The Diffusion Mechanism of Megaproject Citizenship Behavior: The Role of Institutional Isomorphism

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Abstract: Megaproject citizenship behavior (MCB) has been confirmed to a play vital role on megaproject performance. Although current research has argued that institution elements have had an impact on MCB diffusion, limited studies have empirically investigated the distinct effectiveness of various institution elements on driving MCB’s widespread diffusion in construction megaprojects. Based on institution theory, this study proposes a theoretical model comprising institutional elements (i.e., normative and mimetic isomorphism), owner’s support, relationship-based trust, and their effect or impact on MCB’s diffusion. Based on 171 industrial questionnaires collected from managers of contractors and designers in megaprojects. Partial least squares structure equation modeling (PLS-SEM) was used to validate the established model. The results indicated that both normative and mimetic isomorphism have positive effects on facilitating MCB diffusion, and owner’s support has shown partial mediation in promoting MCB diffusion through normative isomorphism, as well as full mediation in the promoting of MCB diffusion through mimetic isomorphism. Meanwhile, relationship-based trust exerts a positive moderating effect on the relationship between mimetic isomorphism and MCB. This study extends current literature on driving MCB diffusion from the perspective of institutional theory, contributing by providing four implications for megaproject managers to “buy in” more extensive MCB.

Keywords: megaproject citizenship behavior; institutional normative isomorphism; institutional mimetic isomorphism; owner’s support

1. Introduction

Megaprojects are unique and highly complicated construction projects with numerous uncertainties [1]. It is impossible that the contracts of such projects cover contingencies and details exhaustively in advance, so participating entities need to proactively engage in certain informal cooperation and additional efforts for gaining project success [2,3]. For instance, in response to the COVID-19 pandemic, completing the construction of Huoshenshan Hospital and Leishenshan Hospital of China with high quality and high efficiency required not only effective promotion of formal management and command systems, but also the support of informal effort by participants [4]. Such efforts that go beyond formal contract obligations are regarded as organizational citizenship behavior (OCB), which refers to individual discretionary behaviors that are not explicitly recognized by a formal reward system but could collectively promote the effective functioning of the organization [5]. In the context of megaprojects, the OCB engaged by participating entities in megaprojects was designated as megaproject citizenship behavior (MCB), which...
is altruistic and informal cooperative behavior benefiting other partners, and in turn, promoting megaproject goal achievement [2,6–8].

MCB is vital for overcoming project uncertainty, handling project complexities, and achieving project management effectiveness during the implementation stage [4,7–9]. Due to the certainty of megaprojects, stakeholders mainly rely on contingent actions enacted in response to situations and definitions [10]. Especially for project managers and leaders, who often need to engage in MCB by undertaking more additional roles and responsibilities than expected in ordinary projects [2,4]. Consequently, MCB, as preparations to meet the external institutional demands for megaprojects, is essential for flexible and successful project management [11]. For instance, [4,7] each took the I-495 and I-95 Express Lanes in the Washington, D.C. and Wuhan Huoshenshan Hospital built for COVID-19 in China as examples to confirm that the participants’ MCB is critical for a megaproject’s success and sustainability. In addition, during the COVID-19 outbreak in Wuhan, China, participants of Wuhan Huoshenshan Hospital seamlessly collaborated and allocated sufficient resources in compliance with the overall arrangement within a short timeframe, and finally built this megaproject in record time (9–12 days) [8]. These practices illustrated that the project stakeholders’ positive MCB contributes to better performance by mitigating the shocks and disturbances, reducing transaction costs, uncertainty, and the risk of vicious competition among stakeholders, including protest and resistance [9,12,13]. Due to the great benefits provided by MCB, it is essential to unveil the underlying diffusion mechanism among participating entities in the megaproject, so as to enhance project performance. However, there are very few studies at present that have investigated the propagation of MCB for the construction of megaprojects.

All the participating entities of megaprojects from the different enterprises shape megaproject organizations, which develops into a complex social network [7]. The diffusion of MCB in this network is substantially affected by external social norms and cultural factors [6], which refer to two different kinds of institutional elements (institutional normative element and culture-cognition element), according to institution theory [14]. More and more researchers have claimed that institution theory lays the foundation for megaproject behavior research [15–17], as institution theory highlighted that organizational behavior is shaped by institutional context from both a macro and micro view [18–20]. Therefore, institution theory provides a novel lens for examining how institution environment drives MCB diffusion in the context of megaprojects [21].

Currently, megaproject management research has either focused on the regulative elements at the macro-level, or paid attention to projects through the lens of economics (e.g., [9,22,23]), but to a large degree it is the normative and cognitive-cultural factors of the micro-level that have received less attention [3,11,24]. Meanwhile, MCB is a phenomenon engaged by participating entities who were mainly motivated voluntarily by noneconomic elements and occurred beyond formal contract scope at the micro-levels [7]. Together with the unique properties of megaprojects and the inter-organizational attributes of MCB [25,26], the diffusion mechanism(s) of MCB driven by institutional elements was consequently more complicated. However, there has been rare empirical studies to unveil the effect of distinct institutional elements in influencing MCB diffusion [11,21]. Therefore, this study intended to draw upon institutional theory to examine the contribution of institutional elements (i.e., normative and mimetic isomorphism) in promoting MCB diffusion within megaprojects.

The structure of this study first reviews the theoretical background of MCB, institutional theory and their links. The next section proposes the research hypotheses. The following section explains the methodology and presents the results of the empirical analysis. Finally, we present a discussion of the findings, theoretical contributions, and managerial applications, and conclude with the limitations and suggestions for future research.
2. Theoretical Background

2.1. Institutional Isomorphism: The Influence of Institutional Elements on Organizational Behavior

The institutional theory stresses the impact of regulations, social norms, and cultural cognitive systems on organizational behavior [14]. It not only includes management decision-making organizations, but also a wider range of bodies such as the government, supervisory authorities, consumers, community, and other stakeholders [16,17,27]. Therefore, institutional theory considers the organization as an open system, and its behavior is often led by the isomorphism of institutional factors such as regulations, norms, and cultural cognition [28]. According to DiMaggio and Powell (1983) [29], institutionalization is a result of the continuous diffusion and spread of certain organizational behavior. This diffusion is primarily achieved through the three types of institutional isomorphism processes: coercive, normative, and mimetic. Specifically, coercive isomorphism refers to “the formal and external pressures exerted upon them by other organizations upon which they are dependent, and the cultural expectations in the society within which the organizations’ function”. Coercive pressures can also arise from government regulations and policies, as well as from industry and professional networks and associations, or in the form of competitive necessity within an industry or market segment [14,30]. Mimetic isomorphism occurs as organizations respond to uncertainty by modeling themselves after other organizations that are perceived to be legitimate or successful when goals are ambiguous or when the environment creates uncertainty [29]. This pressure comes from cultural cognition, originally [14,21]. Normative isomorphism occurs primarily as a result of professionalization, defined as “the collective struggle of members of an occupation to define the conditions and methods of their work, to control the production of the future member professionals, and to establish a cognitive base and legitimization for their occupational autonomy” [29]. Institutional isomorphism is considered a key element in explaining the shaping and diffusion of organizational behavior from external environmental factors [28], especially in highly complex situations [15].

2.2. Megaproject Citizenship Behavior

Megaproject citizenship behavior includes five kinds of behavior in megaprojects, specifically referring to project compliance, contingent collaboration, conscientiousness, harmonious relationship maintenance, and initiative behavior [2]. According to Yang et al. (2018) [2], more specifically, contingent collaboration behavior (CCL) is the willingness to assist and collaborate with others without enforcement by formal contracts. Project compliance (PC) refers to the principle that people involved in projects have voluntary compliance with, and internalization of, rules, norms, and procedures without supervision. Harmonious relationship maintenance (HRM) is behavior intended to create and preserve positive relationships with the project stakeholders. Initiative behavior (IB) refers to voluntary creativity and innovative design for task-related actions, which leads to enhanced project performance. Conscientious behavior (CB) means that participating entities are self-motivated and complete their responded tasks with maximum quality. Based on [2], MCB is a kind of positive action that benefits both other participating entities and the entirety of the megaproject. Actors must take charge of the costs of their behavior, including short-term business loss. MCB is directed toward broader social interorganizational networks that comprises both internal and external stakeholders. The object of compliance goes beyond the project boundary and extends to the host government. Interorganizational collaboration derives from giving contingent aid. Harmonious relationship maintenance covered both formal and informal ties among participating entities, the host government, and external stakeholders. Conscientiousness was quite popular as opposed to opportunism, and even voluntarily invested extra resources to support megaprojects. In complicated organization network-like megaprojects, behavior on different levels is all affected by the general institutional environment [3,19]. MCB happens at the inter-organizational level with high flexibility and has been characterized with consideration beyond the project’s
scope [2]; however, by influenced by external social institutional contexts, participants cannot be simply acting according to their own needs, since the value of MCB is indirect and uncertain and must behave under the influence of external institutional norms or industrial standards [2,5]. Moreover, the external environment is characterized by immense complexity and uncertainty, causing participants to react by team behavior, other participants’ demands, stakeholders such as the leading government, governments related to their parent company, local government departments, construction industry associations, labor unions, the general public, and the media [25,26,31].

2.3. The Diffusion of MCB under Institutional Isomorphism

Given the above behavioral dynamics, the institutional theory provides a cogent theoretical explanation for the diffusion and spread of MCB driven by external socio-environmental factors. The theory enables coercive, normative, and mimetic isomorphism to be viewed independently [14]. Compared to coercive isomorphism at the macro level, normative and mimetic isomorphism can better explain the initiatives and adaptability of an entity, emphasizing the collaborative behavior and the involvement in work at meso- and micro-level [11]. MCB occurred within the scope of one construction megaproject and was acted by participating parties on behalf of different companies at the meso and micro levels [2]. A study conducted by [32] suggests that the coercive factors do not play an important role in institutional isomorphism, and their effect is merely emblematic. As one kind of altruistic behavior, MCBs were characterized by a lack of external enforcement and not imposed by formal regulative mechanisms [2,6]. Hence, this study deleted the coercive isomorphic pressure representing the regulative factor of the institution and mainly investigated the effect of normative and mimetic isomorphism in influencing MCB.

2.4. The Effect of Megaproject Context

The megaproject context characteristics play an important role in the MCB diffusion driven by institutional isomorphic pressure. The trust among participants is a key context factor affecting inter-organizational behavior [24,33], making it an important driver in the diffusion of MCB in the face of these difficulties. There are three main types of trust, namely system-based trust, cognition-based trust, and affect-based trust. System-based trust is built on formal arrangements between contracting parties; cognition-based trust denotes the trust based on objective information and trustworthiness of the contracting parties; affect-based trust focuses on the personal relationship between two individuals that are not developed within the contracting system [33,34]. Since the current market in China operates under insufficient regulation and normalization, participants are prone to not act according to contract, leading to many disputes during, and criticisms of, megaprojects [35]. Such highly uncertain and less normative megaproject context weakens system-based and cognition-based trust [33]. Instead of such an environment, personal relationship networks often develop [36]. The trust among participants is usually built on personal relationship networks, such as links with the government, previous partnership, and unofficial relationships [24]. Relationships are often strengthened during continuous participation in megaprojects, before forming the affect-based trust, which is often called relationship-based trust in the Chinese context [3,37]. This indicates that relationship-based trust significantly impacts the diffusion of inter-organizational behavior and institutional isomorphic role [38]. Given this, this study takes the relationship-based trust among participants into account to investigate the diffusion of MCB through institutional factors.

As one kind of altruistic behavior, the diffusion process of MCB needs to be initiated by the leading entity [6]. In the megaproject context, the owner plays the leading role because the owner’s supportive attitude and action can spark and guide other participating entities’ MCB [39]. Megaprojects are often funded and initiated by the government [40]. Owners and the leading government department are in a close relationship, and the government often sets up agencies such as the Project Preparatory Office (PPO) to handle the major decision-making during megaproject implementation [41,42]. Moreover, legal authority
is set up with the role of the project owner, and most of the owner leaders are selected and appointed from state-owned enterprises (SOEs). They are experienced in managing megaprojects and in a complicated relationship with the government [43]. For instance, the senior management personnel of the Hong Kong-Zhuhai-Macao Bridge Authority are also members of the Hong Kong-Zhuhai-Macao Bridge Task Force. Therefore, this senior management personnel are in charge of managing and monitoring the participants on behalf of the government, and meanwhile responsible for the megaproject performance [39]. The project tasks, management requirements, and project objectives are to be conveyed and supervised by the owners [42,44]. The attitude of the owner towards certain actions can affect participant behavior [8,42], making the owner’s support an essential part of the participant decision-making [3]. Therefore, the owner’s support for MCB is a variable in the research model for examining the MCB diffusion mechanism.

3. Research Hypothesis

3.1. The Effect of Project Owners’ Support on MCB’s Diffusion

To better encourage participants, the owners’ support for MCB can be manifested through three channels: (1) The providing of incentives that are necessary to guarantee the realization of MCB’s future value. Extra costs generated by MCB and the high uncertainty with the long implementation period of the megaprojects make the future return of MCB unpredictable [45]. If the owner is willing to provide incentives such as a reliable commitment to future cooperation and rewarding participants with outstanding performance, the participants’ willingness to engage in MCB would be greatly enhanced. (2) The developing and involvement in a communication platform among participants. MCB can substantially influence project implementation in practice, and the inter-organizational nature of MCB might encourage a responsible party to shirk responsibility, or even getting into the paradox of ‘the more you do, the more chance you make mistakes’, which finally leads to serious conflicts [3,46]. If the owner provides a platform to facilitate the communications and the exchange of ideas between participants so that behavior decisions can be properly scrutinized and identified [46], the transparency and efficiency of MCB could be greatly enhanced, and the liability risk of MCB would be reduced [42]. Such an owner’s support is necessary and is key to foster participants’ MCB so that all parties are working collaboratively to complete the project [47]. (3) Offering a reasonable and fair legitimacy assessment of participants’ MCB and confirming its substantial value to megaprojects. Major motivators for participants to engage in MCB include getting more development opportunities for their company, satisfying government demands, and bearing social responsibility [7,48]. These values are often reflected through perceptions and the legal recognition of MCB from the external environment [43]. Many owners of megaprojects take up additional government positions [16,44]. They have a channel for the participants to gain their legitimacy by governmental officials to reward those participants with outstanding MCB engagement [3,42]. The value of participants’ MCB is acknowledged through these awards ceremonies, greatly enhancing the motivation for participants to engage in MCB [42]. As a result, this study proposes the following hypothesis:

Hypothesis 1 (H1). Owner’s support has a positive impact on MCB.

3.2. The Effect of Institutional Isomorphism on MCB and Owners’ Support

3.2.1. Normative Isomorphism

Normative isomorphism refers to the influence of social norms on organization behavior [28], and ensures the appropriate actions are taken under the given circumstances [49]. The well-developed education systems, training institutions, and organizations for accreditation of professional qualifications led the trend towards professionalism and encouraged the development of consensus and norms within the professions, creating a common view in organization behavior within the specific field [19,29]. In tandem, industrial associations, labor unions, advisory bodies, and the media provide diverse information channels for
communication, enabling the formation of inter-organizational professional networks that are expanding and developing towards delicacy management [42]. The professional consensus can thus be further strengthened through communication between organizations, affecting organizational behavior [29].

Megaproject management relies on normative isomorphism on MCB visa permeating professional behavior standards [11]. In general, the institutional environment varies in different fields. This study focused on analyzing the institutional environment of megaprojects in China. Specifically, there are two main routes through which institutional normative isomorphism promotes the MCB of megaproject participants.

Firstly, the leading government department and local government tend to set up a specialized management unit to manage the megaprojects [14]. This management unit might use different awards to motivate the participants to engage in MCB to ensure megaproject performance. MCB is graded with different levels to reveal its value and is evaluated regularly. The winner is then rewarded at an annual awards presentation ceremony [50]. Through promoting the positive impacts of MCB on the megaproject and the benefits gained by participants, other participants could be encouraged.

Secondly, megaprojects are often normatively influenced by labor unions, media, consulting agencies, institutes, and other public institutions [27,30]. Labor unions and megaprojects administrative departments often organize merit competitions to review the project’s performance and to encourage MCB, while institutes and consulting agencies document and spread the idea of MCB through books and reports, and the media plays a part in propagating the MCB of participants, confirming its social significance [10]. As a result, behavioral norms and routines are developed [11,51]. If the participants do not comply with certain norms or routines, they are prone to be criticized by the public [26], or, in other words, institutional normative isomorphism could be seen as mandatory [14].

Owners of the megaprojects are usually familiar with the participants’ behavior and are especially aware of the value and importance of MCB to the megaprojects. Moreover, within public projects, the project owner is heavily influenced by the institutional environment [22]. They take certain measures to stimulate and support MCB. Hence, this study suggests the following hypotheses:

**Hypothesis 2a (H2a). Normative isomorphism has a positive impact on MCB.**

**Hypothesis 2b (H2b). Normative isomorphism has a positive impact on the owners’ support for MCB.**

3.2.2. Mimetic Isomorphism

Mimetic isomorphism is mainly caused by the standard responses to external uncertainties [29]. When the environment is highly uncertain, and the organization is facing a complicated task and has a less clear goal, they tend to mimic the practices and those behaviors of their counterparts, or even rivals, that are deemed more successful or lawful, to reduce risks and losses [29]. Compared to other projects, megaprojects tend to face technical and managerial challenges of particularly great magnitude. Since MCB is inter-organizational and complex, it requires a relatively larger amount of inputs over a longer period before its impact on the megaproject is noticeable [43,51]. However, the rapid economic development often brings about fluctuations in the cost of labor and raw materials, and the initiators of the megaproject usually lack clear, long-term project goals and requests [52]. Thus, the effect of MCB is weakened by the frequent changes in the project scope and requirements, and negative impacts might even occur [11]. Megaprojects are also deemed as high at risk as they have a reputation for being inefficient [20]. The potential value of MCB relies on the success of the projects, which is indirect and difficult to quantify, leading to an even higher risk profile [53]. What is more, the construction industry usually only focuses on short-term benefits, lacking interest in long-term altruism brought by MCB [11]. This mindset results in difficulties in the timely identification of MCB and its legitimacy, and can even lead to conflicts and suspicion that ultimately weaken the MCB
intention of participants. The above characteristics increase the risk and uncertainty of MCB, causing the participants to follow the MCB strategies of their counterparts or other similar projects.

Culture-cognition of participants could provide the mental frames and sense-making processes within which organizational behavior was embedded, and essentially determine their mimetic behavior to respond to uncertainties [25,26]. The mimetic isomorphism in a megaproject comes from the experience of being a project manager that shapes his cognition on MCB [11,26]. To this extent, the MCB experience has not been easy to gain directly since the megaproject always is unique and highly complex, and may be obtained by training and observation indirectly [11,35]. Firstly, participants could identify MCB phenomenon that could be simulated based on their culture-cognition by (1) attending successful megaproject investigations and information exchanges organized by the government section and industrial association [9,54,55]; (2) learning MCB examples that were praised and propagated by megaproject documents material including social media reports [10], books published by participating entities involved in successful megaprojects [11], and the literature published by researchers trained by professional associations [2,8,30,31]. Secondly, participants could identify valuable MCB practice as their behavioral model based on cooperation history with excellent participating companies in megaprojects examples, communication with practitioners [30], roles model acknowledged by championing meeting, or coordination meeting of the same megaprojects [3,9]. Through mimetic behavior, the outstanding participants can not only gain reputation and credit in the society, but may also get more business opportunities and government funding in the future, and even political promotions for senior management personnel [43]. Within public megaprojects, the owner is heavily influenced by the institutional environment [22]. Moreover, as the most responsible and beneficial party, the owner should have a stronger motivation to mimic the successful MCB practices of other projects to enhance megaproject performance [44,55]. Thus, this study suggests the following hypotheses:

Hypothesis 3a (H3a). Mimetic isomorphism positively impacts MCB.

Hypothesis 3b (H3b). Mimetic isomorphism positively impacts the owner’s support for MCB.

3.3. The Effect of Relationship-Based Trust on the Diffusion of MCB Driven by Institutional Isomorphism

Relationship-based trust is an interpersonal relationship that builds upon formal or informal exchanges, creating a network of mutual trust based on mutual restraint and reciprocity [56]. This kind of network enables mutual trust and understanding [57]. In this relationship network, one participating team tends to imitate the behavior of another they trust [58], and to comply together with the common behavioral norms set up by the organization that could ensure the team’s legitimacy [59]. This mutual sharing of norms potentially affects organizational behavior and norms themselves, and can continue to extend throughout the inter-organization network [59,60]. Even though it might cause short-term inefficiency, participants are willing to bear the cost to maintain their mutual trust [61]. For megaprojects, based on the previous relationship with the related government departments, public social institutions, and the other participants, one participant is willing to trust the ability and integrity of others to engage in MCB and fairly co-establish a behavior evaluation standard. The degree of relationship-based trust with other participants can determine which party’s behavior and performance are used as a reference [38], and to decide which standard is used to guide a participant’s MCB. Hence, this study presents the following hypothesis:

Hypothesis 4a (H4a). Relationship-based trust among participants encourages the driving effect of MCB by institutional normative isomorphism.
Hypothesis 4b (H4b). Relationship-based trust among participants encourages the driving effect of MCB by institutional mimetic isomorphism.

Hypothesis 4c (H4c). Relationship-based trust among participants positively affects MCB.

Figure 1 shows the research model of this study.

![Figure 1. Research model of MCB's diffusion driven by institutional isomorphism.](image)

4. Research Method

More than 90% of citizenship behavior research that examines its antecedents and outcomes have been conducted by survey method together with regressive path analysis given that simulating team behavior in a laboratory is difficult [62]. Therefore, this study chose a survey as the main method to answer the research questions. The data was collected through a questionnaire survey described in our previous study [2], which was designed based on interviews with 40 experts in two rounds of interviewing. The first round was a semi-structured interview, and the 26 industrial experts were selected by a purposive method and limited to middle and top managers with more than 8 years of megaproject management experience. The interviewees consisted of 3 officials in host governments, 7 owners, 3 contractors, 1 designer, 3 supervisors, and 9 consultants, who all occupied different roles and could augment the heterogeneity of the interview profiles, thus enhancing the validity of interviews. The second round was a structured interview, the other 14 interviewees were considered for the diversity of their backgrounds and professional expertise, which would improve the heterogeneity of the interview background and thus strengthen the validity of interviews. The eight industrial interviewees had at least 8 years of experience and senior management positions in megaprojects, and all six academic experts were professors working on research in large-scale and complex megaprojects.

MCB was measured according to five dimensions including 20 items, namely: compliance, contingent collaboration, harmonious relationship maintenance, conscientiousness, and initiative behavior [2]. Interviews with 26 experts were carried out to investigate the institutional elements that might have an isomorphic effect on MCB and the owner’s supportive measures. They were informed of the definition of institutional isomorphic elements at the beginning of the interview. A total of 8 institutional elements were reported by the interviewees. Based on [29, 59], the eight institutional elements are classified into normative and mimetic isomorphism. Eight institutional items were contextualized based on the interviews of 26 experts and similar items were synthesized to produce the final six items in total. These formed the preliminary questions of the institutional environment of MCB. The items for the owner’s support referred to [24, 63] regarding ‘top management
support’. To measure the degree of relationship-based trust, a scale based on [34,64] was used. As the measuring scale of [34] is designed for the individual level, the items were modified using the “referent-shift consensus model” organization-level assessment method of [65] to align the items to MCB in the context of megaprojects.

All the measurements were revised according to interviews with 14 other experts. To be specific, the experts agreed on the importance of project owner support in the process of encouraging MCB and forming institutional isomorphism and agreed that relationship-based trust should be chosen for analysis. The items were retained since their mean scores by 14 experts were higher than 2.5 and, consequently, item NI3, which intended to measure normative isomorphism, was discarded for its lower mean score. Table 1 shows the final measuring tool for this research.

Chinese mainland construction megaprojects were considered in the survey. MCB was mainly conducted by contractors and designers to fulfil the megaproject collectively, following [66], middle- or high-level managers of contractors and designers at the implementation stage were selected as the respondents to fill out the questionnaires.

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). To ensure the survey was limited to the scope of megaprojects and obtain data to meet the requirement, we used non-probability sampling for the difficulty of megaprojects data acquisition. Specifically, with the help of our interviewed experts, two of the Chinese authors organized a five-minute 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, and 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. Moreover, 289 questionnaires were distributed to participating team managers from designers and constructors, and 209 were received, thus totaling a response rate of 72% that is normal and acceptable, according to [67]. Finally, 171 valid responses were involved in at least 1 of 89 construction megaprojects in China. The results of power analysis yielded 0.859 power beyond the threshold value 0.8 (\( \alpha = 0.05 \)), and therefore the sample size 171 was sufficient to reach the desired level [68,69]. The small sample was limited by the availability of megaprojects data, and our study is an explosive research in the field of the megaproject, therefore SmartPLS2.0M3, a PLS-SEM tool that works particularly well with small sample sizes for explosive research [70,71], was used for data analysis.

As one single cross-sectional study, there is the possibility of common methods variance (CMV). To cope with this issue, firstly, we took some procedural remedies to deal with CMV. According to suggestions by [72], our samples were anonymously collected from two different parties of megaprojects (designers and constructors), and our questionnaire was developed after three rounds of modification to reduce potential item ambiguity. Second, as one kind of post hoc remedy, we used the Harman one-factor test on the first-order latent variables recommended by [73] to evaluate the potential CMV. The results showed that the first factor identified accounts for only 25.8% of the total variance explained, which is much lower than the threshold value 50% suggested by [73]. This indicates that none of the individual factors can sufficiently account for explained variance. Thus, CMV biases of this study are acceptable.

5. Results

The results are shown in Tables 1 and 2, where three conclusions can be drawn: (1) all the factor loadings are higher than 0.5, and the \( t \) value is larger than the threshold value 2.58 (\( p < 0.001 \)), showing that the reliability of measuring items is acceptable [71,74];
(2) the CR value is greater than 0.7, meaning that the construct’s internal consistency is satisfactory [71]; (3) the standardized factor loading exceeds the threshold of 0.5 [75] with significance at a high level ($t > 2.58$), therefore, without a cross-loading issue, it indicates a satisfactory convergent validity [71]. Table 3 shows that the constructs satisfy the discriminant validity requirement, as all AVE values are greater than 0.5, and the square roots of AVE of every construct are greater than its correlation coefficient with the other constructs.

Table 1. Measuring tool for institutional isomorphism MCB model.

| Construct                  | Code | Item                                                                 | Factor Loading |
|----------------------------|------|----------------------------------------------------------------------|----------------|
| Project Compliance (PC)    | PC1  | We obey project task arrangements of our own accord                  | 0.848          |
|                            | PC2  | We abide project management requirements of our own accord           | 0.904          |
|                            | PC3  | We voluntarily obey project goals                                    | 0.871          |
|                            | PC4  | We strictly obey government’s project requirements                    | 0.770          |
|                            | CCL2 | We remind other participants of possible mistakes out of goodwill    | 0.707          |
| Contingent Collaboration (CCL) | CCL3 | We assist other participants to solve construction related difficulties (e.g., lending equipment) | 0.785 |
|                            | CCL4 | We share project experiences with other participants                 | 0.818          |
|                            | CCL5 | We facilitate other participants in both upper and lower working processes and interfaces | 0.808 |
|                            | CCL6 | We proactively resolve conflicts with other participants              | 0.794          |
|                            | CB2  | We strive for perfection, even under no supervision                  | 0.794          |
| Conscientiousness (CB)     | CB3  | We consciously distribute sufficient resources (manpower, money, material) for the project | 0.880 |
|                            | CB4  | We join or organize team training of our own accord                   | 0.853          |
|                            | CB5  | We join and assist activities and meetings organized by project organization of our own accord | 0.789 |
| Harmonious Relationship Maintenance (HRM) | HRM1 | We proactively build a harmonious relationship with the related government officials | 0.887 |
|                            | HRM2 | We proactively build a harmonious relationship with the stakeholders (e.g., residents affected by the project, local government, etc.) | 0.697 |
|                            | HRM3 | We do not care about the past grudges and conflicts with other participants for the sake of the project | 0.833 |
| Initiative Behavior (IB)   | IB1  | We provided innovative ideas to improve the project                  | 0.625          |
|                            | IB2  | We proactively applied advanced technologies (e.g., BIM, green building, etc.) | 0.762 |
|                            | IB3  | We pointed out potential improvements of project management           | 0.855          |
|                            | IB4  | We voluntarily make constructive suggestions on project implementation | 0.760          |
| Normative Isomorphic (NI)  | NI1  | Media actively propagate the major contributions of megaproject participants | 0.889          |
|                            | NI2  | Management units (e.g., labor unions, project coordination office, etc.) organize or promote merit competition and other activities that encourage OCB | 0.905 |
|                            | NI3  | Construction mode of megaprojects are in general beyond conventional and already turned into customary practice | 0.262 |
| Mimetic Isomorphic (MI)    | MI1  | Other megaprojects achieved a satisfactory result through OCB encouraging activities (e.g., merit competitions) | 0.911 |
|                            | MI2  | Other megaprojects achieved positive social impact through enhancing participants’ OCB | 0.950 |
|                            | MI3  | OCB of other megaproject participants received the deserved rewards and acclaim | 0.927 |
Table 1. Cont.

| Construct Code | Item | Factor Loading |
|----------------|------|---------------|
| TR1 (participants who are of vital interest to us, same as below) | Based on our relationship, we believe the other party handles things in a fair manner | 0.837 |
| TR2 | Based on our relationship, we believe the other party holds fast to morality | 0.833 |
| TR3 | Based on our relationship, we believe the other party protects our interests | 0.891 |
| TR4 | Based on our relationship, we believe the other party fulfills their promises | 0.921 |
| TR5 | Based on our relationship, we believe the other party is honest | 0.927 |
| TR6 | Based on our relationship, we believe the other party has professionalism | 0.861 |
| TR7 | Based on our relationship, we believe the other party has dedication | 0.888 |
| OS1 | The project has implemented several measures to promote the OCB of participants | 0.828 |
| OS2 | Promoting OCB is an important task to the project | 0.910 |
| OS3 | The project provided supports for participants to develop OCB | 0.895 |
| OS4 | The project confirms the value of participants’ OCB | 0.889 |

* Note: NI3 has been deleted since the mean score given by 14 experts is lower than 2.5 and its factor loading is less than 0.5.

Table 2. Factor loadings of variables in institutional isomorphism MCB.

| Items | CB | CCL | HGM | IB | MI | NI | PC | OS | TR | T-Value |
|-------|----|-----|-----|----|----|----|----|----|----|--------|
| CB2   | 0.7956 | 0.4924 | 0.4806 | 0.4575 | 0.2305 | 0.2734 | 0.3504 | 0.2624 | 0.2886 | 32.467 |
| CB3   | 0.8500 | 0.5018 | 0.5067 | 0.4264 | 0.1757 | 0.2825 | 0.3586 | 0.2478 | 0.2292 | 42.361 |
| CB4   | 0.8519 | 0.5039 | 0.5865 | 0.4952 | 0.2730 | 0.3328 | 0.3839 | 0.3042 | 0.3712 | 47.299 |
| CB5   | 0.7885 | 0.5349 | 0.5255 | 0.4670 | 0.2303 | 0.2816 | 0.3296 | 0.2358 | 0.1969 | 30.293 |
| CB6   | 0.8445 | 0.7262 | 0.4275 | 0.3378 | 0.1779 | 0.2491 | 0.2701 | 0.2040 | 0.1843 | 18.297 |
| CB7   | 0.4468 | 0.7863 | 0.4474 | 0.3961 | 0.2179 | 0.2499 | 0.3064 | 0.2506 | 0.2989 | 36.421 |
| CB8   | 0.5155 | 0.8189 | 0.4157 | 0.4633 | 0.2344 | 0.2732 | 0.3801 | 0.3294 | 0.3500 | 38.114 |
| CB9   | 0.4617 | 0.8066 | 0.3561 | 0.4174 | 0.1296 | 0.1745 | 0.3277 | 0.2298 | 0.2683 | 22.406 |
| CB10  | 0.5387 | 0.7942 | 0.4419 | 0.3392 | 0.1871 | 0.2957 | 0.3775 | 0.3071 | 0.3059 | 33.066 |
| HRM1  | 0.5167 | 0.3959 | 0.8213 | 0.3891 | 0.1999 | 0.1721 | 0.2855 | 0.1602 | 0.1717 | 34.725 |
| HRM2  | 0.6152 | 0.4903 | 0.8875 | 0.4010 | 0.2332 | 0.3015 | 0.3309 | 0.2628 | 0.2774 | 67.447 |
| HRM3  | 0.4020 | 0.3999 | 0.7093 | 0.3740 | 0.0670 | 0.1385 | 0.2064 | 0.1438 | 0.2129 | 15.303 |
| IB1   | 0.3917 | 0.3544 | 0.2615 | 0.7498 | 0.2268 | 0.3019 | 0.2776 | 0.2629 | 0.1710 | 18.212 |
| IB2   | 0.4301 | 0.3812 | 0.4071 | 0.7653 | 0.3066 | 0.2506 | 0.2886 | 0.2895 | 0.2197 | 24.339 |
| IB3   | 0.4935 | 0.4551 | 0.4444 | 0.8859 | 0.3035 | 0.2585 | 0.2659 | 0.2829 | 0.2399 | 59.302 |
| IB4   | 0.5081 | 0.4487 | 0.4273 | 0.8581 | 0.2873 | 0.2941 | 0.2854 | 0.2857 | 0.1973 | 47.134 |
| MI1   | 0.2881 | 0.2383 | 0.1875 | 0.3098 | 0.6914 | 0.4523 | 0.2094 | 0.4218 | 0.3472 | 17.309 |
| MI2   | 0.3091 | 0.2271 | 0.1927 | 0.3293 | 0.7035 | 0.4162 | 0.2534 | 0.4577 | 0.3840 | 19.467 |
| MI3   | 0.2849 | 0.2223 | 0.1707 | 0.3223 | 0.6678 | 0.3875 | 0.2267 | 0.4201 | 0.3575 | 17.894 |
| MI4   | 0.3322 | 0.2670 | 0.2862 | 0.2945 | 0.3588 | 0.6583 | 0.2918 | 0.3439 | 0.3016 | 17.039 |
| MI5   | 0.3854 | 0.3023 | 0.2287 | 0.3048 | 0.4351 | 0.6495 | 0.2923 | 0.3950 | 0.3292 | 19.791 |
| PC1   | 0.4549 | 0.4306 | 0.4052 | 0.3517 | 0.1567 | 0.2103 | 0.8419 | 0.2195 | 0.2388 | 37.313 |
| PC2   | 0.5636 | 0.4312 | 0.3904 | 0.3934 | 0.1397 | 0.1987 | 0.9029 | 0.2087 | 0.1888 | 60.161 |
| PC3   | 0.5363 | 0.4870 | 0.3923 | 0.4249 | 0.1723 | 0.2286 | 0.8729 | 0.2470 | 0.1874 | 42.979 |
| PC4   | 0.4829 | 0.4252 | 0.4314 | 0.3678 | 0.1618 | 0.2045 | 0.7752 | 0.1985 | 0.2648 | 21.561 |
| OS1   | 0.2538 | 0.2676 | 0.1914 | 0.2307 | 0.3226 | 0.3299 | 0.2538 | 0.6006 | 0.3615 | 18.662 |
| OS2   | 0.3504 | 0.3308 | 0.2752 | 0.2899 | 0.4038 | 0.3806 | 0.3280 | 0.7034 | 0.4571 | 27.515 |
| OS3   | 0.2701 | 0.2569 | 0.1984 | 0.2827 | 0.3847 | 0.3174 | 0.2466 | 0.5520 | 0.3417 | 21.634 |
| OS4   | 0.3252 | 0.2858 | 0.2125 | 0.3310 | 0.4259 | 0.3564 | 0.2991 | 0.5890 | 0.3957 | 21.329 |
Table 2. Cont.

| Items | CB    | CCL   | HGM   | IB    | MI    | NI    | PC    | OS    | TR    | T-Value |
|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|---------|
| TR1   | 0.2880| 0.2640| 0.2365| 0.2014| 0.3121| 0.2844| 0.2724| 0.3844| 0.5451| 19.618  |
| TR2   | 0.3305| 0.2966| 0.2298| 0.1965| 0.2921| 0.2932| 0.3125| 0.4081| 0.5959| 17.573  |
| TR3   | 0.3113| 0.3415| 0.2207| 0.1960| 0.3533| 0.3315| 0.3158| 0.4707| 0.7075| 23.374  |
| TR4   | 0.3230| 0.3472| 0.2606| 0.2117| 0.3182| 0.2932| 0.3103| 0.4265| 0.6768| 24.658  |
| TR5   | 0.3018| 0.3007| 0.2519| 0.2194| 0.3300| 0.2987| 0.2640| 0.3700| 0.6297| 21.311  |
| TR6   | 0.3350| 0.2976| 0.3186| 0.2255| 0.3501| 0.3074| 0.2794| 0.3533| 0.5790| 17.178  |
| TR7   | 0.4172| 0.3967| 0.3525| 0.2867| 0.4166| 0.3663| 0.3453| 0.4680| 0.7616| 23.325  |

Note: The bold values are the load values of the variables of each item. The T-values are the significant level corresponding to the load values.

Table 3. The reliability and validity of the institutional isomorphism MCB model measuring scale.

| Items | AVE | CR | Cronbach’s α | CB    | CCL | HGM | IB    | MI    | NI    | OS | PC | TR |
|-------|-----|----|--------------|-------|-----|-----|-------|-------|-------|----|----|----|
| CB    | 0.7442| 0.8927| 0.8627 | 0.8410 | 0.8627 |    |       |       |       |    |    |    |
| CCL   | 0.6748| 0.8880| 0.8438 | 0.6185 | 0.8124 |    |       |       |       |    |    |    |
| HRM   | 0.6678| 0.8497| 0.7256 | 0.6393 | 0.5328 | 0.8172 |    |       |       |    |    |    |
| IB    | 0.6706| 0.8886| 0.8439 | 0.5618 | 0.5052 | 0.4787 | 0.8189 |    |       |    |    |    |
| MI    | 0.864 | 0.9501| 0.9211 | 0.4310 | 0.3348 | 0.2814 | 0.4761 | 0.9295 |    |    |    |
| NI    | 0.805 | 0.8919| 0.7580 | 0.5303 | 0.4391 | 0.4068 | 0.4609 | 0.6088 | 0.8972 |    |    |    |
| OS    | 0.7758| 0.9326| 0.9036 | 0.4928 | 0.4660 | 0.3648 | 0.4618 | 0.6130 | 0.5622 | 0.8808 |    |    |
| PC    | 0.7277| 0.9118| 0.8536 | 0.6021 | 0.5231 | 0.4757 | 0.4542 | 0.3341 | 0.4663 | 0.4654 | 0.8531 |    |
| TR    | 0.7753| 0.9602| 0.9514 | 0.4753 | 0.4918 | 0.3860 | 0.3336 | 0.5039 | 0.4582 | 0.6166 | 0.4321 | 0.8805 |

Note: The bold values are the square roots of AVE calculated manually by the author.

5.1. Structural Model Evaluation Results

As shown in Figure 2, the R2 of all variables of MCB is 0.440, indicating that substantial variances in the construct are explained by the research model. The coefficient of the owner’s support has a significant positive impact on MCB (α = 0.35, p < 0.001), therefore H1 is confirmed. The influence of normative isomorphism on MCB is significant (α = 0.46, p < 0.001). The coefficient for the path between normative isomorphism and owner’s support is also significant (α = 0.291, p < 0.001). Therefore, H2a and H2b are supported. Mimetic isomorphism is found to have significant relationships with both MCB (α = 0.18, p < 0.001) and owner’s support for MCB (α = 0.453, p < 0.001), therefore H3a and H3b are also supported. The effect of relationship-based trust on MCB is revealed to be significant (α = 0.34, p < 0.001), therefore H4c is supported.

![Figure 2. Results of PLS analysis of MCB Model. Note: ** means p < 0.01, *** means p < 0.001](image-url)

To further reveal the mechanism of MCB diffusion, an alternative model was constructed. The results of the analysis show that the effect of normative isomorphism on MCB is still significant but decreases (α = 0.354, p < 0.001) after inputting the variable ‘owner’s support’ into the model. H2a was supported again, indirectly. The influence of mimetic isomorphism on MCB is no longer significant (α = 0.027, p > 0.1, p = 0.329). This result reflects the mediating effect of owner’s support on MCB when institutional isomorphism is driving MCB diffusion.
5.2. Mediation Analysis

The four-step method was adopted to further verify the above mediating effect. Step 1 is to calculate the relationship between normative isomorphism, mimetic isomorphism, and MCB. As shown in Figure 2, the effects of both normative and mimetic isomorphism on MCB are highly significant. Step 2 is to compute the links between the independent variables (normative and mimetic isomorphism) and the mediator (owner’s support of MCB). These links were found to be highly significant, as shown in Figure 2. Step 3 is to compute the relationship between the mediator (owner’s support) and the dependent variable (MCB). In agreement with hypothesis H1, this calculation indicates a high level of significance between the two. Step 4, the mediator (owner’s support of MCB) is added. The coefficient of institutional isomorphism to MCB is still significant \( p < 0.001 \), but with a drop (from 0.46 *** to 0.354 ***). The link between mimetic isomorphism and MCB was found to be insignificant \( p > 0.1 \). As a result, the owner’s support of MCB has shown partial mediation in driving MCB through normative isomorphism, and full mediation in driving MCB through mimetic isomorphism.

5.3. Moderation Analysis

The interaction terms test between relationship-based trust and two kinds of institutional isomorphism were conducted to analyze the moderation [27]. In Figure 2, the influence of the interaction term relationship-based trust \( \times \) normative isomorphism on MCB is not significant \( \beta = -0.04, \text{N.S} \), therefore H4a is rejected, while the influence of the interaction term relationship-based trust \( \times \) mimetic isomorphism on MCB was highly significant \( p < 0.01 \) in effect size \( \beta = 0.13 \). Therefore, H4b is supported.

6. Findings and Discussion

Authors should discuss the results and how they can be interpreted from the perspective of previous studies and of the working hypotheses. The findings and their implications should be discussed in the broadest context possible. Future research directions may also be highlighted.

6.1. Promoting MCB through Normative Isomorphism

Normative isomorphism produced by social norms was found to have a significant impact on MCB engagement (H2a was supported), and the project owner’s support also demonstrates mediation during the process (H1a and mediation effect were supported), but the relationship-based trust among participants shows no effect in driving MCB by a normative isomorphism (H4a was not supported). Normative isomorphism has a quite significant effect in promoting constructors and designers to engage in MCB (H2a: 0.46 **), but a weaker influence in encouraging owner’s support for MCB (H2b: 0.291 ***). This concludes that measures to shape and strengthen MCB behavioral norm. Such measures included a reward system organized by the government and owner, a megaproject merit competitions arranged by industrial institutions, training programs associated with MCB by professional megaprojects association, and the positive propaganda of MCB by media or educational institutes [76]. Along with these external institutional norms at play, project owners tend to provide a platform for the participants to facilitate communication and legitimize MCB. What is transparent about the value propositions that actors benefit from MCB engagement, such as specific future constructs and service opportunities, and new knowledge of undertaking or managing specific megaproject issues, as well as how to confirm the value of MCB. These supports play an important role in encouraging and spreading MCB.

The relationship-based trust among participants also has a positive impact on spreading MCB (H4c was supported) but showed no impact via the above-mentioned institutional isomorphism process (H4a was rejected). This finding indicates the independent process of different participants’ MCB engagement driven by normative isomorphism, which might be due to the different tasks among participants and their differing relationships with the
government department (e.g., the construction team has more contact with local officials, while the design team has more contact with the leading government department, etc.) [53]. Normative isomorphism has a weak influence in encouraging owners to support MCB (H2b: 0.291 ***) since the owners are usually one-time owners, tending to respond to the requests of the leading government department only. Moreover, the tight communication with the parent company means the MCB might be affected by the parent company’s institutional isomorphism [77]. Thus, the dynamics in the present case may lead to the weak impact of normative isomorphism on owner’s support and the difficulty in spreading MCB through owners.

6.2. Promoting MCB through Mimetic Isomorphism

The results show a significant positive influence of mimetic institutional isomorphism on MCB (H3a was supported), and that the owner’s support has full mediation in this relationship (H3b and mediation effect were supported). The relationship-based trust among participants also positively contributes to the above-mentioned relationship (H4b was supported). This implies that, through learning from successful projects and propaganda from public institutions, participants could observe the benefits of MCB, which in turn reduces the uncertainties, leading to the willingness to mimic this behavior [29].

According to H2a, H3a, H2b, and H3b, compared to normative isomorphism, mimetic isomorphism has a weaker impact on the construction and design teams, but a stronger effect on the owners. The promotion of MCB by mimetic isomorphism depends entirely on the owner’s support for MCB (full mediation effect was supported), which might be due to the uniqueness and regionalism of megaprojects. Given these characteristics, communication between projects is rare, and the regional difference makes MCB even more difficult to be spread. Moreover, since the effectiveness of MCB is measured by its influence on the megaprojects [5], and that influence is mainly evaluated by owners, the true value of MCB cannot be shown without the acknowledgment and involvement of the owners [42]. Without the owner’s support, the risk of MCB could not be reduced, even if the participants imitate the other’s MCB [42], therefore it could not be spread through mimetic isomorphism in this sense [29]. Participants would have no chance to examine and learn from the successful cases without the owner’s support, inhibiting mimetic isomorphism to spread MCB.

The importance of the owner’s support can also be reflected in the independent MCB development process and the lack of communication between participants in the same project. Even in the same project, the division of labor causes MCB to be rather independent, leading to a lack of opportunities and incentives for participants to observe others’ needs and situations. If no communication platform, such as a champion meeting, is offered by the owner [3], no information is provided for the other project participants to observe each other’s behavior. Owners always have greater incentives in learning and imitate the MCB of other megaprojects, since they take greater project responsibility [39,54,55]. This, in turn, could motivate owners to provide more support to the participants, increasing their willingness to develop MCB.

6.3. The Impact of Relationship-Based Trust in Promoting MCB through Normative Isomorphism

The relationship-based trust among participants including owners, construction teams, and design teams demonstrates moderation in the promotion of MCB through normative isomorphism, and directly enhances MCB (H4a, H4b and H4c were all supported). This indicates that the process of spreading MCB through normative isomorphism is interrelated among the participants, and this interrelationship could magnify the effect of normative isomorphism, yet be restrained by the level of relationship-based trust of participants. The participants tend to select another participant they trust as the subject they imitate [58,59] and reference for decision making. MCB can spread throughout this relationship network, further intensifying the altruistic behavior of the participants, and creating a virtuous cycle [78]. In particular, the trust built upon past experiences of the construction and design
teams with the owner plays a vital role in the effectiveness of the owner’s supportive measures and the spread of MCB in a given institutional environment. However, due to the complex relationship between megaproject owners and the leading government department, the latter often determines what supporting measures owners can offer and their degree of influence (e.g., the level of the award and recognition, the effectiveness of the merit competition, etc.). If the leading government department is being criticized for its bad credibility by the general public, the participants may no longer trust the owner’s supporting measures, and consequently not mimic or practice MCB. On the other hand, the relationship-based trust between construction parties (contractor, subcontractor, supplier, etc.), between designers (contractor for design, design consultant, etc.), as well as between construction parties and designers, determines which MCB will be mimicked. If the external institutional environment is ignored, high levels of relationship-based trust could also directly enhance MCB because of the harmonious relationships it has already engendered. Participants are more willing to bear short-term losses to maintain this relationship network [61].

7. Conclusions and Implications

MCB phenomenon has been quite popular in some megaprojects like the Hong Kong–Zhuhai–Macao Bridge project, and helps these projects achieve great management effectiveness [7,8]. However, few studies have explored how to drive such a phenomenon diffuse in large numbers. According to the perspective of institutional isomorphism, the diffusion of MCB could be mainly promoted by external institutional context and were complicated for megaprojects complexity, such as parties’ mutual trust based on their informal relationship and the special role of owners with the strong governmental connection [79].

Combined with the above complexity of megaprojects, this study investigated and revealed the effect of the external institutional environment on driving the diffusion of MCB. The findings showed that: (1) Institutional norm plays a powerful role in the diffusion process of MCB. H1, H2a, and H2b were supported with stronger effect. This means that the impact mainly derives from the leading government department and managerial organizations, which develop and reinforce behavioral norm in megaprojects field. In brief, the leading government works as one bellwether to prompt MCB diffusion. (2) Working as institutional mimetic isomorphism, based on H3b, culture cognition could facilitate participating teams tending to mimic the MCB since MCB are deemed more successful or lawful, and consequently promotes MCB more popular. Combining H3a with H3b, this impact on owners was stronger than that on construction and design teams. In this diffusion process, referring to H4b, participating entities appeared to choose whom they have developed relationship-based trust with as their behavior model. Together with the mediation effect (H1, H3a, and H3b), it is a remarkable fact that the promotion of MCB by mutual imitation in terms of culture cognition depends entirely on the owner’s support for MCB. When this support is in place, participants not only have greater opportunities to imitate MCB but are also more willing to engage in MCB that is supported and affirmed by the owners.

Based on the above conclusion, this study has major empirical and theoretical implications. Theoretically, our research could contribute to megaproject management theory development. Specifically, the social norm and culture-cognition of the institutional environment are the main powers used to drive MCB diffusion continuously in megaprojects; during this process, the owners’ support for MCB plays an important and even decisive role. MCB is a dearth of academic research in the area of megaprojects. This study produced knowledge about organizational behavior laws at the group level in the megaproject context which, consequently, could narrow the current gap between megaproject management practice and its study.

Regarding to the managerial and empirical implications, firstly, the leading government was the bellwether to prompt MCB more popular in the megaprojects field. A code of conduct developed by the leading government department and public institutions could
be used as a guide to proactively promote MCB among the project participants, and their mutual imitation of the altruistic behavior could be used to develop a virtuous cycle to improve management effectiveness.

Secondly, the owner’s support plays an important role in the process of spreading MCB through external institutional elements. In establishing and suggesting management strategies, the leading government department and public institutions should first consider the influence of owners, so as to improve decision-making efficiency through granting greater authorization to owners [24], and to encourage owners to communicate more with the other similar megaprojects. The effectiveness of the owner’s support could be enhanced to facilitate the spread of MCB.

Thirdly, management decision-making should focus on the interaction of mutual imitation among participants driven by culture cognition. This kind of interaction could be magnified by the trust built upon the informal relationship network of the construction team, designer, and owner. To promote the virtuous cycle of MCB, one should encourage fair partnerships between project participants, such as fair risk-sharing to cultivate a trusting relationship. With this trust being established, the MCB of a key participant should be affirmed and promoted immediately so that a demonstrative effect could be generated through the imitating behavior of other participants.

In conclusion, there is currently a lack of attention to MCB in the construction and engineering industries. Organizations that set codes of conduct like construction industry associations, consulting companies, and international project management institutions such as PMI and CIOB do not pay enough attention to organizational behavior. This insufficient consideration could weaken the spreading effect of MCB driven by the external institutional environment. Therefore, these organizations should focus more on parties’ behavior, especially on positive MCB, to ensure an effective work atmosphere in the field.

Limitation and Future Research

This study extends the recent research on organizational behaviors in the construction megaprojects field by providing further insight into the external social context underlying project participants’ MCB to diffuse in the megaproject’s organization. Despite its contributions, the current research has some limitations that call for further study. First, this study was based on the Chinese social context, which might weaken the generalizability of the empirical results applied to other institutional contexts. The next stage of MCB research should be to compare the impacts of institutional isomorphism between different contexts. Nevertheless, as China plays a rapidly growing role in the global construction market, our findings will help international participating entities understand the organizational behavior in Chinese megaprojects. Second, although a series of methodological measures were adopted to minimize the effects of response bias (i.e., social desirability), it is essential to admit that this study was cross-sectional and all the data were collected from self-report questionnaires. There were issues in self-report survey such as social desirability bias, response bias, and the clarity of the items, which brings the risk of obtaining different interpretations of questions. We adopted some measures to minimize the impact of the above issues. For instance, our questionnaire was designed to appear both short and not overcrowded, and the 40 experts’ interview was conducted as a pilot study to ensure that the items are understandable. A further longitudinal study and peer-assessment survey may help improve the reliability of empirical findings.

Thirdly, limited by the bad availability of megaprojects data, our total sample size was so small that we chose PLS-SEM to conduct data analysis and without using some other methods for a large sample, such as CB-SEM method, to conduct our study. Multiple cases which deeply analyze or broadly survey could be conducted to acquire a more profound understanding in the future.
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References
1. He, Q.; Wang, T.; Chan, A.P.; Xu, J. Developing a List of Key Performance Indicators for Benchmarking the Success of Construction Megaprojects. J. Constr. Eng. Manag. 2021, 147, 04020164. [CrossRef]
2. Yang, D.; He, Q.; Cui, Q.; Hsu, S.C. Organizational Citizenship Behavior in Construction Megaprojects. J. Manag. Eng. 2018, 34, 04018017. [CrossRef]
3. Hetemi, E.; Gemuenden, H.G.; Ordieres-Meré, J. Embeddedness and actors’ behaviors in large-scale project lifecycle: Lessons learned from a High-Speed Rail project in Spain. J. Manag. Eng. 2020, 36, 05020014. [CrossRef]
4. Wang, W.; Fu, Y.; Gao, J.; Shang, K.; Gao, S.; Xing, J.; Ni, G.; Yuan, Z.; Qiao, Y.; Mi, L. How the COVID-19 Outbreak Affected Organizational Citizenship Behavior in Emergency Construction Megaprojects: Case Study from Two Emergency Hospital Projects in Wuhan, China. J. Manag. Eng. 2021, 37, 04021088. [CrossRef]
5. Organ, D.W. Organizational Citizenship Behavior: The Good Soldier Syndrome; Lexington Books: Lexington, MA, USA, 1988.
6. Li, N.; Kirkman, B.L.; Porter, C.O. Toward a model of work team altruism. Acad. Manag. Rev. 2014, 39, 541–565. [CrossRef]
7. Yang, D.; He, Q.; Cui, Q.; Hsu, S.C. Non-economic motivations for organizational citizenship behavior in construction megaprojects. Int. J. Proj. Manag. 2020, 38, 64–74. [CrossRef]
8. Luo, H.; Liu, J.; Li, C.; Chen, K.; Zhang, M. Ultra-rapid delivery of specialty field hospitals to combat COVID-19: Lessons learned from the Leishenshan Hospital project in Wuhan. Autom. Constr. 2020, 119, 103345. [CrossRef]
9. Ma, H.; Liu, Z.; Zeng, S.; Lin, H.; Tam, V.W.Y. Does megaproject social responsibility improve the sustainability of the construction industry? Eng. Constr. Archit. Manag. 2019, 27, 975–996. [CrossRef]
10. Ninan, J.; Clegg, S.; Mahalingam, A. Branding and governmental fortiﬁcations in megaprojects: The role of social media. Int. J. Proj. Manag. 2019, 37, 59–72. [CrossRef]
11. Biersenthal, C.; Clegg, S.; Mahalingam, A.; Sankaran, S. Applying institutional theories to managing megaprojects. Int. J. Proj. Manag. 2018, 36, 43–54. [CrossRef]
12. Den Ende, L.V.; Van Marrewijk, A. Teargas, taboo and transformation: A neo-institutional study of community resistance and the struggle to legitimize subway projects in Amsterdam 1960–2018. Int. J. Proj. Manag. 2019, 37, 331–346. [CrossRef]
13. Cuganesan, S.; Floris, M. Investigating perspective taking when infrastructure megaproject teams engage local communities: Navigating tensions and balancing perspectives. Int. J. Proj. Manag. 2020, 38, 153–164. [CrossRef]
14. Scott, W.R. The institutional environment of global project organizations. Eng. Proj. Organ. J. 2012, 2, 27–35. [CrossRef]
15. Sönderlund, J.; Sydow, J. Projects and institutions: Towards understanding their mutual constitution and dynamics. Int. J. Proj. Manag. 2019, 37, 259–268. [CrossRef]
16. Li, Y.; Lu, Y.; Cui, Q.; Han, Y. Organizational behavior in megaprojects: Integrative review and directions for future research. J. Manag. Eng. 2019, 35, 04019009. [CrossRef]
17. Qiu, Y.; Chen, H.; Sheng, Z.; Cheng, S. Governance of institutional complexity in megaproject organizations. Int. J. Proj. Manag. 2019, 37, 425–443. [CrossRef]
18. Chi, C.S.F.; Javernick-Will, A.M. Institutional effects on project arrangement: High-speed rail projects in China and Taiwan. Constr. Manag. Econ. 2011, 29, 595–611. [CrossRef]
19. Bresnen, M. Institutional development, divergence and change in the discipline of project management. Int. J. Proj. Manag. 2016, 34, 328–338. [CrossRef]
49. March, J.G.; Olsen, J.P. Rediscovering Institutions: The Organizational Basis of Politics; The Free Press: New York, NY, USA, 1989; pp. 26–29.

50. Tang, T.; Wan, J.B.; Zhang, R. Discussion on Successful Practices and Experience of Working Competition on the South-to-North Water Transfer Project. *South-to-North Water Transf. Water Sci. Technol.* 2013, 11, 174–176. (In Chinese)

51. Love, P.E.D.; Ahia-Dagbui, D.D. Debunking fake news in a post-truth era: The plausible untruths of cost underestimation in transport infrastructure projects. *Transp. Res. Part A Policy Pract.* 2018, 113, 357–368. [CrossRef]

52. Giezen, M.; Bertolini, L.; Salet, W. Adding value to the decision-making process of megaprojects: Fostering strategic ambiguity, redundancy, and resilience. *Transp. Policy* 2015, 44, 169–178. [CrossRef]

53. Heere, N.; Xing, X. BOCOG’s road to success: Predictors of commitment to organizational success among Beijing Olympic employees. *Eur. Sport Manag. Q.* 2012, 12, 161–181. [CrossRef]

54. Shi, C.; Chen, Y.; You, J.; Yao, H. Asset Specificity and Contractors’ Opportunistic Behavior: Moderating Roles of Contract and Trust. *J. Manag. Eng.* 2018, 34, 04018026. [CrossRef]

55. Liu, J.; Wang, Z.; Skitmore, M.; Yan, L. How contractor behavior affects engineering project value-added performance. *J. Manag. Eng.* 2019, 35, 04019012. [CrossRef]

56. Lin, L.H.; Ho, Y.L. Guanxi and OCB: The Chinese cases. *J. Bus. Ethics* 2010, 96, 285–298. [CrossRef]

57. Granovetter, M. Economic Action and Social Structure: The Problem of Embeddedness. *Am. J. Sociol.* 1985, 91, 481–510. [CrossRef]

58. Burt, R.S. Toward a Structural Theory of Action: Network Models of Social Structure, Perception and Action; Academic Press: Cambridge, MA, USA, 1982; p. 33.

59. Teo, H.H.; Wei, K.K.; Benbasat, I. Predicting Intention to Adopt Interorganizational Linkages: An Institutional Perspective. *MIS Q.* 2003, 27, 19–49. [CrossRef]

60. Powell, W.P.; Bromley, P. New Institutionalism in the Analysis of Complex Organizations. *Int. Encycl. Soc. Behav. Sci.* 2015, 101, 764–769.

61. Macaulay, S. Non-Contractual Relations in Business: A Preliminary Study. *Am. Sociol. Rev.* 1963, 28, 55–67. [CrossRef]

62. Podsakoff, N.P.; Podsakoff, P.M.; MacKenzie, S.B.; Maynes, T.D.; Spelma, T.M. Consequences of unit-level organizational citizenship behaviors: A review and recommendations for future research. *J. Organ. Behav.* 2014, 35 (Suppl. 1), S87–S119.

63. Zhu, Y.; Li, Y.; Wang, W.; Chen, J. What leads to post-implementation success of ERP? An empirical study of the Chinese retail industry. *Int. J. Inf. Manag.* 2010, 30, 265–276. [CrossRef]

64. Müller, R.; Andersen, E.S.; Kvalnes, Ø.; Shao, J.; Sankaran, S.; Turner, R.; Biesenthal, C.; Walker, D.; Gudergan, S. The interrelationship of governance, trust, and ethics in temporary organizations. *Proj. Manag. J.* 2013, 44, 26–44.

65. Bommer, W.H.; Diederoff, E.C.; Rubin, R.S. Does prevalence mitigate relevance? The moderating effect of group-level OCB on employee performance. *Acad. Manag. J.* 2007, 50, 1481–1494. [CrossRef]

66. Smith, K.G.; Carroll, S.J.; Ashford, S.J. Intra- and interorganizational cooperation: Toward a research agenda. *Acad. Manag. J.* 1995, 38, 7–23.

67. Baruch, Y.; Holton, B.C. Survey response rate levels and trends in organizational research. *Hum. Relat.* 2008, 61, 1139–1160.

68. Lomax, R.G. An Introduction to Statistical Concepts, 3rd ed.; Routledge: New York, NY, USA, 2012; pp. 55–56.

69. Shi, Y.; Du, J.; Worthy, D.A. The impact of engineering information formats on learning and execution of construction operations: A virtual reality pipe maintenance experiment. *Hum. Constr. 2020, 119, 103367.*

70. Hair, J.F.; Howard, M.C.; Nitzl, C. Assessing measurement model quality in PLS-SEM using confirmatory composite analysis. *J. Bus. Res.* 2020, 109, 101–110. [CrossRef]

71. Hair, J.F.; Ringle, C.M.; Sarstedt, M. PLS-SEM: Indeed a silver bullet. *J. Mark. Theory Pract.* 2011, 19, 139–152. [CrossRef]

72. Podsakoff, P.M.; MacKenzie, S.B.; Lee, J.Y.; Podsakoff, N.P. Common method biases in behavioral research: A critical review of the literature and recommended remedies. *J. Appl. Psychol.* 2003, 88, 879. [CrossRef]

73. Podsakoff, P.M.; Organ, D.W. Self-Reports in Organizational Research: Problems and Prospects. *J. Manag.* 1986, 12, 531–544. [CrossRef]

74. Ning, Y.; Ling, F.Y.Y. Reducing hindrances to adoption of relational behaviors in public construction projects. *J. Constr. Eng. Manag.* 2013, 139, 04013017. [CrossRef]

75. Hulland, J. Use of partial least squares (PLS) in strategic management research: A review of four recent studies. *Strateg. Manag. J.* 1999, 20, 195–204. [CrossRef]

76. Ninan, J.; Mahalingam, A.; Clegg, S. External Stakeholder Management Strategies and Resources in Megaprojects: An Organizational Power Perspective. *Proj. Manag. J.* 2019, 50, 625–640. [CrossRef]

77. Aronson, Z.H.; Lechler, T.G. Contributing beyond the call of duty: Examining the role of culture in fostering citizenship behavior and success in project-based work. *RD Manag.* 2009, 39, 444–460. [CrossRef]

78. Cross, R.; Baker, W.; Parker, A. What creates energy in organizations? *MIT Sloan Manag. Rev.* 2003, 44, 51–57.

79. Winch, G. Megaproject Stakeholder Management. In *The Oxford Handbook of Megaproject Management*; Flyvbjerg, B., Ed.; Oxford University Press: Oxford, UK, 2017.