

Article

What Drives Megaproject Social Responsibility Behavior? A Qualitative Study in China

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Abstract

Megaprojects' global expansion yields profound socio-economic and environmental effects, highlighting the significance of megaproject social responsibility (MSR). Stakeholders of megaprojects must possess a thorough understanding of what drives MSR behavior to formulate impactful governance strategies. Despite research advances in understanding MSR behavior triggers, the field lacks a holistic and systematic perspective, failing to adequately explain the driving mechanism behind behavior. This study conducted a qualitative analysis based on the motivation–opportunity–ability (MOA) framework to explore current practices and identify the drivers of MSR behavior. By gathering interview data from 10 megaproject experts and textual materials of three prominent megaprojects, we identified fifteen first-order concepts within seven second-order themes under the MOA framework and provided a more comprehensive and nuanced view of the drivers of MSR behavior. This study introduces a novel theoretical perspective and analytical framework, enhancing comprehension and interpretation of MSR behavior and enriching the theoretical underpinning of social responsibility management in megaprojects.

Keywords: megaproject social responsibility behavior; drivers; qualitative study; MOA framework

1. Introduction

Megaprojects are characterized by their vast scale, extensive duration, and immense complexity, often exceeding USD 1 billion in cost, engaging diverse stakeholders and exerting significant economic and social impacts [1–3]. Amidst rapid global economic growth, technological advancements, and improved management practices, more nations are investing in megaprojects, aiming to bolster their infrastructure, industrial progress, and global competitiveness [1,4]. The value derived from megaprojects extends beyond a short-term monetary sense, encompassing substantial social value with a broad and profound impact on communities, regions, and even nations [5].

Given megaprojects' deep ties to social interests, megaproject social responsibility (MSR) is currently receiving increasing academic and industrial attention [6]. MSR, which refers to the broad responsibilities for social well-being assumed through the policies and behaviors of megaproject stakeholders [7], has garnered significant research focus. Scholars have developed a set of evaluation indicators for MSR to establish the groundwork for empirical research, offering a comprehensive assessment spanning political, economic, legal, and environmental dimensions [8–10]. Furthermore, empirical studies have confirmed the pivotal role of MSR practices and behavior in improving project performance [11–13],



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preserving environmental and ecological balance [14], advancing sustainable industry development [15], promoting megaproject success and green innovation under stakeholder pressure [16], and enhancing community acceptance through public trust [17]. However, despite the growing recognition of the far-reaching and long-lasting effects of MSR, numerous megaprojects still suffer from striking quality accidents, ecological destruction, and societal unrest triggered by inadequate implementation of social responsibility practices [5,18]. For instance, the Three Gorges Dam project, the world's largest hydroelectric project, has faced criticism for its perceived threats to the environment, animal species, and resettled people [8]; the absence of adequate international cooperation and transparency in the construction of the Grand Ethiopian Renaissance Dam has exacerbated the water crisis in the downstream countries and fueled regional tensions [19]. Therefore, we maintain that promoting active implementation of MSR behavior by megaproject stakeholders remains profoundly pertinent at present.

To ensure the fulfillment of MSR behavior and develop effective governance strategies, it is vital to have a profound grasp of the drivers behind MSR behavior [20]. Previous studies have investigated the drivers from two aspects, namely the external environment and internal organizational factors. Institutional pressures [21,22], stakeholder relationships [5,9], and managers' psychological traits [23,24] have always been the research focus of scholars. Despite offering valuable insights, these studies have not fully explained the driving processes behind MSR behavior. They primarily focus on local perspectives (e.g., institutional theory [21], stakeholder theory [5], personal psychological traits [23]) or specific behavior dimensions (e.g., organizational citizenship behavior [18], environmentally responsible behavior [25], economically responsible behavior [26]). This focus has limited the explanation of the intricate driving processes behind MSR behavior to a narrow research scope. The multitude of stakeholders in megaprojects, along with their heterogeneity and interactivity, combined with the complexity of the projects, renders MSR behavior intricate [27]. Evidently, the occurrence of behavior is not determined unilaterally; rather, it necessitates a systemic and holistic explanation [28]. Therefore, further research is warranted on "what drives MSR behavior".

Researchers have argued that integrating the various factors into a comprehensive model would help improve understanding of the behavior [29,30]. Driven by this conviction, our objective is to construct a model that allows us to answer "what drives MSR behavior" in a systematic manner that is both theoretically informed and empirically based. We approach the aforementioned research question through qualitative analysis. Qualitative methods are recommended as the best way to understand complex phenomena, especially for immature theoretical areas [31]. We have based our study on a preliminary conceptual framework derived from existing behavioral literature. Specifically, we employed the motivation–opportunity–ability (MOA) framework as a theoretical touchstone. We then empirically refined and extended the model by analyzing textual information and interview data from megaprojects. The MOA framework represents a metatheoretical principle that transcends specific topics and research domains and offers a concise and broad lens for holistically understanding behavior and guiding researchers to vital clues [32]. In the context of megaprojects, partaking subjects engaged in MSR behavior necessitate sufficient motivations, suitable opportunities, and corresponding abilities, all of which are indispensable.

This study adopts Chinese megaprojects as its empirical context and employs a qualitative research design combining semi-structured interviews with megaproject experts and textual analysis of representative megaproject cases. Through an iterative process of data coding and theory elaboration guided by the MOA framework, this study develops a contextually grounded understanding of the factors driving MSR behavior. This

study contributes to the MSR literature through an intentional investigation that provides a much-needed and thorough holistic picture of the factors that drive MSR behavior and determines if there are any missing antecedents specific to megaprojects. This study responds to the call for further exploration of MSR behavior drivers through developing research and theory that is targeted, relevant, and valuable to the megaproject field [16,27]. The findings will drive participating subjects to shift from passive compliance to active social responsibility, while encouraging government departments to transition from passive to proactive management of social responsibility. They will also enhance the social responsibility governance system of megaprojects, enabling sustainable development and informing reasonable recommendations for future policies and practices.

2. Literature Review and Theoretical Background

2.1. MSR Behavior

Social responsibility refers to an organization's willingness to incorporate social and environmental considerations in its decision-making and be accountable for the impacts of its decisions and activities on society and the environment [33]. Corporate social responsibility (CSR) has been a hotspot in both business and academia since the 1990s and continues to expand into various domains [34,35]. Given the high carbon emissions, resource exploitation, and adverse impacts on the environment, CSR in the construction industry has attracted the attention of scholars and a certain degree of exploration [36]. As research into CSR in the construction field progresses, scholars have begun to focus on CSR indicators, ESG performance, and their performance outcomes in construction and project contexts [37,38], especially megaprojects that are closely linked to the public interest of society [16]. Zeng et al. [7] first proposed MSR and defined it as the policies and practices of the stakeholders participating through the project life-cycle, reflecting responsibilities for the broader societal well-being. Compared with corporate and general project social responsibility, MSR is characterized by stakeholder heterogeneity, project life cycle dynamics, and social responsibility interaction [7].

Research on MSR has attracted extensive attention from both academia and industry, with recent studies extending this focus to international megaproject contexts [39]. Early MSR literature focused on concept definition and feature identification to obtain a clear perception of MSR [7,16,40]. Subsequently, scholars initiated evaluation studies of MSR and constructed assessment frameworks to establish the groundwork for empirical studies. For example, Lin et al. [8] devised an MSR evaluation system spanning organizational and project levels, considering the project life cycle and stakeholder heterogeneity. Ma et al. [9] constructed an MSR pyramid model from four aspects, namely economic and quality, legal and regulatory, environmental and ethical, and political and community responsibility. More recently, Li et al. [41] identified social responsibility factors in new infrastructure construction and developed an integrated framework covering political, ethics-environmental, legal, and economic dimensions. Since then, scholars have conducted targeted studies on MSR external effects to underscore its significance. He et al. [6,11] found that MSR positively affects the performance and success of megaprojects. Ma et al. [12,14,15] investigated the spillover effects of MSR on the organizations' performance, the industry's sustainable development, and the environment and ecological balance, respectively. Furthermore, certain scholars have recognized the important role of stakeholders in megaproject governance and MSR, gaining insights through methods such as social network analysis [8], stakeholder value networks [5,42], and mass-media-based societal network analysis [43].

With the ongoing development of MSR research, socially responsible behavior, as a specific manifestation of social responsibility, has gradually attracted the attention of researchers in the field of megaprojects [21,24,27,44]. Socially responsible behavior represents

a micro perspective that allows us to zoom in on specific stakeholders to appreciate the nature of the actions they take to fulfill their social responsibilities [45]. Xie et al. [27] define MSR behavior as “specific actions taken by stakeholders to fulfill their social responsibility throughout the megaprojects’ life cycle, aimed at enhancing societal well-being or avoiding harmful consequences.” More recently, Mirzaee and Martek [46] further examined social responsibility behaviors as behavioral strategies for avoiding, de-escalating, and resolving social conflicts arising in megaprojects. Compared to the rich research on MSR, MSR behavior has been relatively understudied. As a micro-level phenomenon, MSR behavior is observable and measurable, with strategic implications that are clearer for stakeholders interested in adopting social responsibility strategies [21]. Consequently, from the managers’ perspective, MSR behavior is gaining significance. Investigating the drivers and mechanisms that promote these behaviors can facilitate the implementation of more direct and effective strategies.

2.2. Drivers of MSR Behavior

The drivers of MSR behavior refer to the factors motivating megaproject participants to take practical actions to fulfill their social responsibilities. The study of MSR behavior, as an emerging research trend, has witnessed an increasing number of researchers offering empirical and theoretical insights into how and why these pro-social activities emerge. Table 1 provides an overview of research concerning the drivers of MSR behavior.

Table 1. Drivers of MSR behavior in prior relevant studies.

Author	Research Focus	Theory	Method	Drivers	Findings
Xie et al. [21]	MSR behavior	New institutional sociology	Structural equation model	Institutional pressure	Regulatory pressure significantly influences MSR behavior, while normative and cultural cognitive pressure have no significant effect on MSRB. CEO narcissism inversely affects MSR, with the CEO’s social responsibility cognition mediating and public concern moderating. Strengthening ties with the government and general contractors can boost MSR success for the owner organization. As the MSR pyramid ascends, the positive impact of external stakeholders and the negative effect of project complexity intensify. Mimetic pressure had a positive effect, whereas coercive and normative pressure had no significant effect.
Lin et al. [23]	MSR practices	Upper-echelons theory	Regression analysis	CEO narcissism	
Zheng et al. [5]	MSR practices	Stakeholder theory	Stakeholder Value Network	Stakeholder network of MSR	
Ma et al. [9]	Climbing process of MSR	Stakeholder theory	Regression analysis	External stakeholders	
Zhai et al. [24]	Socially responsible collective action in major water transfer projects	Institutional theory	Structural equation model	Institutional pressure	

Table 1. Cont.

Author	Research Focus	Theory	Method	Drivers	Findings
Zhai et al. [47]	Socially responsible collective actions in megaprojects.	Social influence theory	Structural equation model	Social influence process	Subjective norms, group norms and social identity could increase stakeholders' intention to take socially responsible collective action.
Wang et al. [18]	Organizational citizenship behaviors for the environment in megaprojects	Social identity theory	Structural equation model	Project participants' perceptions	Project participants' perceptions of internal stakeholder practices had a positive effect on behavior, while those on external stakeholder practices had minimal impact.
Wang et al. [25]	Organizational citizenship behaviors for the environment in megaprojects	Institutional theory	Structural equation model	Institutional pressure	Mimetic and normative pressures significantly influenced the behavior, while coercive pressure had no notable effect.
Wang et al. [48]	Organizational citizenship behaviors for the environment in megaprojects	Leadership theory/social identity perspective	Partial least squares modeling and hierarchical regression	Leadership styles (transformational and transactional leadership)	Both transformational and transactional leadership effectively motivate OCBs through environmental commitment; power distance moderates the relationship between transformational leadership and OCBs.
Xie et al. [49]	Environmentally responsible behavior in megaprojects	Planned behavior theory	Structural equation model	Subjective norms, attitudes, and perceived behavioral control	Subjective norms, attitudes, and perceived behavioral control all have a positive influence on the behavior.
Zhai et al. [50]	Environmentally responsible behavior of megaproject contractors	Extended theory of planned behavior	Partial least squares structural equation modeling	Moral identity, corporate green culture, attitudes, subjective norms, perceived behavioral control	All identified factors positively influence ERB; the extended TPB model demonstrates superior explanatory and predictive power over the basic TPB model.
Wu et al. [26]	Megaproject safety behaviors	Social capital theory	Exploratory case study	Social capital	The structure, relationship, and perception of social capital all positively influence behavior.

Previous literature has proposed two main categories to explain the drivers of MSR behavior. First, drivers originating from the external environment, such as institutional pressures [21,24], and external stakeholders [9]. Second, internal drivers originating from individuals or organizations, such as CEO narcissism [23], stakeholder networks [5], and

subjective norms [47]. Table 1 shows that the majority of scholars have examined the drivers of MSR behavior through local theoretical perspectives. A considerable focus of the literature chain has been the institutional theory [21,24] and stakeholder perspectives [5,9]. Other parts of the literature focus on perspectives such as individual psychological traits [23] and social influences [47] to analyze the subjective factors that contribute to MSR behavior. Moreover, some scholars have investigated specific dimensions of MSR behavior, such as megaproject organizational citizenship behaviors [18,25,48], environmentally responsible behavior [49,50], and safety behavior [26].

Overall, there are some gaps in previous research on the drivers of MSR behavior. Prior studies have predominantly validated the drivers of MSR from local theoretical perspectives or by examining isolated dimensions, lacking comprehensive and systematic investigations. This limitation restricts the explanation of the intricate process driving MSR behavior to a narrow scope, failing to fully capture its overarching mechanism. Furthermore, despite the exploration of various drivers, the lack of clarity and coherence in the literature on MSR behavior has resulted in a fragmented understanding of the phenomenon. Researchers have argued that integrating the various factors into a comprehensive model would help improve understanding of the behavior [29,30]. Therefore, our study aims to address this gap through an in-depth qualitative analysis based on the MOA integrative framework.

2.3. MOA Framework

The MOA framework was first proposed by MacInnis and Jaworski [51] for predicting consumer attitudes toward advertising message processing. According to MOA theory, behavior results from three factors—motivation (M), opportunity (O), and ability (A)—which collectively form the MOA framework [52–54]. This framework jointly explains behavior occurrence based on subjective possibilities, objective possibilities, and subjective judgments of objective possibilities [55]. Motivation reflects the goal-directed willingness, interest, or desire driving the behavior; opportunity refers to the external environmental conditions that enable or constrain behavioral enactment; and ability refers to the skills or knowledge required for behavior execution [56]. Similarly, Fishbein [57] suggested the three necessary factors for any volitional behavior to occur as “the strong positive intention to perform the behavior”, “the skills necessary to carry out the behavior”, and “the context of opportunity provided by the environment”.

The MOA framework has been widely adopted to explain diverse behaviors. Across different research domains, MOA theory has found application in marketing [58], knowledge management practices [56], behavior in information systems research [59], and firm-level decision making [60]. Initially, the theory focused on individual behavior [56,61,62], but it has since been expanded to investigate organizational behavior, such as corporate social business [63] and firm efficiency [64]. Research conducted across various fields and levels has enriched the content and bolstered the reliability of the MOA theoretical model.

To guide our qualitative exploration of MSR behavior, we sought a conceptual framework that could serve as a sensitizing device without constraining the emergence of empirically grounded insights. We chose the MOA framework for several reasons.

First, it represents a metatheoretical principle that transcends specific topics and research domains, allowing variables like motivation, opportunity, and ability to be defined within various research contexts [65]. It can address empirical phenomena across diverse contexts and has been applied to explain organizational and contractor behavior in project and construction contexts [66,67].

Second, the MOA framework explains behavior as a concise and comprehensive framework [68,69], offering the flexibility of being broad and inclusive. While several theoretical perspectives have been employed to investigate MSR behavior and related phenomena,

each provides only a partial account of the behavioral drivers. Stakeholder theory [5,9], widely applied in MSR research, identifies the interests and influence of key actors, thereby offering partial insights into the motivational dimension of MSR behavior; however, it does not systematically address whether participating organizations possess the capacity to fulfill their responsibilities (ability) or the objective contextual conditions that enable behavioral enactment (opportunity). Institutional theory [35], by contrast, captures the constraining and enabling effects of formal regulatory pressures on organizational behavior, corresponding primarily to the opportunity dimension; yet it largely overlooks internal motivational drivers—such as moral commitments and reputational concerns—and the capability prerequisites that determine whether organizations can translate external pressures into concrete action. The theory of planned behavior [70], while encompassing attitudinal (motivation), normative (partial opportunity), and control (ability) components, was developed principally for individual-level behavioral prediction and does not adequately account for the organizational-level resource and contextual mechanisms central to MSR behavior in megaprojects. In contrast, the MOA framework simultaneously addresses all three dimensions—motivation, opportunity, and ability—enabling a more complete and integrated account of why, when, and how MSR behavior occurs. By encompassing internal motivational forces, external contextual conditions, and organizational capacity within a single coherent structure, the MOA framework effectively transcends the partial explanatory scope of each alternative perspective, making it particularly well-suited for holistically understanding the drivers of MSR behavior in the complex megaproject context.

3. Methodology

While MSR behavior has garnered growing attention in recent years, insufficient research has focused on elucidating its driving mechanisms. We used an exploratory qualitative research approach to fill this gap. Qualitative methods are suited to theoretically underdeveloped domains, enabling systematic exploration of complex phenomena within a guiding conceptual framework [71,72]. Given that the drivers of MSR behavior remain insufficiently theorized, this approach allows us to systematically identify and conceptualize these factors in megaproject contexts. We developed a data structure through a process of purposive sampling, data collection, and data analysis following the Gioia method [73].

To ensure the rigor and credibility of this qualitative inquiry, potential sources of confirmation bias were systematically identified and addressed throughout the research process. Confirmation bias represents a recognized methodological concern in qualitative research, particularly in studies that draw on a prior theoretical framework to guide analysis. In this study, four potential sources of bias were identified: the *a priori* adoption of the MOA framework risked predisposing researchers toward framework-induced categorization; the interpretive nature of qualitative coding introduced the possibility of subjective inconsistencies across researchers; social desirability bias may have influenced interviewees to present their organizations' practices in an overly favorable light; and purposive sampling risked overrepresenting megaprojects with more prominent social responsibility practices. The corresponding procedural safeguards implemented to address each of these risks are described in the respective sections that follow.

3.1. Research Scope

The empirical background of this study is set in the context of megaprojects in China. China was selected as the research setting because it provides a rich and suitable empirical context for investigating the driving mechanisms of MSR behavior.

First, China has experienced rapid and extensive megaproject development over recent decades, covering various sectors such as transportation, energy, water conservancy, urban

development, and public infrastructure. The large number and diversity of megaproject practices provide abundant empirical evidence for exploring how MSR behavior emerges and is implemented in complex project environments.

Second, megaprojects in China exhibit typical characteristics of large-scale infrastructure projects, including substantial investment, long project life cycles, technological and organizational complexity, multiple stakeholder involvement, and significant socio-economic and environmental impacts. These characteristics make social responsibility issues particularly prominent and provide an appropriate setting for examining the drivers influencing MSR behavior.

Furthermore, China has become one of the most influential megaproject development contexts globally. Understanding the drivers of MSR behavior in this setting can therefore contribute not only to improving megaproject governance in China but also to advancing broader discussions regarding social responsibility management in large-scale projects.

Therefore, this study uses Chinese megaprojects as an information-rich empirical setting rather than simply a geographical boundary. Insights derived from this context contribute to a deeper understanding of MSR behavior and provide a basis for future studies in different project and institutional environments.

3.2. Purposive Sampling

Purposive sampling was conducted in line with the research objectives to maximize sample diversity and the richness of information [74,75]. To enhance the reliability of qualitative research, we gathered both text materials and interview data for mutual validation and supplementation [76]. Several considerations guided the selection of text materials and respondents. For text data, two considerations shaped the selection. First, the selected cases were required to involve different types of megaprojects to enhance the reliability of the research results. Second, the selected cases must encompass a broad range of social responsibility practices and be richly documented, supplying ample material for the study. For interview data, three considerations guided the selection. First, interviewees were required to be middle or senior managers with over 5 years of experience in megaprojects, ensuring a profound understanding and knowledge of MSR behaviors. Second, interviewees must be highly knowledgeable about their organizations' social responsibility practices. Third, interviewees should exhibit demographic diversity (e.g., involved in different projects) and have engaged in a wide variety of MSR behavior practices. The deliberate attention to diversity across project types, organizational roles, and levels of industry experience in the sampling process also served to mitigate potential sampling bias and enhance the breadth and representativeness of the findings.

3.3. Data Collection

The original data were collected from publicly available text data and semi-structured interviews, and existing literature was fully integrated into the subsequent model description. The text data came from public text materials of three typical megaproject cases in China. These representative cases with abundant public information can provide a relatively holistic response to MSR-related issues while avoiding Hawthorne effect errors and providing open, objective insights [77]. The interview data were collected from 10 engineering experts with active experience in megaproject construction. Semi-structured interviews facilitated deeper insights into the participants' perspectives, experiences, and emotions, offering a powerful way for researchers and respondents to collectively make sense of complex and evolving concepts [31]. The cross-validation of information from different sources enhances the authenticity and reliability of the data and ensures the reliability and validity of the research results [76].

3.3.1. Text Materials

From September 2022 to February 2023, we extensively collected and reviewed published materials on megaprojects. Following preliminary reading and screening, the South-to-North Water Diversion Project, Qinghai–Tibet Railway, and Three Gorges Dam were chosen for text data collection. First, these projects possess robust practical social responsibility experience and are emblematic. They encompass diverse social responsibility practices, including protecting ecosystems, addressing permafrost challenges, managing water resources, preserving cultural heritage, and managing land acquisition and resettlement. Second, these renowned projects have garnered significant societal attention. Surrounding these megaprojects, there are plenty of news reports, construction records, and literary works, which provide detailed descriptions of environmental protection, quality assurance, land acquisition and resettlement, technology and management innovation, and other content related to social responsibility, supplying ample material for our study. Finally, the selected projects cover different types of megaprojects, spanning water conservancy, transportation, and industrial energy, enhancing the reliability of the research results. Text data offers the advantage of avoiding direct interaction with the research object and environment, minimizing artificial interference and potential observer effects [78], thereby also serving to reduce the risk of social desirability bias that may arise in direct interview settings and helping to ensure a more objective account of MSR practices. Table 2 shows the sources of collected text data. A1, A2, and A3, respectively, mark the text data collected from the documentary literature, report collections, and news reports related to the South-to-North Water Diversion Project, Qinghai–Tibet Railway, and Three Gorges Dam.

Table 2. Source of textual material.

No.	Title	Author
A1. The South-to-North Water Diversion Project	The South-to-North Water Diversion Project Construction News Collection 2004 Volume~ The South-to-North Water Diversion Project Construction News Collection 2008 Volume [1]	General Office of the South-to-North Water Diversion Project Construction Committee Office of the State Council
	The South-to-North Water Diversion Project Construction News Collection 2013 Volume~ The South-to-North Water Diversion Project Construction News Collection 2015 Volume [2]	
	The China South-to-North Water Diversion Project Construction Yearbook 2005~ The China South-to-North Water Diversion Project Construction Yearbook 2018 [3]	Edited by the Compilation Committee of The China South-to-North Water Diversion Project Construction Yearbook Wen Dan
	The South-to-North Water Diversion Middle Route Project [4]	
A2. The Qinghai–Tibet Railway	Across the roof of the world Qinghai–Tibet railway construction news report 2004–2005 selection [5]	The Qinghai–Tibet Railway Construction News Report Selection and Editing Committee Ren Xigui
	The Qinghai–Tibet Railway [6]	
	The Qinghai–Tibet Railway Comprehensive Volume [7]	
	The Qinghai–Tibet Railway Science and Technology Volume Environmental Protection [8]	The Writing Committee of the Qinghai–Tibet Railway
	The Qinghai–Tibet Railway Project Management Volume [9]	
	The Qinghai–Tibet Railway Operation Management Volume [10]	
A3. The Three Gorges Dam	The Qinghai–Tibet Railway Health Security Volume [11]	
	The Three Gorges Project in One Hundred Years—An Anthology of 1919~1992 News about the Three Gorges Project [12]	Edited by the Three Gorges Project Construction Committee of the State Council
	The Three Gorges Project in One Hundred Years—An Anthology of 1993~2003 News about the Three Gorges Project [13]	
	The Three Gorges Project in One Hundred Years—An Anthology of 2004~2009 News about the Three Gorges Project [14]	
	The Yangtze River Three Gorges Project [15]	Ji Changhua
	A Symphony of Dreams and Reality—Documentary of the Three Gorges Project [16]	Sun Ronggang

3.3.2. Interview Materials

From January 2023 to July 2023, we conducted a number of semi-structured interviews in person. Semi-structured interviews excel at capturing rich data on relatively unexplored phenomena [79]. In line with the purposive sampling criteria outlined above, we selected 10 experts in the field of megaprojects as interviewees (as shown in Table 3). First, the interviewees possess at least 5 years of megaproject experience and strong familiarity with their organization's social responsibility practices. Second, they hold mid-to senior-level managerial positions, such as project managers, general managers, and design/construction leaders. This ensures they have a profound understanding and knowledge of MSR behaviors. Furthermore, they are respectively participating in four typical megaprojects, spanning comprehensive pipeline corridors, rail transportation, comprehensive transportation center and surrounding facilities support, and large-scale bridges. Detailed information on these megaproject cases is provided in Table S1 in Supplementary Materials. Each project involves an investment exceeding USD 1 billion, and all are public infrastructure projects, offering a broad spectrum of MSR practices. The interviewees possessed strong logical thinking, analytical judgment, and communication skills to swiftly grasp the interview's purpose and content. The outline of the semi-structured interviews with the experts is provided in Table S2 in Supplementary Materials. The interviews, which ranged from 60 to 90 min in length, were concluded once no additional valuable information was forthcoming [80]. With the interviewees' consent, each interview was audio-recorded to ensure a complete record of the proceedings.

Table 3. Basic information about interviewees.

No.	Position	Industry Experience (Year)	Project	Investment (Billion)	Type	Time (min)
B1	Project Manager	18	Yiwu Mall Avenue and Surrounding Supporting Construction	1.29	Comprehensive Pipe Gallery Project	84
B2	Technical Chief Engineer	15				77
B3	Project Chief Economist	11				71
B4	Deputy Project Manager	31				65
B5	Executive Vice President	10	Hangzhou Metro Line 3 Phase II Project	1.03	Rail Transit Project	63
B6	Project Manager	15				68
B7	Deputy Chief Engineer	33	Guangzhou Baiyun International Airport Phase III Expansion Project	7.56	Comprehensive Transportation Center and Surrounding Facilities Support	65
B8	Deputy Project Manager	5				70
B9	Owner's Representative	7				71
B10	Technical Chief Engineer	6	Shenzhen-Zhongshan Bridge	5.86	Large-scale Bridge Projects	81

3.4. Data Analysis

Data were analyzed following the Gioia method [73], with NVivo used to support the coding process. The Gioia method is particularly suited to this study for two reasons. First, it provides a systematic and rigorous approach to moving from raw empirical material to theoretical interpretation, which aligns with our objective of developing a comprehensive model of MSR behavior drivers. Second, the Gioia method accommodates the use of a prior theoretical framework as a sensitizing device, which is consistent with our adoption of the MOA framework to guide the analysis while remaining open to insights emerging from the data [81].

All interviews were audio-recorded, transcribed verbatim, and then coded alongside text data using NVivo 11. Our research questions were the starting point for the analysis. The data were analyzed in three stages, moving from raw empirical material to theoretical interpretation. Although presented sequentially below, our analysis was dynamic and iterative in practice.

In the first stage, researchers conducted a thorough review of the text and interview transcripts to familiarize themselves with the data. During this stage, we remained as

faithful as possible to the informants' own terms, making only limited attempts at broader conceptualization, so as to prevent the premature imposition of MOA-derived theoretical categories on the data. In the second stage, we identified second-order themes by systematically comparing similarities and differences among the first-order concepts and systematically grouped them into second-order themes [73,82]. To minimize subjective interpretation bias, each researcher independently coded the data prior to cross-comparison; any disagreements were subsequently resolved through iterative discussions among researchers until consensus was reached [80]. In the third stage, the second-order themes were further aggregated into aggregate dimensions corresponding to the three components of the MOA framework. We also validated the logical relationships gained from the analysis by comparing them with existing literature to refine our findings [83]. Additionally, thorough documentation of our procedures ensured the traceability and replicability of our methodology.

4. Extraction of Drivers

4.1. First-Order Coding

First-order coding involves identifying empirical observations from the raw data and grouping them into concepts that reflect the informants' own terms as closely as possible [73,84]. We imported text and interview data into NVivo 11 software for coding and strictly followed the coding procedure. Table 4 presents an excerpt from the refinement and induction process of first-order coding, with 2–3 representative empirical observations selected for each first-order concept.

Table 4. Examples of first-order coding.

Original Data	Conceptualization	First-Order Concept
A1: By swiftly and rigorously addressing quality concerns, substantial enhancements have emerged. Last year, through a combination of interviews, admonishments, notifications, and clear out of the field (interviewed and admonished the head of all 208 partaking subjects, issued notices of criticism to 36 partaking subjects, retained 3 units for probation, cleared 4 units out of the field...), a high-pressure environment was established. This approach effectively turned passivity into proactivity, leading to a significant improvement in project quality. B3: Our unit annually signs the responsibility letter with the general contractor, encompassing quality and safety control commitments, among others. A2: If the construction fails to comply with environmental protection standards or violates environmental protection regulations, the Qinghai–Tibet Railway Construction General Command will impose penalties according to the severity of the case.	Notification of criticism Clear out of the field Sign the responsibility letter Penalties	Accountability and punishment
A2: The introduction of environmental supervision has brought environmental management into normal procedures during the construction period, strengthened the protection of soil erosion and wild animals and plants, and can provide timely feedback on the discovered environmental problems, so that the environmental problems during the construction process can be controlled.	Environmental Supervisor	Supervision and inspection
A3: The Three Gorges Project enforces five levels of quality control, in contrast to the typical three levels for general projects. The construction, supervision, and project departments constitute the three basic levels. Additionally, the State Council oversees quality through the Quality Director's Office and the Three Gorges Inspection Team. Rigorous inspection sets the Three Gorges Project apart, ensuring scrutiny at each level and stage unlike other projects.	Quality Director's Office Inspection Team	
B2: These contract requirements related to social responsibility are formulated on the premise of national laws and regulations, plus some requirements of local governments. The specific implementation content will be checked through the quality inspection station and the security inspection station. B4: Our behavior is governed by three primary factors, namely contracts take precedence, followed by the national laws and regulations, and industry norms. B9: Policies and regulations have an impact on social responsibility, such as the protection of cultivated soils, the protection of basic farmland and greening relocation.	Laws and Regulations Laws, Regulations, and Norms Policies and Regulations	Laws and Regulations

Table 4. Cont.

Original Data	Conceptualization	First-Order Concept
B1: Another consideration for us to fulfill our social responsibility is our corporate image, which is intangible.	Corporate Image	Organizational reputation
B6: More important than the cost–benefit drive is the corporate reputation.	Corporate Reputation	
B8: When the project is penalized, the unit will increase the penalty for the project management team, and the project must not discredit the enterprise.	Cannot be discredited	
B9: Construction project works, state-owned enterprises need to consider profits on the one hand, and reputation on the other.	Fame	
B6: When we arrive in a new place, fulfilling our social responsibility will help open up the market here.	Open Market	Organizational Survival and Development
B6: Only when all projects are carried out according to the company’s benchmarks can the company’s image be improved to get more projects. Companies that do poorly will be pulled into the bad reputation list.	Get more projects	
B10: There are megaprojects that do not necessarily earn money, but doing well on the project at hand can have an impact on subsequent performance, such as engineering bids.	Follow-on Business	
B10: A unit that does not perform well on such a megaproject will jeopardize its future bids. Since megaprojects offer abundant resources and possibilities, wasting them will make the bidders question the unit’s competence and dedication to accomplish the expected results.	Future Bids	

4.2. Second-Order Themes

In the second stage, we identified second-order themes by deliberately examining similarities and differences among the first-order concepts. Through this process, the 15 first-order concepts identified in the previous stage were systematically aggregated into 7 second-order themes, and their correspondence is shown in Table 5.

Table 5. Second-order themes.

Second-Order Theme	First-Order Concept	Connotation
Resource support	Government support	Government fosters a conducive external environment for MSR behavior through measures such as providing policy subsidies. Top managers provide resources and safeguards for MSR behavior, such as developing strategies and setting incentives.
	Top management support	
social responsibility culture	Propaganda education	Promote MSR values and norms to all megaproject members to increase their awareness and responsibility. Illustrate the practical impact and significance of MSR behavior through exemplar role models and proactive leadership.
	Demonstration leading	
Regulatory pressure	Laws and regulations	Megaprojects must adhere to laws and regulations on safety and quality, environmental protection, and social welfare, etc. The partaking subjects that fail to fulfill MSR will be investigated and may face consequences such as fines, criticism, and business restrictions. Supervisory bodies regularly monitor and inspect the MSR fulfillment of partaking subjects of megaprojects.
	Accountability and punishment	
	Supervision and inspection	
Innovation ability	Technology innovation ability	The partaking subjects have the ability to improve technical methods, programs, and processes, etc. The partaking subjects have the ability to improve management concepts, methods, and rules, etc.
	Management innovation ability	
Collaboration ability	Coordination ability	The partaking subjects are able to effectively coordinate their objectives, plans, and actions to prevent conflicts. The partaking subjects have the ability to effectively share information and resources.
	Sharing ability	
Instrumental motivation	Organizational reputation	The partaking subjects implement MSR behavior to enhance their image and reputation in society. The partaking subjects implement MSR behavior to scale their operations and improve efficiency.
	Organizational survival and development	
Moral motivation	Moral emotion	Members of partaking subjects seek emotional satisfaction through their actions. The cognitive beliefs of members, including values, codes of conduct, and ethics, guide their understanding of what is considered right and proper.
	Moral cognition	

4.3. Aggregate Dimensions

In the third stage, the seven second-order themes were further abstracted into three aggregate dimensions corresponding to the MOA framework: motivation, opportunity, and ability. We iteratively refined the coding results by moving back and forth among the empirical data, relevant literature, and model building until no additional concepts or themes emerged, at which point the data structure of MSR behavior drivers reached analytical sufficiency. Figure 1 presents the final data structure of MSR behavior drivers, illustrating the relationships among first-order concepts, second-order themes, and aggregate dimensions.

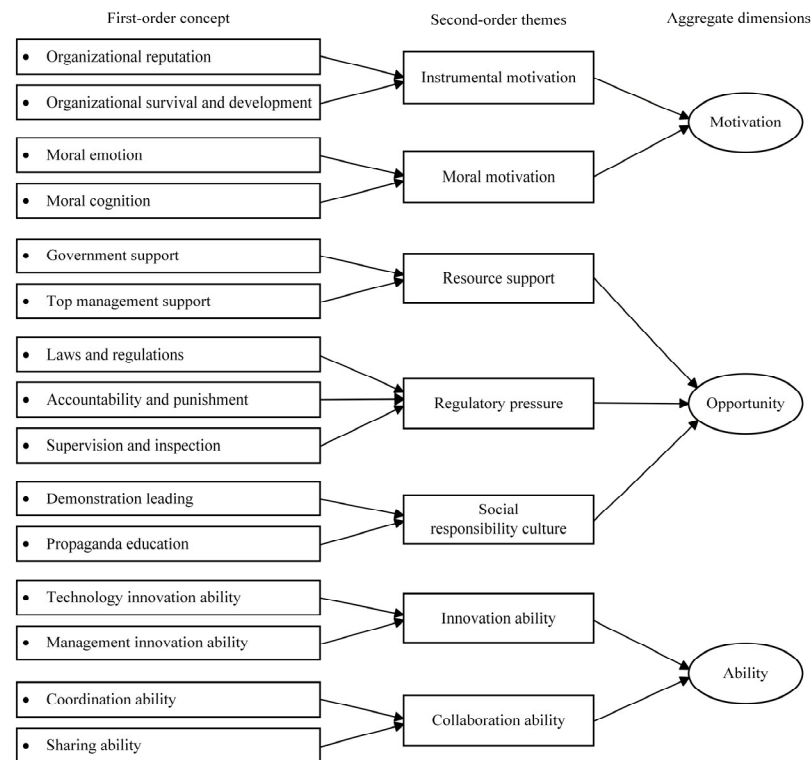


Figure 1. Data structure of MSR behavior drivers.

5. Findings and Discussion

This study identified 15 first-order concepts within seven second-order themes across the dimensions of motivation, opportunity, and ability. This section provides a detailed explanation of these elements, supported by empirical data and relevant literature.

5.1. Ability Analysis

Ability refers to the skills necessary to execute a specific behavior within a given situation. Occurrence of behavior can be influenced by the individual or team's inherent competency traits [58]. In the context of megaprojects, abilities that drive social responsibility behavior include innovation ability and collaboration ability.

5.1.1. Innovation Ability

Innovation ability refers to the professional knowledge, experience, skills, and their integration required by organizations to accomplish uncertain, non-conventional, and innovative tasks [85]. The complexity of megaprojects fosters abundant opportunities for innovation [86]. Two first-order concepts were identified under the second-order theme of innovation ability: technology innovation ability and management innovation ability.

1. Technology innovation ability. Compared to regular projects, megaprojects often incorporate numerous technology innovations due to their need for the utilization of complex technologies. Innovative solutions are vital for megaproject construction and fulfilling social responsibility [87]. For example, to address seawater corrosion, engineers of the Hong Kong-Zhuhai-Macau Bridge replaced traditional cathodic protection with a novel approach—installing protected mud areas in seawater [88]. The construction of the Qinghai–Tibet Railway faced three global engineering challenges, namely multi-year frozen soil, high-altitude hypoxia, and fragile ecology, which requires technology innovation. The intricate megaproject environments drove participants to devise innovative solutions, meeting requirements and overcoming obstacles.

2. Management innovation ability. Megaprojects are highly complex and uncertain. Traditional management systems cannot meet the requirements of megaprojects in areas like schedule, cost, quality, and safety [6]. To fulfill social responsibility, partaking subjects need to innovate a series of management measures to achieve social responsibility goals. For instance, due to the differences in existing laws and regulations among Hong Kong, Zhuhai, and Macau, the Hong Kong-Zhuhai-Macau Bridge construction management adopted a “specialized group-trilateral committee-project legal entity” three-level organizational structure for joint construction management decision-making [89]. The Qinghai–Tibet Railway introduced an environmental supervision system, which compensated for the deficiencies in railway construction environmental protection management and marked a significant milestone in China’s railway construction history [85].

In summary, innovation ability drives MSR behavior. Megaprojects face both technology and management challenges that require innovative solutions. Innovation ability helps mitigate challenges, reduce uncertainty, and address practical needs in megaprojects. This enables partaking subjects to successfully fulfill MSR behavior.

5.1.2. Collaboration Ability

Collaboration ability refers to the ability of organizations to effectively communicate, coordinate, and cooperate to achieve shared goals [90]. The characteristics of megaprojects underscore the importance of stakeholder collaboration for successful MSR implementation [40]. Two first-order concepts were identified under the second-order theme of collaboration ability: coordination ability and sharing ability.

1. Coordination ability. Effective coordination among stakeholders helps prevent conflicts when addressing social responsibility issues in megaprojects [23]. For example, the ecological compensation plan for the Hong Kong-Zhuhai-Macau Bridge was swiftly executed within a year due to successful collaboration among relevant organizations [91]. During the ecological compensation plan development, the South China Sea Fisheries Research Institute initiated preliminary suggestions; the Guangdong Provincial Oceanic and Fishery Administration constructed the framework, refining the proposal; the Hong Kong-Zhuhai-Macau Bridge Coordination Group Office managed trilateral government coordination; and the governments of Guangdong, Hong Kong, and Macau reached the ultimate decision.

2. Sharing ability. Megaprojects involve interactions among multiple stakeholders, and effective information sharing is an essential safeguard for achieving the shared goals [92]. For instance, the Qinghai–Tibet Railway project developed a management information system to strengthen the collection, collation, analysis, and transmission of information. This ensured that the railway construction process remained standardized, orderly, and controllable. Transparent communication channels and information sharing mechanisms can promote social responsibility fulfillment among collaborating parties in megaprojects [93].

In conclusion, collaboration ability drives MSR behavior. Collaboration ability fosters cooperation and resource sharing among stakeholders in megaprojects, strengthening organizations' ability to fulfill MSR behavior. This encourages partaking subjects to actively implement MSR behavior.

5.2. Motivation Analysis

Motivation serves as the internal driving force that stimulates organizational action, influencing the intensity and direction of behavior [64]. In the context of megaprojects, motivations of MSR behavior include instrumental motivations and moral motivations.

5.2.1. Instrumental Motivation

Instrumental motivation represents consequentialism, where behavior is determined by decision-makers weighing the pros and cons of their actions [94]. Researchers have conflicting views on whether social responsibility practices are a cost or a benefit for organizations. Some argue that it incurs significant financial expenses, while others believe it can enhance an organization's image and reduce transaction costs [95]. When the benefits of MSR behavior outweigh the costs, organizations will implement it driven by instrumental motivation. Two first-order concepts were identified under the second-order theme of instrumental motivation: organizational reputation and organizational survival and development.

1. Organizational reputation. Megaprojects often attract significant public and media attention, necessitating careful reputation management [96]. Existing research shows that better performance in megaprojects does not result from the threat of financial penalties but depends on maintaining a good reputation and the fear of losing face [97]. Megaprojects involve the joint collaboration of multiple organizations. Partners prefer to seek out organizations with good reputations, leaving those with poor reputations facing challenges such as declining profitability and survival. As several interviewees stated, "If a project is penalized, the organization will impose greater penalties on the project management team to avoid tarnishing the company's image" and "Being an intangible consideration for social responsibility, corporate image is very important."

2. Organizational survival and development. Fulfilling social responsibility is not only a necessary condition for pursuing profit and survival assurance, but also an effective way to demonstrate strength and promote future growth prospects [98]. Corporate reputation and experience in MSR positively impact obtaining engineering business and market competitiveness, creating favorable conditions for future development [6]. As the interviewee mentioned, "Once upon arriving in a new place, it is important to fulfill social responsibilities for opening up the market." Furthermore, empirical research results indicate a series of positive effects of MSR, such as improving organizational financial performance [12] and achieving project success [6]. These positive effects provide significant benefits and guarantees for organizational survival and development, offering reasons for partaking subjects to implement MSR behavior.

In conclusion, instrumental motivation drives MSR behavior. Organizations tend to actively implement MSR behaviors in order to pursue a favorable reputation and ensure their survival and development.

5.2.2. Moral Motivation

Moral motivation refers to goals arising from moral norms or ideal beliefs and is characterized by its voluntary nature. As part of society, organizations have an obligation to contribute to the common good [99]. Two first-order concepts were identified under the second-order theme of moral motivation: moral cognition and moral emotion.

1. Moral cognition. The core objective of MSR behavior is to promote social welfare, which has a certain moral basis. Partaking subjects are often acutely aware of the public and social attributes of megaprojects. Moreover, most organizations involved in megaprojects are state-owned enterprises that prioritize social welfare over their own interests [22]. Compared to private ones, state-owned enterprises tend to have a stronger sense of social responsibility and view fulfilling it as a natural obligation. For example, one respondent stated, “As a central enterprise, we should take on social responsibility; this is our responsibility, so why not execute it?”

2. Moral emotion. Given the inherent public goods attribute, megaprojects may inspire participants to take on social responsibility and make self-sacrifices for the public interest [100]. Megaprojects encompass remarkable social and symbolic importance, evoking a profound sense of pride among participants. This motivates them to amplify the societal value of their organization’s endeavors and embrace social responsibility in pursuit of advancing social welfare [101]. For instance, an interviewee stated, “Each of our employees is fully aware that they are contributing to the Three Gorges Project, resulting in elevated enthusiasm and a profound sense of confidence in attaining success.”

In conclusion, moral motivation drives MSR behavior. Megaprojects carry remarkable social and symbolic significance. The moral cognition and moral emotion of participating organizations stimulate their sense of social responsibility, thus promoting the implementation of MSR behavior.

5.3. Opportunity Analysis

Opportunity represents the incentive effects of objective environmental conditions on subjects’ actions, serving as an external driver of MSR behavior [102]. In the context of megaprojects, opportunity encompasses both the formal institutional environment—comprising laws, regulations, and accountability mechanisms—and the informal cultural environment shaped by shared values and normative expectations regarding social responsibility, both of which function as external contextual conditions that enable or constrain the MSR behavior of participating organizations. Variation in social responsibility behavior is probably associated with variation in institutions and the sticks and carrots they provide to constrain and enable behavior [35].

5.3.1. Resource Support

Resource support refers to the various resources provided by stakeholders to partaking subjects of megaprojects to help fulfill their social responsibility, including human, material, and financial resources [103]. Resources are vital for organizational activities and integral to social responsibility fulfillment. Two first-order concepts were identified under the second-order theme of resource support: government support and top management support.

1. Government support. Governments play an indispensable role in engineering decision-making, particularly within the megaproject domain [104]. Strong government support provides favorable conditions for implementing MSR behavior. On the one hand, the government offers substantial financial support for MSR initiatives. For example, “The environmental protection investment of the Qinghai–Tibet Railway surpassed 2 billion yuan, constituting over 8% of the total investment of the project, far exceeding the 3% standard”. Interviewees said, “In the bidding process of megaprojects, the government does not strictly follow the lowest bid and will not reduce the costs for social responsibility initiatives, such as safety and cultural construction measures.” On the other hand, the government plays an important role in coordinating megaprojects, especially in solving intricate issues like land acquisition and resettlement. The smooth completion of the resettlement work in the South-to-North Water Diversion Project and the Three Gorges

Project owes much to the government's provision of funds and extensive public work led by officials.

2. Top management support. To effectively manage megaprojects, governments usually establish a dedicated organization (e.g., headquarters or project management office) to deliver the project. In this organization, senior managers form the top management team of megaprojects, responsible for strategy formulation, decision-making, coordination, and management [105]. On the one hand, the top management team sets material incentives to encourage MSR behavior. For instance, the headquarters for the Qinghai–Tibet Railway rewarded units with outstanding safety performance by adding points in quality credibility and labor competition assessments. On the other hand, the top management team's orientation and attention to social responsibility will affect the organization's practice in this area. Interviewees emphasized, "It is also related to the personal values of the project manager. If he places a high value on social responsibility, the initiatives are more likely to be executed effectively."

In summary, resource support acts as a key driver of MSR behavior. Through the provision of essential resources and assurances, resource support creates a favorable external environment for stakeholders to engage in MSR behavior. This encourages stakeholders to actively implement MSR initiatives.

5.3.2. Regulatory Pressure

Regulatory pressure refers to the binding force of compulsory requirements from governments and regulatory organizations [25]. In engineering, it mainly includes laws, regulations, and industry standards, which are usually related to administrative agencies. Three first-order concepts were identified under the second-order theme of regulatory pressure: laws and regulations, accountability and punishment, and supervision and inspection.

1. Laws and regulations. Governments promote partaking subjects to fulfill MSR behavior by issuing compulsory measures such as laws, regulations, and industry standards. For example, the Regulations on Water Pollution Control in Areas Along the South-to-North Water Diversion Project were China's first local legislation to standardize engineering water pollution prevention and control measures. A review of multiple interviews found that stakeholders' understanding of social responsibility mainly comes from compulsory requirements of laws or internal company regulations, reflecting the effectiveness of regulatory pressure. In addition, the enactment of laws and regulations related to social responsibility shows the government's increasing focus on this issue. Partaking in subjects that actively implement social responsibility can gain favor from the government and a competitive advantage.

2. Accountability and punishment. Partaking subjects that violate laws and regulations may face severe consequences, including legal punishment, loss of legitimacy, damage to their reputation, and even threats to their survival and development. For example, "During the construction of the South-to-North Water Diversion Project, over 40 construction units were designated as untrustworthy on the government website." To avoid potential punishment and ensure the long-term survival and development of their organization, partaking subjects often demonstrate a commitment to fulfill their social responsibility through tangible actions.

3. Supervision and inspection. Strict regulatory inspections increase the probability of punishment due to insufficient MSR behavior, promoting the fulfillment of MSR behavior. For example, text data show that, "Maintaining high standards of water environment quality is closely linked to the implementation of strict environmental supervision measures."

In conclusion, regulatory pressure drives MSR behavior. Laws and regulations promulgated by administrative agencies, as well as measures such as accountability and

punishment, supervision and inspection, urge organizations to undertake MSR initiatives in order to comply with legal requirements.

5.3.3. Social Responsibility Culture

Social responsibility culture refers to the shared beliefs and values of partaking subjects in megaprojects regarding social responsibility goals and practices [106]. Organizational culture influences behavior through the deep-rooted values, which guide decision-making based on goals and beliefs [107]. Two first-order concepts were identified under the second-order theme of social responsibility culture: demonstration leading and propaganda education.

1. Demonstration leading. The leading and exemplary role of partaking subjects helps rally forces from all parties and form a powerful synergy to ensure the achievement of social responsibility goals. For instance, to ensure wetland protection during bridge, culvert, and roadbed construction, the project department of China Railway No.1 Bureau established a wetland protection volunteer service team. This team, composed of over 30 management personnel, has taken on a leading and exemplary role in wetland protection activities.

2. Propaganda education. Social responsibility culture is often translated into slogans posted at project sites to motivate all units. For example, the slogan proposed by the Hong Kong-Zhuhai-Macao Bridge is “Construct a world-class cross-sea channel, provide exceptional services to users, and become a landmark structure” [108]. During the construction of the Qinghai–Tibet Railway, over 500 ecological awareness slogan boards were erected at the construction site, and more than 40 training classes were conducted [109]. The importance of a value-driven approach is heightened when projects are imbued with significant ideological and political meaning [104]. These slogans are conducive to clarifying the social responsibility goals of partaking subjects and promoting the fulfillment of MSR behavior.

In summary, social responsibility culture drives MSR behavior. By demonstration leading and propaganda educating, the tangible effects and importance of fulfilling social responsibility are conveyed to members of the organization. This encourages members to learn from each other and strengthens their sense of responsibility, thereby stimulating MSR behavior.

5.4. Contextual Influences and Transferability of MSR Behavior Drivers

The findings of this study were derived from Chinese megaprojects, which provide an information-rich empirical context for exploring the formation mechanisms of MSR behavior. Due to their large scale, long life cycle, complex stakeholder relationships, and significant social and environmental impacts, Chinese megaprojects offer valuable opportunities to observe how motivation, opportunity, and ability drivers shape MSR behavior. Nevertheless, while the MOA framework provides a transferable theoretical lens, the specific manifestation and relative importance of individual drivers may vary across different market and institutional environments.

In the Chinese megaproject context, the drivers identified in this study reflect the characteristics of large-scale project delivery systems involving extensive resource integration and multi-stakeholder coordination. For example, opportunity-related drivers, such as resource support and social responsibility culture, are particularly important because megaproject participants need sufficient organizational resources, shared values, and collaborative environments to transform responsibility awareness into actual behavior. Similarly, ability-related drivers, including innovation ability and collaboration ability, highlight that implementing MSR requires not only willingness but also the capability to address technological complexity, stakeholder conflicts, and sustainability challenges.

In comparison, megaprojects developed in market-oriented systems, such as the European Union and the United States, may involve different mechanisms through which MSR behavior are promoted. For instance, stakeholder participation, public consultation processes, environmental assessment systems, contractual arrangements, corporate sustainability strategies, and market reputation mechanisms may play more prominent roles in shaping organizational motivation and opportunities for MSR behavior. Therefore, similar drivers may exist across different contexts, but their sources and pathways may differ. For example, regulatory pressure identified in this study may originate from formal regulations, industry standards, public accountability mechanisms, or stakeholder expectations depending on the institutional environment. Therefore, the proposed MOA framework should not be interpreted as a fixed set of drivers limited to Chinese megaprojects, but rather as a flexible analytical framework for understanding why and how organizations engage in MSR behavior.

6. Conclusions

In this study, we conducted a qualitative analysis of the drivers of MSR behavior guided by the MOA framework. We summarized seven second-order themes under the three dimensions of motivation, opportunity, and ability, namely (1) motivation factors, including instrumental motivation and moral motivation; (2) opportunity factors, including resource support, social responsibility culture and regulatory pressure; and (3) ability factors, including innovation ability and collaboration ability. On this basis, a systematic data structure of MSR behavior drivers was constructed. Additionally, the specific factors driving MSR behavior were discussed after analyzing the seven second-order themes.

6.1. Theoretical Implications

MSR management has become a prominent research focus in the field of megaproject management. Recent megaproject studies have further emphasized inclusive stakeholder-ecosystem governance and ethical-risk management, indicating that MSR behavior should be understood not only as isolated responsible actions but also as a relational and ethical governance process across heterogeneous stakeholders [110,111]. This view is also consistent with recent megaproject governance research, which highlights the complementary roles of contractual and relational governance mechanisms in coordinating heterogeneous actors and improving megaproject performance [112]. However, research findings remain fragmented in this domain, and the development of a comprehensive MSR management system is still nascent. This study extends the application of the MOA framework to the megaproject field and contributes to existing MSR literature by comprehensively identifying and elucidating the drivers of MSR behavior through qualitative research. First, our study offers an integrative perspective. The MOA framework provides a more comprehensive conceptualization and theoretical analysis of the drivers of MSR behavior. The qualitative nature of this research enabled the identification of causes and phenomena previously overlooked by researchers, thus facilitating the development of the MSR behavior driver data structure shown in Figure 1. These are often implicit and untested hypotheses in case studies. Thus, our integrative perspective offers a rich theoretical foundation for future MSR behavior research, enabling researchers to further validate the relationships between factors and gain a deeper understanding of MSR behavior.

A comparison with prior MSR behavior research further clarifies the distinct contributions of our findings. Several second-order themes identified in this study bear conceptual resonance with factors examined in existing literature. Regulatory pressure corresponds to the institutional pressure construct widely explored in prior studies [21,24,25]; however, our study advances this by disaggregating it into three actionable sub-dimensions—laws

and regulations, accountability and punishment, and supervision and inspection—offering a more granular account of how formal regulatory mechanisms operate in megaproject contexts. Instrumental motivation, encompassing organizational reputation and organizational survival and development, aligns with the consequentialist perspective on organizational social responsibility behavior [94,95]; however, prior studies on MSR behavior drivers have not explicitly theorized these factors as primary drivers, indicating that this dimension remains underexplored in the existing literature. Similarly, moral cognition bears conceptual affinity with the moral identity construct examined in prior behavioral research on megaprojects [50]. These factors, while not entirely unprecedented, are meaningfully refined and contextualized within the megaproject setting in the present study.

In contrast, several factors identified in this study represent genuinely novel contributions not systematically theorized in the existing MSR behavior literature. Most notably, the ability dimension as a whole—comprising innovation ability and collaboration ability—has been largely absent from prior research, which has predominantly examined motivational and institutional antecedents while neglecting the capacity prerequisites for behavioral enactment. Resource support (encompassing government support and top management support) as an opportunity-type driver, social responsibility culture (encompassing demonstration leading and propaganda education) as a shared value-based contextual mechanism, and moral emotion as a distinct affective motivator have likewise not been explicitly theorized in preceding MSR behavior studies. The systematic identification of these previously unrecognized factors underscores the value of the MOA framework's tripartite structure in uncovering antecedents that single-dimension theoretical approaches would inevitably overlook.

Second, we validated and strengthened the MOA framework. This qualitative study revealed previously unrecognized aggregate dimensions and second-order themes of drivers by delving into practical experiences of MSR behavior. These proposed variables not only proved to be drivers of MSR behavior, but also by definition are inherently supplementary to the motivation, opportunity, and ability factors. Finally, we responded to the call by Dasí et al. [113], Jiang et al. [114], and Bouwmans et al. [115] to extend the MOA framework, elucidating potential drivers of organizational behavior in megaproject contexts. Although the MOA framework was initially developed to investigate individual behavior, we recognize the benefits of its application at the organizational level. This enriches the breadth and depth of MOA theoretical research. The MOA framework is a flexible and extensible framework that can be adapted to diverse contexts. Although this study was conducted in China, researchers from other countries may also find the framework useful and worthy of further exploration.

6.2. Practical Implications

This paper provides new insights into the drivers of MSR behavior, which will be relevant for researchers interested in the strategic nature of MSR decisions. Given practical management applications, these drivers can be delved into three distinct groups, namely cognitive level, objective conditions, and higher-level management considerations. The cognitive level reflects the three types of social responsibility cognition faced by megaproject management teams. Instrumental motivation highlights the belief that MSR behavior is pursued for its associated benefits. Moral motivation emphasizes the sense of obligation in fulfilling MSR behavior. Regulatory pressure underscores the perception that MSR behavior is mandated by group or governmental constraints, emphasizing compliance with contractual, regulatory, and legal obligations. Determining the predominant cognition holds vital importance as it guides the management team in selecting appropriate management measures. The objective conditions reflect the real-world limitations for partaking subjects

to fulfill MSR behavior, including innovation ability, collaboration ability, and resource support. Addressing these elements should occur in the project's early stages rather than after its initiation. Unlike contract and system management, social responsibility culture is a soft driving force, representing cultural management as a higher-level management. To cultivate MSR culture, megaproject management teams can promote it through propaganda education and demonstration leading. This can be achieved by actively publicizing the importance of MSR through various means such as publicity slogans, lectures, online articles, and free training courses. Additionally, the government or owners can support the creation of industry models and examples of organizations that fulfill their social responsibility. This can be done through communication and sharing experiences, enabling participating organizations to recognize the value of social responsibility and cultivate an MSR culture.

6.3. Limitations and Future Research

This investigation also has its limitations. First, despite the selection of typical megaprojects, the data collected in this study did not cover all types of megaprojects, potentially leaving some underlying drivers undiscovered. Future research can further verify and refine the data structure by incorporating additional coding materials. Second, a qualitative approach was applied as the research methodology for this study. While this approach was considered appropriate due to the low level of research maturity in this field, it has the disadvantage of not being able to statistically generalize to a larger population. However, this opens a window of opportunity for future research in order to validate the proposed drivers, their interrelationships, and yield more statistically significant results. Finally, although this study selected Chinese megaprojects as an information-rich empirical setting, the contextual boundaries of the findings should be acknowledged. China provides a suitable context for exploring MSR behavior due to the large number, diversity, complexity, and social significance of its megaproject practices. However, the specific manifestation and relative importance of the identified drivers may vary across different institutional, cultural, regulatory, and market environments. Therefore, this study does not claim that the proposed framework applies identically to all megaproject contexts. Future research could conduct comparative studies across different countries and market systems, such as the European Union and the United States, further refine the identified driver categories, and explore how contextual conditions shape MSR behavior.

Supplementary Materials: The following supporting information can be downloaded at: <https://www.mdpi.com/article/10.3390/buildings16132680/s1>. Table S1: Detailed information on megaproject cases; Table S2: Outline of the semi-structured interview with the experts.

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