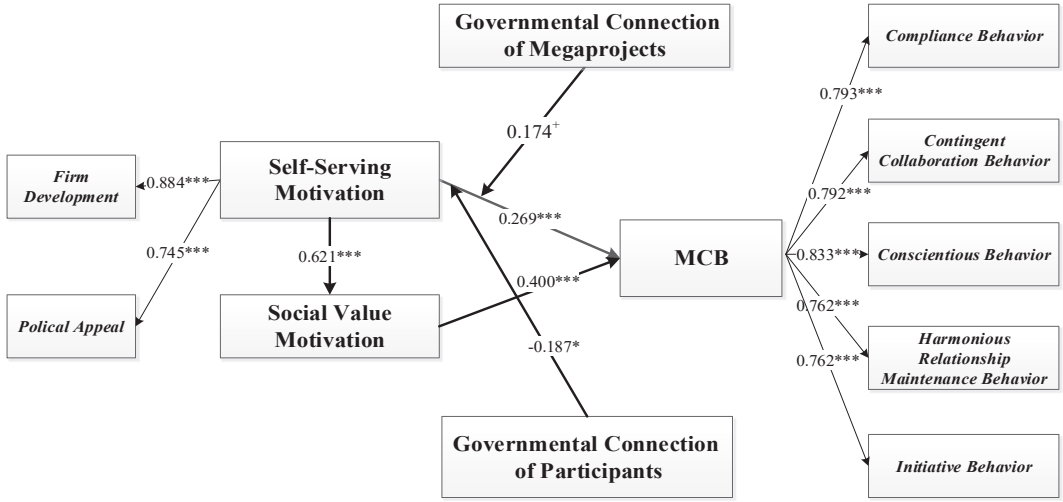

Fig. 3. Analysis results for the research model.

for FD and PA and indicates that these motives are neither separate from nor opposed to each other. In their theoretical study on team altruism, Li et al. (2014) proposed a similar idea that was empirically verified by the findings of the present study.

11.3. The impact of government connections on MCB motivation

Participants' government connections (PGC) have a significantly negative influence on the relationship between SSM and MCB practice. H3a, which posits a positive effect based on the literature, is therefore rejected. There are two reasons for this result. First, comparing the context of this study with that of previous work in this area, it is important to note that the previous studies have generally focused on those firms or individuals (i.e., private enterprises or entrepreneurs) that currently lack and are positively seeking GC (e.g., Li & Liang, 2015). In this study, 82.3% of the samples were SOEs that already possessed strong GC with a mean level of 3.55 (Table 3), so their PA had already been largely satisfied, especially in the case of China. These firms have experienced great business success (Liu et al., 2010) and thus no longer need to seek to achieve further huge advances in terms of their FD and PA through MCB engagement and do not show greater passion for MCB that is driven by SSM, in contrast, GC has a negative effect on such MCB. Second, due to government support for new types of urbanization in China, the number of construction megaprojects involving participants with strong GC is rapidly increasing, although their capability of undertaking such projects does not immediately improve at the same speed. Therefore, the effort and capacity of these parties to engage in MCB are reduced, and participants face major task pressure and a very high risk of mistakes that can damage their FD and PA.

The megaproject's GC (MGC) has a marginally significant positive effect on the SSM–MCB link. When MGC increases, only some participants will engage MCB for FD and PA. This finding is consistent with previous megaproject research that suggests that the power of resource certification and distribution is centralized in government agencies or related organizations, and that those participants hoping to gain continuous resource certification and support prefer to maintain favorable GC by engaging in MCB with short-term cost losses in Chinese area (Chi et al., 2011). Li and Liang (2015), a Confucian social model study, also argued that some firms who enjoy substantial business success showed low political intention. In sum, the influence of MGC is only significant at a marginal level.

However, this study's findings fail to provide evidence for any significant direct influence of GC on the SV–MCB link, indicating that the SV of the participants, which drives their MCB engagement, will not be affected by their relational ties with the government. This finding is somewhat surprising because a number of studies (for example, Li & Liang, 2015) have indicated that at least some part of those firms with strong GC could exert substantial effort and resources to fulfill their SV motives as well as benefit the collective and the broader society. The insignificant influence of GC on SV may be thus attributed to the fact that 88% of the megaprojects considered in this study were hosted by the government, and hence both MGC and PGC were set at high levels. These apparently contradictory findings suggest that MCB engagement processes driven by non-economic motives may become relatively complex under the influence of overall GC in Chinese construction megaprojects. Therefore, these findings require further research and more comprehensive analysis.

11.4. The complexity of motivation for MCB

Considering the various findings in Table 4, we can see that both MGC and PGC directly reduced the function of SSM motives in driving MCB engagement (total moderating effect of H2a and H3a in M4) but did not affect that of SV motives (total moderating effect of H2b and H3b effect in M4). However, MGC and PGC both strengthened the direct function of SSM (the path coefficient of H1a gradually increased from M2 to M5, and the three-way interaction in M5 showed a significant positive effect) but weakened the role of SV in driving MCB engagement (the path coefficient of H1b gradually decreased from M2 to M5). This complex result suggests that GC does not directly weaken the role of SV in driving MCB. Instead, given the mediating effect analysis result, this weakened role may instead be attributed indirectly to the partly intermediating effect of SV on the SSM–MCB link. In other words, the changeless function of SV on driving MCB was partly and indirectly replaced by SSM. As a consequence, the SV that drives MCB is weakened while the SSM that drives MCB is actually strengthened, so the SV that drives MCB engagement is implicitly and partially transformed into SSM.

Our comprehensive analysis shows that together with the dual role of SV, MGC and PGC may both trigger and cover up the transformation of SV into SSM. This means that participants with strong GC in government-hosted construction megaprojects have higher chances of having their SV converted into SSM. Li and Liang (2015) pointed out that the relationship between strong GC and SV in China will be impacted by how this emprise embraces the Confucian doctrine. Traditionally in Confucian cultural background, there is a strong societal orientation that cooperation or governmental section will have a collectivistic sense and that those driven by self-serving motivation will not be respected (Fu et al. 2010). And this value orientation has been institutionalized in the society (Fu et al., 2010).. As a result, participants (e.g. SOEs) with relational ties to the government are expected to show great concern for social welfare

(Cun, 2012; Jia & Zhang, 2013), and the government usually regard SOEs as pillars of economic development and tools for promoting common interests (Li et al., 2011). These participants' SV concerns are thus often taken for granted and therefore they often downplay their SSM, especially in relation to their pursuit of political objectives. As a consequence, these firms tend to not report a great deal of concern for future business benefits and political appeal, but often show their strong SV motivation. Actually, their SSM may be satisfied in the name of their SV motive. One of the Chinese managers interviewed made an interesting comment:

> *"We are local SOEs and contributing to local development is our responsibility. We should not always focus on our own benefit… regarding political intention, it is wrong to say either yes or no."*

Consequently, although these participants' SV for MCB is higher than their SSM in general, GC can introduce complexities and may cause SV to act partly as a mediator; SV can be tacitly transformed into SSM to the point where SSM eventually becomes larger than SV. This finding indicates that those SOEs that want or need to assume greater social responsibility may downplay and cover up the beneficial effects of SSM on their FD and PA. As a result, MCB engagement is actually driven by FD and PA motives even though the apparent driver is to seek SV.

12. Conclusions and implications

This study aims to identify how the organizational citizenship behavior practices of the participants in construction megaprojects are associated with their potential motives and how the related megaproject contextual factors are involved. We empirically verified these associations by conducting interviews with industry experts and a questionnaire survey of owners, constructors, and designers involved in construction megaprojects in China. The MCB engagement motives examined included not only SV motives to pursue social welfare improvement and public identification, but also SSM motives such as future firm development opportunities and political appeal satisfaction, finding that the former motive is generally stronger than the latter. The worthy noticed finding is that some participants with strong connections with government sectors, especially those participating in government-led megaprojects, may engage in MCB in the name of SV, but their actual purpose is to pursue FD and PA, because SV may be transformed into SSM through the mediating role of the former. Our findings reveal that the non-economic motivations of these participants are ubiquitous and important in influencing positive MCB engagement practices. Moreover, contextual factors such as multiple connections with the government can introduce complexities in MCB implementation and motivation. Based on internal logic, our findings may reveal how and why stakeholders tactically engage in MCB as a voluntary non-rational altruistic behavior.

This empirical exploratory study offers some practical implications for megaproject management. First, in terms of the various motives of stakeholders to engage in MCB as well as the influence of contextual factors on different motivations and subsequent MCB, the traditionally adversarial relationships bias and homo economics utilitarianism in construction management practice must be corrected and the altruistic awareness and motivation of the participants to engage in positive MCB must be comprehensively assessed. Second, to improve the level of MCB in construction megaprojects, the internal motives of the participants could be stimulated using immaterial long-term value orientation and non-economic-based approaches. Providing behavior-modifying extrinsic rewards such as material incentives and sanctions is often suboptimal because the adoption of sanctions and rewards is costly and positive behaviors are often rapidly extinguished once the tangible incentives are removed (Li et al., 2014). With a basic and reasonable economic profit guarantee, MCB driven by long-term non-economic approaches can help participants reap benefits in the future through their altruistic behavior and transform their antagonistic status into a win-win situation. A positive industrial climate can also be promoted to discourage the subjective intentional passive behavior of these participants. Third, an open, normative, and transparent market environment should be established where private firms can enter the megaproject market through fair competition with SOEs. Generally, the MCB driven by private entities will be no less significant than that driven by SOEs (Liu, Fellows, & Tuuli, 2011). The GC of the participants may also be weakened through the involvement of private firms, hence non-economic motives could be clearly identified and encouraged. Consequently, the management effectiveness in construction megaprojects may be enhanced by reducing the emerging complexities of MCB and removing the transformation of SV into SSM caused by government connections.

13. Limitations and directions for future research

The findings of this study must be interpreted in light of the following limitations. First, the data were collected through a questionnaire survey, which could introduce a common method bias in the responses. To address this problem, Harman's one-factor test was performed to examine the possible effects of such bias (Podsakoff & Organ, 1986). No individual dominant factor was detected, and the largest factor interpreted only 28.80% of the overall variances in the measurements, thereby indicating that common method bias does necessarily contaminate our results. Second, this study was conducted in a specific Confucian context in the Chinese construction industry, which could restrict the generalizability of our findings to other cultural contexts, especially the complexity of motivation for MCB. Future studies could extend this research by comparing how participants engage in MCB in different cultural and market environments. Third, as an explosive MCB research, our study was limited to cross-section and easily open to reverse-causality, some dynamic longitudinal survey will be conducted for further study. Fourth, given our relatively small sample size, our examination of the inherent drivers of MCB could have omitted some important external factors. MCB is embedded in an open and external social environment network. By adopting other theoretical perspectives such as institutional theory and plan behavior theory, future studies could investigate other relevant influencing factors and examine the effects of external environmental factors on the diffusion of MCB and other factors during the MCB engagement process.

Conflict of interest

The authors declared that they have no conflicts of interest to this work.

Acknowledgments

This study was funded by the National Natural Science Foundation of China (Grant Nos. 71571137, 71801083, 71602144). The authors would especially like to thank the three anonymous reviewers for their helpful comments on an earlier draft of this paper.

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