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TRUST BETWEEN CONTRACTORS AND OWNERS AND ITS IMPACT ON THE PERCEPTION OF OPEN BOOK POLICY: ESTABLISHING A RESEARCH MODEL FOR FUTURE EMPIRICAL ANALYSIS

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ABSTRACT: Traditional project delivery methods create a zero-sum game, where stakeholders' interests often conflict with the overall project goal. Advanced project delivery methods, such as Integrated Project Delivery (IPD) and Construction Manager at Risk (CMAR), have emerged to address this issue. These methods use the target cost system to align the diverse interests of stakeholders with the overall project goal. Open book policy, in which contractors share cost information with owners, is essential for implementing the target cost system. However, contractors may perceive open book policy negatively, as cost information includes sensitive data like profit margins. Thus, if trust levels between contractors and owners are low, implementing open book policy can become challenging. This study assumes that low trust levels among project participants lead to a negative perception of open book policy, which hinders the adoption of IPD and CMAR. The purpose of this study is to develop a research model investigating the impact of trust on the perception of open book policy. The model consists of three parts: the antecedents of trust, trust, and the perception of open book policy. The perception of open book policy is divided into perceived usefulness and intention to use. Also, trust is classified into calculus-based trust and relational trust. This approach will be useful in identifying which type of trust is more significant in shaping the perception of open book policy. Furthermore, by incorporating the antecedents of trust, the model can provide practical insights into how trust can be fostered and contribute to the adoption of IPD and CMAR. This paper forms the theoretical foundation for an ongoing study that will collect survey data from contractors in South Korea and test the proposed model using structural equation modeling.

1. INTRODUCTION

The construction industry has long suffered from low productivity (Hasan et al. 2018). One primary cause of low productivity is inefficient project delivery methods (Ibrahim et al. 2020). Traditional delivery methods, such as Design-Bid-Build (DBB), are based on highly fragmented and adversarial contracts (Jung et al. 2012). In such systems, each stakeholder prioritizes their interests, making them vulnerable to disputes (Matthews and Howell 2005). These stakeholders focus on protecting their interests and shifting risks onto others rather than collaborating (Ibrahim et al. 2020; Jung et al. 2012). Consequently, traditional delivery methods result in zero-sum games.

Advanced project delivery methods such as Integrated Project Delivery (IPD) and Construction Manager at Risk (CMAR) have emerged to address these issues. To align the diverse interests of project participants, IPD employs the target cost system, and CMAR employs the guaranteed maximum price (GMP). In the target cost system, a target cost is set at the early stage of a project, and any cost savings or overruns are shared among the contracting parties (Wondimu et al. 2020). Through the shared risk and reward approach, the project participants' interests align with the overall project goal. GMP is a similar concept, however, in GMP, a contractor is solely responsible for any cost overruns. Therefore, the target cost system is a broader concept that includes GMP (Chan et al. 2010).

Open book policy, where contractors share cost information with owners, is essential for implementing target costing because it enables owners to assess cost savings or overruns. However, the current perception of open book policy in the construction industry is negative. Open book policy makes contractors vulnerable to owners' opportunistic behavior (Agndal and Nilsson 2010; Caglio 2018; Fehr and Rocha 2018). For example, owners may pressure contractors to lower their profit margins utilizing the disclosed cost information (Kajüter and Kulmala 2005; Möller et al. 2011; Windolph and Moeller 2012). Also, contractors may be concerned that revealing their cost information could lead to disadvantages in future project bidding. In the absence of trust, contractors may feel that owners are closely monitoring their cost performance. Thus, contractors who do not trust owners may be unwilling to disclose cost information.

Unfortunately, the construction industry is infamous for its adversarial culture and low levels of trust (Iyiola and Rjoub, 2020; Lu et al. 2016). Low trust levels can negatively impact the perception of open book policy (Kulmala 2004). Many researchers have referred to trust as a key factor for the successful open book policy (e.g., Fehr and Rocha 2018; Kajüter and Kulmala 2005; Windolph and Moeller 2012). For contractors to disclose cost information without reluctance, they must trust that owners will not misuse it. Kajüter and Kulmala (2005) called this "threshold of trust" for open book policy. Without this threshold of trust, contractors may perceive open book policy negatively. Then, the target cost system cannot be implemented, hindering the adoption of advanced project delivery methods such as IPD and CMAR. The core problem statement is as follows: Low trust levels in the construction industry negatively impact the perception of open book policy, ultimately hindering the adoption of IPD and CMAR (Figure 1).

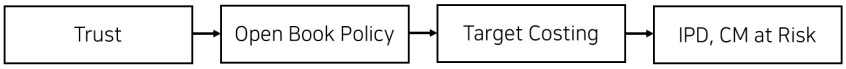

Figure 1. Logical flow of the study

Although many studies have highlighted trust as a prerequisite for the successful open book policy, little empirical research has examined how trust influences the perception of open book policy (Fehr and Rocha 2018). Moreover, research on open book policy has primarily focused on supply chains and supplier-buyer relationships (e.g., Agndal and Nilsson 2024; Liu et al. 2023; Windolph and Moeller 2012). Therefore, the relationship between trust and the perception of open book policy in the construction industry remains largely unexplored. This study hypothesizes that a contractor with higher trust in an owner is more likely to perceive open book policy with the owner favorably. The primary objective of this study is to develop a research model for forthcoming empirical testing. Future research will collect survey data from contractors in South Korea and use structural equation modeling to analyze the proposed model. The next section presents an in-depth literature review on trust and open book policy. Based on this review, the research model linking trust to the perception of open book policy is introduced in the following section. Lastly, the key findings, the future research plan, and the expected contributions are discussed.

2. LITERATURE REVIEW

2.1 Trust

Trust has been studied across various fields, including sociology, psychology, and economics. Sociologists have mainly focused on trust in social relationships based on Social Exchange Theory (SET) (Cropanzano et al. 2017). In contrast, economists have concentrated on the economic and calculative aspects of trust, grounded in Transaction Cost Economics (TCE) and Game Theory (McMackin et al. 2022; Poppo et al.

2016). Psychologists have studied the cognitive and emotional aspects of trust between the trustor and trustee (e.g., Bormann et al. 2025; Hancock et al. 2023). Thus, trust is a multi-dimensional concept with various theoretical perspectives.

Accordingly, various definitions of trust have been proposed (Seppänen et al. 2007). Among these, many scholars have associated trust with risk (Rousseau et al. 1998). Risk arises from the possibility that other parties may act opportunistically. Every relationship inherently involves risk. Engaging in a relationship means accepting that risk. Trust is one of the motivations for accepting the risk inherent in a relationship (Chow et al. 2012). Rousseau et al. (1998) agreed that there are diverse definitions of trust, but at the same time, argued that "willingness to be vulnerable" captures its essence. In this context, "being vulnerable" means accepting the risk. They integrated research from multiple fields and defined trust as follows: “Trust is a psychological state comprising the intention to accept vulnerability based upon positive expectations of the intentions or behavior of another.” This definition is now the most widely accepted in academia.

Rousseau et al. (1998) classified trust into calculus-based trust and relational trust. Calculus-based trust is an economic form of trust grounded in Transaction Cost Economics (TCE), whereas relational trust is a sociological form of trust based on Social Exchange Theory (SET). This classification allows for a comprehensive consideration of the economic and sociological aspects of trust (Khalid and Ali 2017; Yan and Zhang 2020). Additionally, it provides a framework for explaining nearly all business relationships in terms of trust (Poppo et al. 2016).

Calculus-based trust is built on rational choice (Rousseau et al. 1998). According to TCE, individuals and organizations seek to make decisions that minimize transaction costs. Transaction costs arise from the possibility that other parties may act opportunistically (Connelly et al. 2018). A major tenet of TCE is that firms should assume that the other party can act opportunistically and establish appropriate safeguards against opportunistic behavior (Khalid and Ali 2017). When sufficient safeguards are established and the other party’s cost of opportunistic behavior outweighs the benefit— meaning it aligns with the other party’s self-interest to act in a trustworthy manner—the likelihood of opportunistic behavior decreases. This situation is called "lack of opportunistic behavior” (Young-Ybarra and Wiersema 1999). Trust formed in this context is calculus-based trust. The core of calculus-based trust is a cost-benefit analysis of opportunism.

In contrast, relational trust develops from repeated interactions (Rousseau et al. 1998). Relational trust is not based on rational calculations but on the quality of a relationship. One of the most important principles of SET is that trust develops over time if the rule of reciprocity is followed in a relationship (Ahmad et al. 2023). Reciprocity refers to the practice of returning favors or support. Repeated reciprocal interactions create emotional bonds. Thus, relational trust involves emotions (Rousseau et al. 1998). For this reason, relational trust is also called affective trust (McAllister 1995). When relational trust is formed, shared values and norms of cooperation are developed between partners (Poppo et al. 2016). Even if a relationship begins as a simple exchange, relational trust develops as reliable and dependable interactions accumulate, gradually expanding the scope of exchanged resources (Yan and Zhang 2020). For example, individuals begin to exchange personal care and concern and share additional information beyond what the contract requires. Then, a psychological identity of "we" rather than "you and me" is formed, leading the individuals to think, feel, and respond like the other party (Rousseau et al. 1998). Moreover, the individuals can predict how the other party will act based on their preferences and priorities (Poppo et al. 2016). For this reason, relational trust is also called identification-based trust (Saparito et al. 2004).

Table 1 summarizes the two types of trust. Calculus-based trust results from a “forward-looking decision rule” that calculates the likelihood of other parties’ opportunistic behavior (Poppo et al. 2016). Calculus-based trust emphasizes risk minimization, reflecting its rational and calculative aspects (Jiang et al. 2016). In contrast, relational trust is anchored in past interactions. Relational trust is heuristic and emotional, as it is based on the quality of a relationship (Poppo et al. 2016). Although these two types of trust follow different logic and principles, they can coexist to varying degrees (Rousseau et al. 1998).

Trust in the construction industry began to be actively studied in the 2000s. Traditionally, the construction industry has relied on contractual governance based on formal contracts (Li et al. 2018). Contractual governance is primarily sustained by fear and power and cannot consider all contingencies in construction

projects (Chow et al. 2012; Zhang et al. 2021). Consequently, since the 2000s, many construction management experts have begun to recognize the importance of relational governance based on trust (e.g., Laan et al. 2012; Pinto et al. 2009; Wong and Cheung 2005). Specifically, inter-organizational trust fosters collaborative atmospheres and improves project performance (Yan and Zhang 2020; Wang et al. 2021). Trust serves as a lubricant for cooperation between stakeholders with conflicting interests (Zhang et al. 2021). Trust also facilitates negotiations between organizations, suppresses opportunism and disputes, and ultimately reduces transaction costs (Li et al. 2018). Through these mechanisms, trust can enhance project productivity and drive innovation across the industry (Jiang et al. 2016).

Despite its numerous advantages, trust remains mere lip service in the construction industry (Chow et al. 2012; Iyiola and Rjoub, 2020). The construction industry has two significant characteristics. First, stakeholders in construction projects have diverse interests. Second, project participants mainly establish short-term, project-based relationships rather than long-term ones. These two characteristics hinder the formation of trust (Laan et al. 2011; Wu et al. 2017). The lack of trust makes the industry vulnerable to opportunism and disputes (Li et al. 2018). Increased opportunism and disputes, in turn, hinder the formation of trust, creating a self-reinforcing cycle (Lu et al. 2016).

Table 1: Calculus-based trust and relational trust

	Calculus-based trust	Relational trust
Theory	Transaction Cost Economics	Social Exchange Theory
Orientation	Forward-looking decision rule	Anchored in past interactions
Characteristics	Rational and calculative	Heuristic and emotional

2.2 Open book policy

Open book policy is the process of sharing (originally confidential) cost-related information among stakeholders in a supply chain or project (Fehr and Rocha 2018). In the construction industry, the open book typically refers to the contractual right of owners to review and audit contractors' cost information (AIA 2007). Open book policy exists in various forms, depending on the type of information disclosed and the timing of disclosure. While acknowledging the diverse forms of open book policy, Caglio (2018) highlights two essential elements: (1) the disclosure of cost-related information and (2) regular disclosure.

Open book policy emerged in the 1990s in Japan, along with the spread of lean production (Kajuter and Kulmala 2005). In the construction industry, open book policy was introduced with the rise of advanced project delivery methods, such as Integrated Project Delivery (IPD) and Construction Manager at Risk (CMAR). This is because such delivery methods are based on the target cost system which relies on open book policy (Johansen et al. 2021). The target cost system is a contractual method in which a target cost is set at the early stage of a project, and upon project completion, the cost savings (reward) or cost overruns (risk) are shared among the stakeholders based on a predetermined ratio (Wondimu et al. 2020). The shared reward and risk align the diverse interests of stakeholders with the overall project goal, offering a win-win scenario (Rodrigues and Lindhard 2023). It contrasts with traditional project delivery methods, such as Design-Bid-Build (DBB), which create a zero-sum game. When interests are aligned, opportunism and disputes decrease, and project performance improves (Shehadeh et al. 2022). Another key purpose of target costing is efficient cost management. In traditional value engineering processes, budgeting is conducted after the design stage, followed by repeated cycles of feedback and redesigns, which inevitably increase costs and time. In contrast, within the target cost system, a target cost is set at the early stage of a project, and immediate feedback is provided throughout all phases based on the target cost (AIA 2007). This approach enables the target cost system to maximize cost reduction. The effectiveness of target costing has been demonstrated in numerous studies (Rodrigues and Linhard 2023).

Open book policy is essential for achieving the primary purposes of target costing (shared risk and reward and efficient cost management) (Johansen et al. 2020; Windolph and Moeller 2012). First, the open book enables owners to assess cost savings or overruns. Second, it allows project participants to track cost flows in real time and actively engage in cost management (Mouritsen et al. 2001). Project participants can collaborate to identify additional potentials for cost reduction (Engebø et al. 2021; Rodrigues and Linhard

2023). In summary, advanced project delivery methods such as IPD and CMAR are based on target costing, in which open book policy is indispensable.

However, contractors may perceive open book policy negatively. Cost information is confidential and sensitive for contractors, as it contains their performance and profit margins (Kajüter and Kulmala 2005). Thus, open book policy makes contractors who disclose cost information vulnerable to owners' opportunistic behavior (Fehr and Rocha 2018). For example, owners can pressure contractors to lower their profit margins based on disclosed cost information (Windolph and Moeller 2012). Also, owners can exploit contractors' cost information to gain an advantage in negotiations (Agndal and Nilsson 2010). Contractors may feel as though they are being monitored and compelled to improve their cost performance (Caglio 2018). For these reasons, contractors can be unwilling to share cost information with owners.

3. MODEL ESTABLISHMENT

3.1 Research model

The proposed model consists of three parts: the antecedents of trust, trust, and the perception of open book policy (Figure 2). First, the perception of open book policy includes perceived usefulness and intention to use. According to the Technology Acceptance Model (TAM), these two variables play crucial roles in the adoption of new technologies (or policies) (Eraslan Yalcin and Kutlu 2019). Perceived usefulness is defined as "the degree to which a person believes that using a particular system would enhance his or her job performance" (Davis 1989). Unlike perceived ease of use, another key variable of TAM, perceived usefulness is considered "stable and predictive of user acceptance" even for policies that have not yet been implemented (Davis and Granić 2024). Since open book policy has not been widely adopted in South Korea, this study incorporates perceived usefulness into the model instead of perceived ease of use. Intention to use is the degree of a project participant's willingness to adopt a system. Intention to use was included in the model because it directly influences actual system use (Davis and Granić 2024).

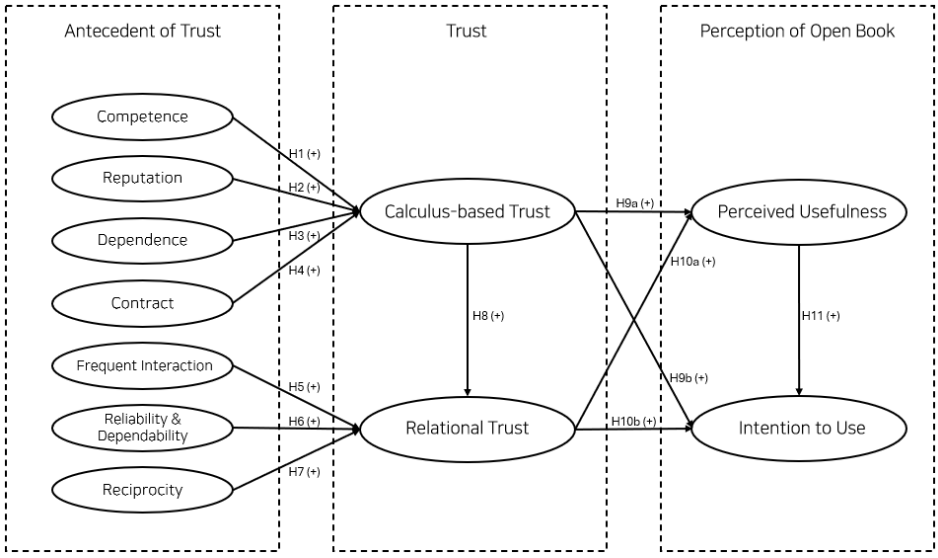

Figure 2. Research model

Trust is classified into calculus-based trust and relational trust. Organizations in construction projects mainly establish short-term, project-based relationships (Li et al. 2018). While some organizations have prior experience working together, others do not. In cases where organizations collaborate for the first time, the trust formed between them is likely to be calculus-based trust (Yan and Zhang 2020). On the other hand, some companies maintain amicable, long-term relationships (Chow et al. 2012). In such cases, relational trust also exists between them. By distinguishing these two types of trust, this study aims to identify which type has a greater impact on the perception of open book policy. Lastly, the antecedents of trust are the

factors that contribute to trust formation. Based on the literature review, this study identifies four antecedents for calculus-based trust and three for relational trust. Beyond analyzing the relationship between trust and the perception of open book policy, this approach can provide more specific and practical recommendations for trust-building mechanisms in the construction industry.

3.2 Hypotheses

3.2.1 Antecedents of trust

There are four antecedents of calculus-based trust: competence, reputation, dependence, and contract. The first antecedent is competence, which refers to the owners' ability to pay construction costs on time and make the right project-related decisions (Jiang et al. 2016). Many researchers have identified competence as a critical antecedent of trust (e.g., Jiang et al. 2016; Yan and Zhang 2020; Wong and Cheung 2005). Owners with greater competence are less likely to engage in opportunistic behavior. Williamson (1993) referred to this phenomenon as the professional sanction. For example, doctors and lawyers are considered highly trustworthy based on their high competence. This trust allows them to earn substantial incomes. From their perspective, long-term benefits from their competence—specifically, their certification and licensing—far outweigh any short-term gains from opportunistic behavior. Engaging in opportunistic behaviors could disqualify their certification or licensing, incurring enormous costs (the professional sanction). Likewise, contractors are likely to have a high level of calculus-based trust in owners with high competence (Jiang et al. 2016).

The second antecedent is reputation. Owners with a strong reputation are less likely to engage in opportunistic behavior. This phenomenon is known as the reputation effect. Williamson (1993) illustrated the reputation effect through the case of Jewish diamond dealers in New York. In the Jewish community of New York, diamond dealers historically closed deals solely with a handshake, without any formal contracts. Williamson (1993) explained that opportunistic behavior was suppressed because a tarnished reputation would lead to social exclusion within the small community, making it impossible for the dealer to engage in future diamond trades. In other words, reputation fostered calculus-based trust, enabling transactions to be completed solely with a handshake. Indeed, many studies have confirmed that reputation is a key antecedent of calculus-based trust (e.g., Jiang et al. 2016; Saparito et al. 2004; Yan et al. 2020).

The third antecedent is dependence. An owner dependent on a contractor is less likely to engage in opportunistic behavior toward the contractor. This phenomenon is known as the lock-in effect (Shi et al. 2018). When an owner depends on a contractor, replacing that contractor incurs substantial switching costs (or conversion costs) for the owner (Luo and Chen 2023). Due to these switching costs, the owner becomes locked in with the contractor, making it difficult for the owner to act opportunistically. This lack of opportunistic behavior can be a foundation of contractors' calculus-based trust in owners (Young-Ybarra and Wiersema 1999).

The fourth antecedent is contract. Contracts can provide a foundation for calculus-based trust by increasing the costs of opportunistic behavior and ensuring rewards for cooperation (Lui and Ngo 2004). Sophisticated contracts reduce transaction ambiguity and decrease the likelihood of opportunistic behavior (Lui and Ngo 2004; Shi et al. 2018). Thus, by establishing appropriate regulations, contracts can help stakeholders participate in transactions with confidence (Williamson 1993). This mechanism is known as the contractual safeguard or contractual governance (Li et al. 2018; Yan and Zhang 2020). In the construction industry, the contractual safeguard is a crucial foundation for calculus-based trust (Jiang et al. 2016). In summary, four hypotheses can be stated as follows:

H1: The competence of an owner is positively associated with a contractor's calculus-based trust in the owner.

H2: An owner's reputation is positively associated with a contractor's calculus-based trust in the owner.

H3: The dependence of an owner on a contractor is positively associated with the contractor's calculus-based trust in the owner.

H4: The complexity of a contract is positively associated with a contractor's calculus-based trust in an owner.

There are three antecedents of relational trust: frequent interaction, reliability and dependability, and reciprocity. Relational trust develops from repeated interactions. Therefore, more frequent interactions increase the likelihood of developing relational trust (McAllister 1995). In addition to frequency, interactions must be reliable and dependable to build relational trust (McAllister 1995; Zhang et al. 2021). Lastly, reciprocity plays a crucial role in the formation of relational trust. Reciprocity refers to the practice of returning favors or support. One of the most important principles of Social Exchange Theory (SET) is that trust develops over time if the rule of reciprocity is followed in a relationship (Ahmad et al. 2023). Exchanges begin with an altruistic act that carries a small risk, and when the other party responds reciprocally, a new round of exchanges begins. Reciprocal responses lead to further reciprocal interactions, creating a continuous cycle of reciprocity (Cropanzano et al. 2017). In SET, relational trust is the result of reciprocal cycles. Accordingly, the following hypotheses are formulated:

H5: Interaction frequency with an owner is positively associated with a contractor's relational trust in the owner.

H6: Reliability and dependability of an owner are positively associated with a contractor's relational trust in the owner.

H7: An owner's reciprocity is positively associated with a contractor's relational trust in the owner.

A certain level of calculus-based trust is necessary for the development of relational trust (McAllister 1995). Relational trust does not exist between organizations collaborating for the first time. In such cases, a basic level of calculus-based trust is required for the organization to accept the risks involved in the relationship (Yan and Zhang 2020). In other words, calculus-based trust serves as a foundation for relational trust. For example, sophisticated contracts foster an environment conducive to relational trust by establishing calculus-based trust first (Zhang et al. 2021). Jiang et al. (2016) showed that a contractor's calculus-based trust in an owner positively influences relational trust. Therefore, the relationship between calculus-based trust and relational trust can be hypothesized as follows:

H8: Calculus-based trust is positively associated with relational trust.

3.2.2 Trust and the perception of open book policy

Trust serves as a safeguard against opportunistic behavior (Chow et al. 2012; Lu et al. 2016). Contractors who trust owners can disclose cost information without fear of misuse (Kajüter and Kulmala 2005). Here, trust includes both relational and calculus-based trust (Möller et al. 2011). Since calculus-based trust is built on safeguards such as sophisticated contracts, it is self-evident that it can suppress opportunistic behavior arising from open book policy. Thus, calculus-based trust can improve the perception of open book policy. Windolph and Moeller (2012) argue that relational trust can also serve as a safeguard in the context of open book policy. Numerous studies support this view, showing that relational trust can suppress opportunistic behavior (e.g., Lu et al. 2016; Luo and Chen 2023). Consequently, open book policy is likely to be perceived more favorably in relationships with high relational trust. Based on the above discussion, the following hypotheses are proposed:

H9a: Calculus-based trust is positively associated with the perceived usefulness of open book policy.

H9b: Calculus-based trust is positively associated with the intention to use open book policy.

H10a: Relational trust is positively associated with the perceived usefulness of open book policy.

H10b: Relational trust is positively associated with the intention to use open book policy.

In the Technology Acceptance Model, intention to use is a key predictor of actual system use, and perceived usefulness plays a central role in shaping this intention (Davis et al. 1989). This relationship has been validated across various research contexts (e.g., Eraslan Yalcin and Kutlu 2019; Teo 2019). Therefore, the last hypothesis can be stated as follows:

H11: The perceived usefulness of open book policy is positively associated with the intention to use open book policy.

4. CONCLUSION

This study begins with the assumption that advanced project delivery methods such as IPD and CMAR are not widely adopted due to the negative perception of open book policy. This negative perception is assumed

to result from a lack of trust between contractors and owners. This study proposes a research model linking trust to the perception of open book policy in the construction industry. Trust is classified into two types—calculus-based trust and relational trust—while the perception of open book policy is divided into perceived usefulness and intention to use. These classifications are expected to enable a more integrative analysis of how trust influences the perception of open book policy. Furthermore, based on a literature review, four antecedents of calculus-based trust and three antecedents of relational trust are identified. By incorporating these antecedents, the proposed model can provide practical insights into how trust can be fostered.

The proposed model will be tested using structural equation modeling in future research. First, a literature review will be conducted to collect survey items, which will then be modified to fit the context of this study. Next, an online survey will be conducted, targeting various boundary spanners of contractors in South Korea. Boundary spanners are individuals who actively interact and communicate with other parties. Since this survey aims to measure respondents' trust in owners and their perception of open book policy, respondents must be boundary spanners. If respondents are not boundary spanners, for example, they may have little interest in the consequences of open book policy. After the survey, the collected data will be analyzed using structural equation modeling.

The questionnaire consists of five sections: (1) respondent information, (2) owner information, (3) antecedents of trust, (4) trust, and (5) perception of open book policy. The survey respondents will be asked to answer based on a specific project in which they interacted and communicated most actively with an owner. Accordingly, the unit of analysis is as follows: (1) the extent to which a respondent trusted an owner in a specific project, and (2) the respondent's perception of open book policy with the owner. In other words, the antecedents of trust and trust are measured based on a past project, and the perception of open book policy is measured in the context of a future project.

Future research will quantitatively examine the impact of trust on the perception of open book policy. By distinguishing between calculus-based trust and relational trust, the study will identify which type of trust is more significant in shaping the perception of open book policy. Furthermore, by examining the antecedents of trust, the study can help develop strategies to enhance trust levels in the construction industry, fostering the positive perception of open book policy. Ultimately, this will contribute to the broader adoption of advanced project delivery methods, such as Integrated Project Delivery and Construction Manager at Risk, within the construction industry.

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