Fostering Trust and Commitment in Complex Project Networks through Dedicated Investment in Partnership Management

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Abstract: An absence of trust among partners can magnify the risk in a complex project by increasing behavioural uncertainty. Partnership trust can effectively substitute for control, reducing variability of outcomes and increasing value-adding strategic collaboration. It is introduced as strategic countermeasures against risks associated with project complexity that can only be achieved with commitment from all partners. This research conceptualises partnership trust on four dimensions and investigates the roles of dedicated investment and information sharing in partnership trust–commitment. The complexity of trust management is further highlighted in an exploration of the importance of the exchange relationship environment.

Keywords: project complexity; risk management; dedicated investment; information sharing; partnership trust; partnership commitment

1. Introduction

Owing to their very nature, complex global projects—infrastructure projects such as toll roads or multimillion-dollar technology projects such as the installation and implementation of enterprise-wide IT systems—require input from various groups both within and outside the sponsoring organisation. Effective coordination of partner firms’ contributions is critical to project performance [1]. Managing these groups requires complex risk management approaches in multiple dimensions, including capacity management [2,3], network structure management [4–6], vulnerability management [7–9], and supply chain management [10,11]. Supplier networks are particularly critical, because supply partners for global projects typically extend abroad, making them vulnerable to ripple effects from local disruptions that can be long-lasting and expensive [12]. Local instability can trigger and amplify vulnerability across the supply chain, resulting in significant disruption of the whole network [13]. Managing this risk requires a coordinated contingency policy and disruption recovery plan [9,14]. That plan must be built upon trust and commitment among partners in the supply network.

Trust must be the foundation; commitment follows from trust. Project managers should invest resources and time in building trust to ensure that partners are willing and available when their capabilities are needed. A low-trust partnership will require more time and energy to sustain than a high-trust relationship, and ultimately will impair performance [15]. Although many researchers have extensively explored the positive role of dedicated investment in fostering high-trust partnerships [16–18], few provide strategic guidelines for investment decisions to build trust and
commitment in various partnership structures. What is needed, by practitioners and researchers alike, is an in-depth analysis of the role that investment-based strategic management plays in building trust and commitment. This study contributes to the literature on global supply chain operation management by empirically exploring the role of dedicated investments in information sharing and trust development.

This study addresses that gap from an integrated perspective that considers transaction cost economics and social exchange theory. The study seeks to identify partnership-driven investment strategies to enhance trust and manage partner commitments in complex global projects. After a framework for strategic management of trust and commitment was developed from the literature, the framework was tested via a structural equation modelling analysis of data collected from a survey of supply chain managers. The analysis found a positive relationship between trust and commitment and dedicated investment, and revealed an asymmetry in partners’ perspectives on dedicated investment and its influence on trust. The environment of the exchange relationship provides notable context for the variability in trust, supporting strategic guidelines for fostering trust through investment.

2. Theoretical Background

The partnership commitment needed to sustain a complex global project is built on mutual trust. Partnership commitment is defined as a firm’s willingness to invest in financial, physical, or relationship-based assets to strengthen or sustain a partnership based on the belief that the partnership is worth maintaining [15,19]. Commitment-based partnerships deliver unique economic benefits compared to transaction-based partnerships [20,21]; however, they cannot be achieved without sacrifice by all partners to create and sustain the commitment. One such sacrifice is a dedicated investment in resources to support the relationship with the partner firm and enhance the collaboration [16]. This study aims to examine how dedicated investment affects information sharing, partnership trust, and commitment. Unlike previous studies, which treated trust as a general outcome of a collaboration rather than a key operational capability or only considered a contractor’s investment in project performance [22,23], this investigation conceptualises the role of trust in global project vulnerability management, operationalises trust as four sub-constructs, and reveals a varying relationship between dedicated investment and the development of trust and commitment.

2.1. Complex Projects’ Vulnerability to Disruption

Large, complex projects with globally dispersed contributors are riskier than simpler projects because they are more complex and engage with more sources of risk (Figure 1). Managing that complexity is a key element in any large project’s success [24]. Complexity makes decision-making for these projects an information-intensive process [25]; a project’s success depends heavily on decisions made collaboratively by multiple partners who may or may not have close relationships [25], creating behavioural uncertainty and consequently complexity [26]. Trust and mutual agreement can ease knowledge sharing and help support consensus around complex decisions, although large complex projects with international supply networks may still struggle to achieve their goals on schedule [27].

One of the distinguishing characteristics of complex projects is the level and complexity of risks they face. Risks can be classified as emerging from technical, economic, social, political, or environmental factors [28]. Risks in different categories may be interrelated, creating more complexity in the project and in the risk management approaches required. Specific characteristics of complex projects can further elevate risk, including their large scale, need for technology integration, the involvement of large numbers of partners, cross-border implementation, high costs, and high levels of public and political attention [29]. Finally, the multinational, multilayered nature of complex projects can create a lack of visibility and consequent misalignment among project partners [30], both creating complexity as a first-order consequence but also undermining trust, which leads to more risk and higher complexity further on in the project.
Well-developed relationships among project partners and suppliers can mitigate these risks. Where a defined communication network and a carefully developed supplier relationship management program exist, suppliers and lead firms can anticipate each other’s behaviour and likely outcomes [31]. When disruptions do occur, suppliers who have strong working relationships with the lead firm will be more willing and able to alter schedules and budgets to accommodate the project’s changing needs [32]. On the other hand, an immature buyer–supplier relationship in which the partners’ orientations are unclear will not support this level of collaboration; information and resource sharing, goal congruence, decision synchronisation, incentive alignment, communication, and joint knowledge creation will all lag in this context, leading to delays and suboptimal outcomes [33,34].

Project complexity, and the consequent vulnerability to disruption, determine the project’s goals. Simpler projects operating in a simpler environment can focus on operational goals such as cost reduction, timeliness, and quality [23,35]. For megaprojects, which must deliver results in a more vulnerable project environment characterised by greater complexity and potentially more difficult partner relationships, project managers must strive to achieve higher levels of resilience, clearer strategic alignment, and more powerful value creation mechanisms, in addition to the basic operational goals [36,37]. Achieving these characteristics, and reaching the project’s goals, requires collaborative efforts enabled by a high level of commitment by each party, to the project and to the other partners, manifested by the dedication of resources and development of mutual understanding [38].

2.2. The Importance of Partner Trust in Complex Projects

Complex projects can benefit by developing mutual trust among partners as a basis for strong, resilient partnerships [39]. Trust fosters alignment, which supports shared understanding and sparks
The commitment-driven alliance which complex projects require [19,29]. These characteristics have been identified as important in a variety of contexts, including public–private partnerships (PPP), which are often characterised by conflict and uncertainty [29]; large, complex IT projects [19]; and large construction projects [1]. These studies uniformly recognise that the alignment that fosters trust and commitment can only be achieved through regular interaction among participants and that trust-based alliances can strengthen shared cultural principles, such as a focus on “doing what’s best for the project” [29]. Although developing alignment and building trust can be slow and difficult, increasing trust can raise commitment levels in partnerships [40] and, ultimately, elevate both operational and strategic performance [41].

Partnership trust is defined as the extent to which partners perceive each other as credible, honest, benevolent, and having integrity; the strength of partners’ collective interest in taking risks; and partners’ willingness to rely on each other’s support to resolve issues in a way that produces mutual benefits [23,42–44]. Partnership trust is built on several components. Shared work standards reflect mutual confidence in partners’ competence to provide goods and services that meet project requirements [15]. Perceptions of integrity and honesty capture partners’ mutual confidence in the ethics, accountability, responsibility, truthfulness, and reliability of all partners [45]. Benevolence captures the presence of empathy, kindness, and politeness in business interactions and the extent to which interactions reflect a partner’s ability to see beyond egocentric profit motives [46,47]. Finally, collective interest or goal congruence describes the extent to which each partner believes their own objectives are served by achieving the larger project objective and the extent to which each partner is willing to customise its practices and services to fit a partner’s business needs [34,46]. These factors help to strengthen the core functions of a project team and serve as the cornerstone of partnership management strategies, facilitating information flows and nurturing productive exchange relationships [43]. A high level of trust in a partnership can reduce the risk of business uncertainty related to supply, demand, and logistics [23,48] and maximise the coordination of value creation activities [37]. The result is increased performance, for both the project and the partners (Figure 2).

![Figure 2. Benefit of trust with respect to associated risk and performance uncertainty.](image)

**3. Hypotheses**

To provide that bilateral perspective, this study begins by developing hypotheses around the relationships between trust and its foundation, information sharing, and between trust and its result, commitment. Then, the role of dedicated investment in increasing trust and commitment is explored, from the perspectives of the investing firm and the benefitting firm.
3.1. Information Sharing to Build Trust in a Coopetition Context

Suppliers are often among the most important partners in complex projects, but the conventional supplier management process is not well-adapted to the particular concerns and challenges of complex, large-scale complex projects [49]. This mismatch has real consequences. Poor supplier management in complex projects can lead to increases in costs and delivery times and poor quality outcomes; ultimately, it can undermine the project’s ability to deliver its promised benefits [50]. These projects present unique challenges for supplier management in their coopetitive environment: Project leaders must simultaneously coordinate collaborative value-creating activities and facilitate competition among interconnected suppliers to secure the project outcome [37]. Firms working together in a horizontal structure, or parallel-aligned working environment, cooperate and compete with exchange partners by sharing costs, resources, and knowledge, and collaborating to increase customer value and enhance innovation [51]. In this structure, suppliers join forces to provide products and services neither could support alone; the partnership may be temporary or permanent. This environment creates both opportunities and risks; strong collaboration-based partnerships enable high-quality design and innovation activities [52], but they also bring increased risks [53,54].

Information sharing is a core element in partnership development in this context because it allows partners to deepen mutual understanding and provides context and tools for conflict resolution [40,55]. Typically, information sharing follows one of two strategies: complementary knowledge transfer to support productivity improvements or supplementary knowledge transfer to support flexibility and adaptability [56]. Information sharing supports a variety of collaborative activities, such as forecast improvement, production and delivery synchronisation, and inventory coordination [57]; integration of operational and strategic activities [58]; finance-based performance improvement [59]; service performance improvement [60]; delivery performance improvement [61]; new product development [62]; and coordination in communication, new market development, process design, and risk communication [63]. Conversely, reluctance to share information hinders the trust-building process between trading partners and can lead to increased uncertainty and a mismatch between supply and demand [15].

The extent and effectiveness of information sharing is related to partnership trust. Transferring important knowledge elements through a stable information technology tool can help build social cooperation [64] and mutual trust [65]. Effective information sharing can also improve the depth of partnerships by increasing the lead firm’s understanding of the supplier’s operational needs and capabilities [66]. Moreover, sharing planning information related to inventory, production, and sales can reduce information asymmetries between partners [67]. When the information exchange extends beyond basic operational and financial data to vital strategic information such as strategic goals, the exchanging partners can effectively build an enduring supply chain alliance [68]. Thus, information sharing positively influences partnership trust.

**Hypothesis 1.** Information sharing is positively associated with partnership trust.

3.2. Trust-Driven Partnership Commitment

In the coopetitive environment that characterises most complex projects, a long-term commitment to cooperation has been identified as a key success factor [69,70]. Complex project outcomes are often determined by the strength of temporary coalitions built around trust and collaboration [71]. Morgan and Hunt’s [72] commitment–trust theory provides a perspective on the relationship between trust and commitment, depicting trust as the key to commitment and suggesting that trust and commitment together create a successful exchange relationship by preserving investments, encouraging consideration of long-term benefits, and discouraging opportunistic behaviour. Trust plays an important role in strategic partnerships [73] and is a critical element in fostering commitment, which influences a firm’s willingness to invest in financial, physical, or relationship-based assets [74].
Partnership trust represents a firm’s willingness to be vulnerable to the actions of another firm based on its perceptions of the partner firm’s work standard, integrity, benevolence, and collective interest [44,75,76]. Exchange partners can achieve high levels of confidence in a partnership only when trust arises from both demonstrated competency (technical skills, experience) and integrity (honesty, character) [76]. Trust is central in sustaining project performance because it reduces behavioural uncertainty [19,77–80]. The process of building trust begins at the outset of a project; when a project leader communicates honestly during and after negotiations, suppliers develop trust and become committed to the partnership and to the success of the project [50].

Building and maintaining partnership trust is a complex process built on two necessary conditions: risk-taking behaviour and partner interdependence on each other’s behaviour [81]. When partnership trust is achieved, it can determine suppliers’ willingness to allow project leaders to influence their decisions and actions [23]. In complex projects such as megaprojects, which often involve organisations and individuals who have never worked together, the partnership may be limited to exchanges based on a sense of credibility emerging from a trust-based relationship [82]. As the trust-based relationship grows, partners will tend to believe their partners’ actions will create positive rather than negative outcomes [83,84], increasing their own confidence in and commitment to the project. Consequently, this study hypothesises that trust plays a positive role in partnership commitment.

Hypothesis 2. **Trust is positively associated with partnership commitment.**

### 3.3. Role of Dedicated Investment in Partnership Management

Dedicated investment refers to supplier’s strategic partnership- or asset-specific investments, including capital and labour, to address the needs of a particular buyer [85,86]. According to transaction cost economics (TCE), dedicated investment by suppliers should tend to reduce a buyers’ likelihood of switching between supply partners and therefore strengthen the partnership [87]. Previous studies have confirmed this relationship, finding a positive correlation between transactional and relational attributes of partnerships. For example, Zhou et al. [88] showed that Chinese firms rely on relational ties and customised contracts for complex transactions. Han et al. [89] demonstrated that dedicated investment plays a positive role in governance based on the degree of vertical coordination in the supply chain. Furthermore, dedicated investment can help stabilise partnerships; for instance, sellers who have sustained transactional relationships with buyers at a specific auction website seldom consider switching to alternate auction sites [90].

Although dedicated investment is generally understood to contribute to trust and commitment in a partnership, firms may develop unique perceptions of a partnership’s strength based on their role, as the supplier allocating dedicated investments or the buyer benefitting from them [91]. The issue of perceptual differences between investing and benefitting firms regarding dedicated investment was initially raised by studies that found most firms were inclined to overestimate the degree of control they garnered from dedicated investments [92,93]. Both buying and supplying firms may be optimistic about their partners’ degree of dependence on them. Suppliers may commit additional assets based on overblown assessments of buyers’ switching costs and thus greater dependence on particular suppliers [94]. Buyers, on the other hand, may overestimate suppliers’ dependence on them and underestimate their own reliance on particular suppliers [95]. Understanding these perceptual differences between buyers and suppliers with regard to mutual dependence is vital to understanding the impact of committing relational resources on partnership trust.

Thus, this study analyses dedicated investments separately, by the firm making the investment (partner firm) and the perspective of the other firm in the partnership (the respondent firm). In a partnership involving two firms, firm A and firm B, partner dedicated investment refers to firm A’s perception of the level of investment dedicated to the partnership by firm B. Respondent dedicated investment is firm A’s perception of its own level of investment for the partnership. Similarly, in the analysis from firm B’s perspective, partner dedicated investment is firm B’s perception of Firm
A’s investment, and respondent dedicated investment is firm B’s perception of its own investment. This approach to delineating partner firms’ cooperative behaviour in contribution [96] is helpful because it illuminates the dynamic effect of partner firms’ contributions on the trust development process.

Dedicated investment supports growth in a core element of trust building, information sharing. When dedicated investment in a partnership is high, partnered firms tend to share information with their partners more freely [97]. Specifically, when investments are made in the early stage of the project, participating firms communicate on initial project design processes with high information quality [24]. Because dedicated investment can lead to partners sharing the goal of increasing the value of the dedicated assets, it may also support collaboration in product design and development [98]. Furthermore, a significant investment in information technology capability by one firm can also improve partner firms’ willingness to share information [99]. Dedicated investment, therefore, leads partners to develop a common platform from which information sharing is the best way to realise a common goal. Therefore, the following hypothesis is proposed to investigate potential asymmetries in the role of dedicated investments in building trust.

**Hypothesis 3a/b.** Dedicated investment by (a) a partner firm or (b) a respondent firm is positively associated with information sharing.

Dedicated investment, as a relationship-building tactic, ensures value creation in both asymmetric buyer-seller relationships and interorganisational projects, fostering a cooperative partnership [16,100]. However, partners’ perceptions of dedicated assets and mutual dimension may vary on a number of dimensions. Buyers overestimate suppliers’ dependence on them and underestimate their own dependence on suppliers [95]; in addition, (i) suppliers assess buyers’ dependence much higher than buyers assess their own dependence, and (ii) buyer and supplier perceptions of supplier dependence differ [101]. Given this difference, the perceived dedicated investment—the nature and value of the resources each firm thinks it and its partner have dedicated—is unique for each partner. Thus, whilst a partner dedicated investment has been generally assumed to lead to positive relational outcomes, the role of the respondent dedicated investment on partnership trust is unclear.

**Hypothesis 4a/b.** Dedicated investment by (a) a partner firm or (b) a respondent firm is positively associated with partnership trust.

From a risk management perspective, dedicated investment comes at a cost for suppliers because it leaves them vulnerable to opportunistic behaviour by the buying firm: buyers could decide to take advantage of a supplier’s dedicated investment by demanding a pricing advantage [85]. Dedicated investment is similarly risky for buying firms, which may face risks such as increased vulnerability to supplier disruption, lack of leverage against them to seek a greater portion of revenue-sharing profit, and increased strategic inflexibility due to supplier irreplaceability [9]. Furthermore, assuming that a supplier’s investment is permanent may lead a buyer to allow itself to become dependent on the supplier and find itself with a limited set alternative suppliers in a crisis [85]. Nevertheless, dedicated investment has been empirically associated with superior performance in buyer-supplier relationships [102]. Because dedicated investment is tailored to a specific relationship with a particular business partner, it can mitigate dissatisfaction and help sustain the partnership [89,103]. Accordingly, dedicated investment is hypothesised to have a positive association with partnership commitment.

**Hypothesis 5a/b.** Dedicated investment by (a) a partner firm or (b) a respondent firm is positively associated with partnership commitment.
4. Research Methodology

Measurement instruments and constructs were generated from the literature review (Appendix A). Structural equation modelling was used to test the measurement and structural model and empirically investigate the proposed model. Such quantitative examination enables the testing of constructed theories and produces precise, numerical data for interpretation [104].

4.1. Sampling and Data Collection

The proposed models were tested using data provided by the members of a nationwide marketing organisation whose membership includes the largest panel of supply chain professionals available. Firstly, a cross-sectional list was created containing approximately 1600 professionals with more than three years of experience in partnership management in South Korea. Individuals on that list were invited to participate in the study. Three screening questions were used to identify appropriate candidates from among the initial respondents: (1) Have you been involved in product or service management for your firm? (2) Can you identify a single international partner firm that either supplied or bought your firm’s product/service? (3) Did you participate in collaborative work for value-creating activities with that partner firm? Respondents whose answers to the screening questions indicated they did not have sufficient experience or knowledge of supply chain processes or partnership development were removed from the study. The remaining respondents were asked to complete the online survey. This process resulted in 472 valid results (29.6% response rate).

The resulting data were grouped into three independent samples: parallel-working firms, buying firms, and supplier firms. Grouping was determined by responses to a survey item asking the respondent to indicate which in which category the relationship with the partner firm was: Structure A: “Our firm and the partner firm produce and supply products and/or services together to the key customer” (parallel-working firm in a horizontal structure); Structure B: “Our firm delivers the production and/or service to the key customer using the partner firm’s supply” (buying firm in a vertical structure); or Structure C: “Our firm provide parts and services to the partner firm who produce and supply the final production and/or service to the key customer” (supplier firm in a vertical structure).

4.2. Initial Sample Analysis

Table 1 shows the distribution of respondent’s demographic information. The risk of common method bias was reduced through an a priori approach by using well-defined constructs adapted from previous studies and avoiding biased language [105]. Then, a Chi-squared test was conducted to check non-response bias between early (first 75%) and late (last 25%) respondents by five demographic categories (gender, age, position, years of experience, industry) [106,107]. This analysis found no significant differences in the effects between the two groups at the 0.1 significance level, indicating that the potential for non-response bias is not a serious concern.

| Measure   | Categories | N  | %    |
|-----------|------------|----|------|
| Gender    | Male       | 275| 58.26|
|           | Female     | 197| 41.74|
| Age       | Less than 30| 263| 55.72|
|           | 31–40      | 153| 32.42|
|           | Older than 40| 56 | 11.86|
| Position  | Analyst    | 49 | 10.38|
|           | Senior Analyst | 134| 28.39|
|           | Manager    | 150| 31.78|
|           | Division Manager | 69 | 14.62|
|           | Executive  | 70 | 14.83|
Table 1. Cont.

| Measure            | Categories     | N  | %     |
|--------------------|----------------|----|-------|
| Years of experience|                |    |       |
| Less than 5 years  | 117            |    | 24.79 |
| 5–9 years          | 219            |    | 46.4  |
| 10–14 years        | 105            |    | 22.25 |
| 15–19 years        | 23             |    | 4.87  |
| More than 20 years | 8              |    | 1.69  |
| Industry           |                |    |       |
| Manufacturing      | 173            |    | 36.65 |
| Construction       | 51             |    | 10.81 |
| Wholesale Trade    | 36             |    | 7.63  |
| Scientific and Technical Services | 32 |    | 6.78  |
| Other Services     | 180            |    | 38.13 |
| Firm type          |                |    |       |
| Parallel-working firm | 177        |    | 37.50 |
| Buying firm        | 191            |    | 40.47 |
| Supplying firm     | 104            |    | 22.03 |

4.3. Data Analysis Methods

Structural equation modelling was used to examine the measurement and the hypothesised model. Confirmatory factor analysis (CFA) was used to confirm unidimensionality, convergent validity, reliability, and discriminant validity. We examined three model fit indices to evaluate the unidimensionality of each measurement construct: normed Chi-squared ($\chi^2$), comparative fit index (CFI), and Tucker–Lewis index (TLI). Root mean square error of approximation (RMSEA) was used for model assessment. Goodness of fit was determined using accepted thresholds for statistical values: normed-$\chi^2$ less than 3.0, CFI greater than 0.70, TLI greater than 0.90, and RMSEA less than 0.10 [108]. Convergence of measurement indicators related to latent variables were examined using average variance extracted (AVE) indices; reliability was estimated from composite reliability (CR) to assess internal consistency and reliability, and finally, discriminant validity was tested based on cross-loadings of the indicators using the Fornell–Larcker criterion [109]. To ensure the normality assumption, the Mardia skewness and kurtosis for multivariate normality test were observed for non-normality with $p$-value at 0.05 [20]. Then, a structural model was tested to observe the significance of direct relationships among latent variables.

5. Results

In the following sections, the results of structural equation modelling analyses are reported and discussed and post-hoc analysis of the relationship between dedicated investment and trust subconstructs is investigated.

5.1. Measurement Model and Discriminant Validity

The trust construct was conceptualised as a second-order model with four dimensions: work standard (WOS), integrity (INT), benevolence (BEN), and collective interest (COI). Structural equation modelling was used to determine whether a higher-order factor model is appropriate for measuring trust. The fit statistics for the second-order model (Figure 3a) were $\chi^2/df = 1.595$, CFI = 0.99, TLI = 0.99, and RMSEA = 0.04; the statistics for the first-order model (Figure 3b) were $\chi^2/df = 1.801$, CFI = 0.99, TLI = 0.99, and RMSEA = 0.04. The target coefficient, the ratio of the two different $\chi^2$ values, was calculated to identify the percentage variation in first-order factors that can be explained by a higher-order model [110]. The variation was found to be 98.8%, which exceeds the accepted threshold value of 0.80 [111], providing evidence of a higher-order partnership trust construct.
were greater than the correlation values below the diagonal. All correlations (0.594 to 0.822) were also adequate (0.721 to 0.963), indicating strong convergent validity of the measurement constructs related to specific sustainabilities.

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Figure 3. Measurement model of partnership trust: (a) first-order model (b) second-order model.

The instrument assessment results (Table 2) confirm the statistical significance of all loadings (0.721 to 0.963), indicating strong convergent validity of the measurement constructs related to specific latent constructs. The CR of the latent constructs (0.813 to 0.948) and first-order constructs (0.760 to 0.889) demonstrated an acceptable reliability range (>0.7) [112]; the AVE estimates for the constructs (0.594 to 0.822) were also adequate (> 0.50) [113]. The model fit was found to be adequate ($\chi^2$/df = 2.328, $p < 0.001$, CFI = 0.97, TLI = 0.96, and RMSEA = 0.05).

Table 2. The discriminant measures.

| Constructs                      | Mean (SD) | $\zeta_1$ | $\zeta_2$ | $\zeta_3$ | $\zeta_4$ | $\zeta_5$ |
|--------------------------------|-----------|-----------|-----------|-----------|-----------|-----------|
| Partner Dedicated Investment ($\zeta_1$) | 4.47 (0.95) | 0.771     |           |           |           |           |
| Respondent Dedicated Investment ($\zeta_2$) | 4.62 (0.99) | 0.618     | 0.825     |           |           |           |
| Information Sharing ($\zeta_3$) | 4.75 (0.87) | 0.664     | 0.576     | 0.770     |           |           |
| Partnership Trust ($\zeta_4$) | 4.62 (0.81) | 0.728     | 0.556     | 0.848     | 0.906     |           |
| Partnership Commitment ($\zeta_5$) | 4.73 (0.89) | 0.622     | 0.566     | 0.881     | 0.845     | 0.785     |
| Cronbach’s alpha ($\alpha$) | –         | 0.799     | 0.865     | 0.905     | 0.921     | 0.914     |
| Composite reliability (CR) | –         | 0.814     | 0.865     | 0.813     | 0.948     | 0.828     |
| Average variance extracted (AVE) | –         | 0.594     | 0.681     | 0.593     | 0.822     | 0.617     |

Discriminant validity was assessed by examining whether the square roots of AVE (listed diagonally) were greater than the correlation values below the diagonal [114]. All correlations satisfied this requirement, except information sharing-commitment, information sharing-trust, and trust-commitment. A $\chi^2$ discriminant validity test for these relationships found them to be significantly distinct ($p < 0.001$). In addition, a CFA with two separate constructs showed a better fit index than a CFA with combined constructs. This result implies that these constructs should be assessed separately.

5.2. Structural Model

The integrative trust-commitment model was assessed using a structural equation model (Figure 4 and Table 3). All hypotheses are supported at the $p < 0.01$ level except hypotheses 4b and 5a, with a good model fit of $\chi^2$/df = 2.53, CFI = 0.96, TLI = 0.95, and RMSEA = 0.06. With respect to the role of dedicated investment, the empirical results revealed that higher dedicated investment by the partner leads to better information sharing and trust ($\beta = 0.452$, $p < 0.001$; and $\beta = 0.255$, $p < 0.001$, respectively), supporting hypotheses 3a and 4a. Higher dedicated investment by partners had an insignificant effect on commitment ($p > 0.05$).
4a Dedicated investment by a partner firm is positively associated with partnership trust. 0.255 0.001
4b Dedicated investment by a respondent firm is associated with partnership trust. −0.022 0.585
5a Dedicated investment by a partner firm is positively associated with partnership commitment. −0.105 0.106
5b Dedicated investment by a respondent firm is positively associated with partnership commitment. 0.136 0.003

With respect to respondents’ dedicated investment, the analysis showed that the higher the respondent dedicated investment, the higher the information sharing and commitment ($\beta = 0.252; p < 0.001$, and $\beta = 0.136; p < 0.01$, respectively), supporting hypotheses 3b and 5b. However, respondent dedicated investment had an insignificant relationship to trust ($p > 0.05$). Finally, the information sharing-trust-commitment model showed a positive causal relationship ($\beta = 0.647; p < 0.001$, and $\beta = 0.911; p < 0.001$, respectively), supporting hypotheses 1 and 2.

Further evaluations were carried out for models structured by the respondent’s structure type (A: parallel-working firm; B: buying firm; C: supplying firm). The model fit results showed marginally acceptable fit statistics for the following structures (Figure 5): Structure A (parallel-working firm): $n = 177$: $\chi^2/df = 1.69$, CFI = 0.94, TLI = 0.93, and RMSEA = 0.06; Structure B (buying firm): $n = 191$: $\chi^2/df = 1.76$, CFI = 0.94, TLI = 0.93, and RMSEA = 0.06; Structure C (supplying firm): $n = 104$: $\chi^2/df = 1.50$, CFI = 0.94, TLI = 0.93, and RMSEA = 0.07.
4a Dedicated investment by a partner firm is positively associated with partnership trust. $0.255 \quad 0.001$

4b Dedicated investment by a respondent firm is associated with partnership trust. $-0.022 \quad 0.585$

5a Dedicated investment by a partner firm is positively associated with partnership commitment. $-0.105 \quad 0.106$

5b Dedicated investment by a respondent firm is positively associated with partnership commitment. $0.136 \quad 0.003$

Figure 4. Results of the structural model and hypothesis (H) testing.

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Figure 5. Investigated structures.

The analysis revealed significantly positive relationships among information sharing, trust, and commitment for all structures ($\beta = 0.615$ to $1.256$; $p < 0.01$). Partner dedicated investment had a positive association with information sharing for all structures, as well ($\beta = 0.321$ to $0.847$; $p < 0.01$). Although the effect of partner dedicated investment on trust appeared insignificant for Structure A, Structures B and C showed positive relationships between partner dedicated investment and trust ($\beta = 0.162$ and $0.302$, respectively; $p < 0.01$). Most interestingly, neither partner nor respondent dedicated investment improved commitment in Structures A and B, and only respondent dedicated investment showed a positive effect on commitment in Structure C ($\beta = 0.258$; $p < 0.001$). The relatively powerful role of partner dedicated investment highlights its importance in complex project success (or avoidance of failure). Partners’ dedicated investments play a prominent role in driving information sharing in both horizontal and vertical relationships and have a direct influence on partnership trust in vertical relationships.

5.3. Post-Hoc Investigation: The Role of Leading Firms’ Dedicated Investment in Trust Development

The role of leading firms’ involvement was further investigated to provide a practical prediction of the link between dedicated investment and trust subconstructs. Two panels were categorised based on the participating firm’s perception of the exchange relationship environment, represented as $\delta$, where $\delta$ is measured by the difference between partner dedicated investment and respondent dedicated investment: Panel A includes firms that perceived a negative exchange in dedicated investment, $\delta < 0$, and Panel B includes firms that perceived positive exchange in dedicated investment, $\delta > 0$. The incremental changes in the level of trust from work standard, integrity, benevolence, and collective interests are visibly apparent in the results (Figure 6).

Significant differences in the level of work standard, integrity, benevolence, and collective interests between the two panels were assessed by means of an analysis of variance (ANOVA) analysis (Table 4). Results of the one-way ANOVA assessment showed that work standard and benevolence were influenced significantly by the exchange relationship environment ($p < 0.05$). The insignificant effect on integrity and collective interest can be interpreted to indicate that these constructs are not affected by the exchange relationship created by dedicated investment.
This finding demonstrates that firms that share valuable information and use information technology to facilitate communication are more likely to develop deeper relationships with partner firms, with deep trust built on work standard, integrity, benevolence, and collective interest. It also indicates that information sharing helps to create a higher level of partnership trust, thereby contributing to partnership commitment. This study adds to previous work that identified the pertinent role of information sharing, contributing the finding that, regardless of the partner role or partnership type, a higher degree of information sharing contributes to a reputation for trustworthiness and reliability and thus contributes significantly to partnership commitment.

6. Discussion

This research has identified a trust-based supplier management process by (i) proposing an integrative trust model to illuminate the role of dedicated investment in supplier management; (ii) examining the varying effectiveness of dedicated investments in parallel-working, buying, and supplying firms; and (iii) providing strategic guidelines for fostering partnership and commitment contingent on exchange relationship environment. In doing so, this study explicated the central importance of dedicated investment in driving information sharing and trust, thereby establishing partnership commitment.

As expected, a higher level of information sharing was shown to significantly positively affect trust (hypothesis 1) and commitment (hypothesis 2). This finding demonstrates that firms that share valuable information and use information technology to facilitate communication are more likely to develop deeper relationships with partner firms, with deep trust built on work standard, integrity, benevolence, and collective interest. It also indicates that information sharing helps to create a higher level of partnership trust, thereby contributing to partnership commitment. This study adds to previous work that identified the pertinent role of information sharing, contributing the finding that, regardless of the partner role or partnership type, a higher degree of information sharing contributes to a reputation for trustworthiness and reliability and thus contributes significantly to partnership commitment.

6.1. Contribution to Theory

This study provides empirical evidence for the measurement and performance implications of partnership trust in collaboration-based complex projects. That evidence, and the process of developing it, feeds into the theoretical literature in three ways.
Firstly, this research has developed valid and reliable instruments to measure partnership trust on four dimensions: work standard, integrity, benevolence, and collective interest. Previously, trust has been examined in terms of relational governance [115], social capital [41], confidence in credibility and goodwill [116], and expectation of behavioural certainty [15]. Whilst Doney and Cannon [117] noted that attributes such as credibility and benevolence are interrelated in business relationships to the extent that they are operationally indistinguishable, this study operationalised trust as a second-order construct comprising four distinct operations. By separating and distinguishing trust subconstructs, researchers can formalise an incremental perspective of trust and further investigate its interrelationship with partnership development initiatives. The results provide an initial basis for an accurate definition and measure of trust, which can provide the foundations for a rich, structured understanding of how trust may be built in project networks.

Secondly, this study amplifies the relationship between information sharing, trust, and commitment posited by social exchange theory. Results strongly support the existence of a sequential relationship between information sharing, trust, and commitment. Thirdly, this study has validated the role of dedicated investment in increasing information sharing among interconnected firms. Dedicated investment reflects the extent to which partner firms believe in a specific relationship and encourages responding firms to also believe in the relationship. These results demonstrate that dedicated investment is a critical driving force in building strong partnerships and minimising vulnerability. In other words, the higher the dedicated investment of the partner, the more likely it is that the partners will engage in active information sharing, eventually leading to trust and commitment. This suggests that strategic decision-making is required regarding dedicated investment, operations, and training.

The role of dedicated investment in building trust varies depending on the firm’s role in the partnership structure. According to TCE, when a firm invests in partner-specific assets, it must expect potential opportunistic behaviour from its partners [118]. This study demonstrates that a one-sided dedicated investment does not guarantee strengthened trust and commitment. Whilst dedicated investment is a fundamental construct in TCE, this study shows that trust plays a far more vital role in raising the confidence of the partners in the relationship and increasing the collective willingness of partnership members to accept vulnerability. Consequently, some trust-embedded exchange relationship must exist if dedicated investment is to have a discernible effect on supplier relationship management.

6.2. Contribution to Practice

This research supports the propositions that (i) information sharing offers worthwhile benefits to all supply participants; (ii) the development of commitment is a complex process that may require a leap of faith in the form of dedicated investments; and (iii) variability in trust must be incorporated into strategic planning for countermeasures against complex project challenges.

On a macro managerial level, project-leading firms must focus on information-sharing activities to foster trust and commitment. This study shows that information sharing acts as a driving factor in the development of trust and commitment, regardless of the firm’s role in the partnership. This finding aligns with Davies and Mackenzie’s [119] conclusion that a regular and accurate information-sharing process can increase the visibility of unexpected problems and intensify collaboration among contracting parties in a complex project structure. On a micro managerial level, firms can dedicate investments strategically to strengthen information sharing, develop trust, and accelerate partnership commitment.

Dedicated investments play an even more limited role in overall partnership trust and commitment in parallel-working relationships. Specifically, partner-dedicated investment only contributes to information sharing and respondent-dedicated investment plays an insignificant role in the trust-commitment relationship. This dynamic may be a result of the nature of the parallel-working relationship; firms in such relationships tend to be mainly interested in identifying emergent problems; in that context, communication and interaction are more meaningful than investment in increasing shared understanding, trust, and openness [119,120]. Only when such investment...
contributes to the reliability and accuracy of shared knowledge will the respondent firm develop the partnership trust that leads to commitment. In a parallel-working relationship, respondent firms may make autonomous decisions about information sharing on an as-needed basis and are less likely to depend on partners’ dedicated investments when deciding whether and how to take part in information-sharing or trust-building activities. This asymmetry in the impact of dedicated investment in parallel-working relationships also appears with regard to information sharing, trust, and commitment. This finding—that parallel-aligned supplying firms do not form trust solely based on relationship-specific assets unless those assets lead to information sharing—has significant implications for complex project management.

Achieving the strategic goals of risk management for partnership-based complex projects requires conscious trust development at different levels, depending on the specific relationship involved. Agreement-based trust partnerships require an operational focus on time and cost reduction and fulfilment of stakeholder needs based on target profit or public acceptance levels [121]. Knowledge-driven partnerships, on the other hand, require sufficient development in partners’ technical and operational competencies to provide superior network performance [122]. “Swim or sink together” partnerships require the most advanced levels of trust, as all partners collectively develop a system that is adaptive to disruptions and navigate multiple interfaces to identify opportunities for value creation [71]. Project leaders can contribute to risk management by working to build trust and commitment, which can be accomplished by creating a transparent environment, mediating coopetitive tensions, and generating value-creating opportunities for interconnected firms. Most importantly, with an appropriately designed partnership structure, a leading firm can encourage, and even transform, suppliers’ perceptions of the partnership.

7. Conclusions and Future Studies

To identify partnership-driven strategies to foster trust and commitment among exchange partners in a complex project, this study conceptualised the role of trust through the risk management perspective, examined trust-enabled partnership commitment on four different constructs, identified the influence of dedicated investment in building trust across various partnership structures, and highlighted the strategic need to create a positive exchange relationship environment.

In analysing the sequential relationship between information sharing, trust, and commitment in various partnership structures, this study overlooks the potential bias in firms’ decision-making behaviours [123]. Respondent firms may believe that their dedication to the cause, as well as their dedicated investment, is always high, while their partners perceive their dedicated investment as comparatively low or nonexistent [45]. Such a bias would make the responding firms likely to respond in ways that privilege immediate individual benefit over potential partnership or network benefits. Another rich avenue for future research involves examining the role of the market environment. A more complete picture of social capital and its impact on partnership management can be created by measuring the role of dedicated investment in existing markets versus new markets. Moreover, differences in national culture, politics, region, and history are important in understanding the dynamics of partnerships in complex projects [124]. Finally, future studies may attempt an in-depth, longitudinal exploration of the relationship between technology-dependent information sharing and the overall trust–commitment partnership under different time horizons.

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### Appendix A

**Table A1. Survey Instrument.**

| Measurements | Partner Dedicated Investment (ζ₁) | Respondent Dedicated Investment (ζ₂) | Information Sharing (ζ₃) | Commitment (ζ₄) | Work Standard (ζ₆) | Integrity (ζ₇) | Benevolence (ζ₈) | Collective Interest (ζ₉) |
|--------------|----------------------------------|-------------------------------------|-------------------------|----------------|------------------|--------------|------------------|-------------------------|
|              | ζ₁₁ This partner firm has made significant investments in resources dedicated to their relationship with us. | ζ₂₁ We have made significant investments in resources dedicated to our relationship with this partner firm. | ζ₃₁ Information sharing on important issues has become a critical element to maintain a strong partnership. | ζ₄₁ Even if we could, we would not drop the partner because we like being associated with it. | ζ₆₁ When we share our problems with the partner, we know that it will respond with understanding. | ζ₇₁ Even when the partner gives us a rather unlikely explanation, we are confident that it is telling the truth. | ζ₈₁ When making important decisions, the partner is concerned about our welfare. | ζ₉₁ Our firm and the partner firm have understanding that common goals can be achieved through a SC framework. |
|              | ζ₁₂ This partner firm’s operating process has been tailored to meet the requirements of our organisation. | ζ₂₂ Our operating process has been tailored to meet the requirements of dealing with this partner. | ζ₃₂ We share a common information technology (software) to facilitate communication with the partner. | ζ₄₂ We want to remain a member of the partner’s network because we genuinely enjoy our relationship with it. | ζ₆₂ We know that this partner will adapt quickly, even if we have to change our specifications at short notice. | ζ₇₂ This partner firm has a reputation for being honest. | ζ₈₂ In the future, we can count on the partner to consider how its decisions and actions will affect us. | ζ₉₂ Our firm and this partner firm have understanding on the importance of improvements that benefit the SC as a whole. |
|              | ζ₁₃ Training our people has involved substantial commitments of time and money for this partner. | ζ₂₃ Training and qualifying this partner have involved substantial commitments of time and money. | ζ₃₃ Our partner firm has a credible reputation for its reliability in information sharing. | ζ₄₃ Our positive feelings towards the partner are a major reason we continue working with it. | | | | |

| Measurements | Loadings |
|--------------|----------|
| ζ₁₁          | 0.763    |
| ζ₁₂          | 0.793    |
| ζ₁₃          | 0.756    |
| ζ₂₁          | 0.828    |
| ζ₂₂          | 0.802    |
| ζ₂₃          | 0.845    |
| ζ₃₁          | 0.723    |
| ζ₃₂          | 0.721    |
| ζ₃₃          | 0.858    |
| ζ₄₁          | 0.745    |
| ζ₄₂          | 0.775    |
| ζ₄₃          | 0.833    |
| ζ₆₁          | 0.884    |
| ζ₆₂          | 0.781    |
| ζ₇₁          | 0.963    |
| ζ₇₂          | 0.843    |
| ζ₇₃          | 0.727    |
| ζ₈₁          | 0.877    |
| ζ₈₂          | 0.874    |
| ζ₈₃          | 0.859    |
| ζ₉₁          | 0.899    |
| ζ₉₂          | 0.889    |
| ζ₉₃          | 0.900    |

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