

Citation: Azizi, H., Mohammadi, M., & Edalatian Shahriari, J. (2027). Identifying the Components of an Internationalization Model Based on a Networking Approach: A Study of Knowledge-Based Companies in the Construction Industry. *Digital Transformation and Administration Innovation*, 5(3), 1-19.

Received date: 2026-06-15 Revised date: 2026-09-15 Accepted date: 2026-09-22 Initial Published date: 2026-10-18 Final Published date: 2027-05-01



Identifying the Components of an Internationalization Model Based on a Networking Approach: A Study of Knowledge-Based Companies in the Construction Industry

Hojatollah Azizi¹, Mahmoud Mohammadi^{2*}, Jamshid Edalatian Shahriari¹

1. Department of Business Management, CT.C., Islamic Azad University, Tehran, Iran

2. Department of Industrial Management, CT.C., Islamic Azad University, Tehran, Iran

*Correspondence: mah.mohammadi50@iau.ac.ir

Abstract

This study aimed to identify and develop a paradigmatic model of network-based internationalization for knowledge-based companies operating in the construction industry. This qualitative exploratory study was conducted using the systematic grounded theory approach of Strauss and Corbin. The participants consisted of university experts in internationalization, networking, entrepreneurship, project management, and related fields, as well as senior managers and experienced professionals from leading construction and civil engineering companies with international activity. Participants were selected through purposive, snowball, and theoretical sampling. Data were collected through 25 in-depth semi-structured interviews, at which point theoretical saturation was achieved. The interviews were analyzed concurrently with data collection using open, axial, and selective coding. MAXQDA was used to organize and manage the qualitative data. Coding dependability was supported by a 30-day recoding procedure, which yielded 89.96% agreement, and inter-coder assessment, which produced 90.91% agreement. The analysis generated 170 open codes, which were integrated into 70 initial concepts and 15 axial categories. The central phenomenon was identified as network-based internationalization in knowledge-based construction companies. The causal conditions consisted of networking for foreign-market entry and networking for strategic partner and consortium selection. Contextual conditions included institutional networking and target-market knowledge and international supply-chain networking. Intervening conditions comprised relational capital and network legitimacy, risk management and project governance, standardization and regulatory legitimacy, operational coordination, and legal and contractual networking. The principal strategies included knowledge transfer and technological learning, technology development and commercialization, interorganizational innovation, international financing, and inter-project knowledge management. The resulting outcomes included stronger project governance, accumulated reputation and relational capital, technology co-creation, improved knowledge absorption and localization, continuous organizational learning, and reduced contractual conflict. Internationalization of knowledge-based construction companies is a cumulative and network-dependent process in which foreign-market access, technological learning, legitimacy, financing, supply integration, and project execution are developed through coordinated interorganizational relationships. Effective network governance can transform project-specific cooperation into sustainable international capabilities and competitive advantage.

Keywords: Internationalization, Networking, Knowledge-Based Companies, Construction Industry, Grounded Theory, Strategic Partnerships, Interorganizational Networks



1. Introduction

Internationalization has become a central strategic concern for firms operating in knowledge-intensive and project-based industries, where competitive advantage increasingly depends on the ability to access foreign markets, mobilize dispersed resources, acquire specialized knowledge, and coordinate interorganizational relationships across institutional and geographic boundaries. For knowledge-based companies, international expansion is rarely a simple extension of domestic marketing activity; rather, it requires the development of capabilities that enable firms to identify opportunities, establish credibility, adapt technologies, obtain complementary resources, and function within complex networks of partners, suppliers, clients, regulators, financial institutions, and professional intermediaries. This challenge is particularly pronounced in the construction industry, where international activity is inherently project-based, resource-intensive, institutionally embedded, and dependent on collaboration among multiple actors with different technical, legal, financial, and organizational responsibilities. Contemporary research therefore increasingly views internationalization not only as a process of market entry, but also as a dynamic capability through which firms combine internal strengths with external relationships to create and sustain competitive positions across national borders (Bi et al., 2024; Mostafiz et al., 2025; Yang et al., 2025).

The traditional view of internationalization often emphasizes gradual foreign-market commitment, export development, ownership advantages, or firm-specific resources. Although these perspectives remain useful, they are insufficient for explaining how smaller, technology-oriented, or knowledge-based firms expand internationally when they lack the scale, capital base, market reputation, or foreign experience of large multinational corporations. In such firms, international growth frequently depends on their ability to compensate for resource limitations through network relationships and strategic partnerships. Networks can provide access to information, technology, distribution channels, institutional knowledge, financing, market legitimacy, and learning opportunities that are difficult to create internally. The growing literature on social and business networks confirms that relationships with customers, suppliers, intermediaries, professional associations, universities, strategic partners, and other firms can accelerate market access and reduce uncertainty associated with internationalization (Gupta et al., 2022; Han et al., 2024). In this sense, networking is not an auxiliary activity undertaken after internationalization begins; it can constitute the very mechanism through which firms become capable of entering and operating in foreign markets.

The importance of networks is even greater for knowledge-based companies because their competitive position is fundamentally tied to intangible assets such as technological expertise, intellectual capabilities, innovation, specialized human capital, and organizational learning. Knowledge-based firms may possess advanced technologies but still face difficulties commercializing those technologies in foreign markets when they lack complementary capabilities such as regulatory knowledge, access to clients, certification channels, financial capacity, or project execution experience. Research on knowledge-based firms has shown that entrepreneurial orientation, strategic flexibility, and organizational capabilities are central to their development, particularly when they must translate knowledge resources into market outcomes (Mohtasham et al., 2026; Yadollahi, 2021). The internationalization of such companies therefore depends not merely on the technical superiority of their products or services, but also on their ability to embed those technologies within networks capable of supporting market penetration, adaptation, validation, and sustained commercialization.

This issue has particular relevance in the construction industry because international construction projects are characterized by temporary coalitions of firms, high capital requirements, considerable contractual complexity, strict regulatory requirements, substantial uncertainty, and dependence on local and international supply chains. Foreign construction activity often requires firms to coordinate with contractors, consulting engineers, clients, subcontractors, equipment suppliers, financial institutions, inspection bodies, and governmental agencies. Evidence from research on construction internationalization suggests that firms entering international markets must combine technical resources with managerial, organizational, and relational capabilities in order to compete effectively (Odediran et al., 2025). At the industry level, construction internationalization has also been increasingly influenced by changes in global value chains, with firms becoming more dependent on cross-border flows of technology, materials, specialized expertise, and project knowledge (Niu et al., 2023). Consequently, firms that seek to internationalize in this sector must be able to position themselves within wider value networks rather than relying solely on internally controlled resources.



The contemporary construction sector is also experiencing rapid technological transformation. Digital tools such as Building Information Modeling, the Internet of Things, and digital twins have altered the organization, coordination, and monitoring of construction activities and have increased the importance of data exchange and interorganizational integration (Shishehgharkhaneh et al., 2022). Collaborative innovation networks have become increasingly significant in this context because technological development in construction is often distributed across universities, contractors, specialized suppliers, engineering firms, and technology developers rather than being concentrated within a single organization. Empirical evidence indicates that collaborative innovation networks in construction evolve through changing patterns of interaction among actors and can influence the generation and diffusion of knowledge across the sector (Wang & Cheng, 2025). Similarly, the performance of large and complex projects is affected by the degree to which organizations are embedded in multiple levels of networks, highlighting the importance of relational positioning and cross-level coordination (Wang et al., 2025). These developments suggest that internationalization and technological networking are increasingly intertwined in the construction industry.

Strategic partner selection therefore becomes a fundamental component of internationalization. Foreign-market entry often exposes firms to unfamiliar legal systems, business norms, financing mechanisms, stakeholder structures, and technical standards. Selecting appropriate partners can reduce these uncertainties by providing access to local knowledge and complementary capabilities. Prior research has emphasized that partner selection should consider not only technical competence but also prior experience, reliability, compatibility, and the complexity of the intended collaboration (Vaez-Alaei et al., 2022). Studies of strategic alliances also suggest that the success of cooperation depends on a combination of organizational fit, complementary resources, trust, governance mechanisms, and shared objectives (Abramian & Harandi, 2022; Jadid al-Eslami & Arbabi, 2021). Partnership arrangements can generate important benefits for participating firms, but their effectiveness depends on the quality of partner relationships and the manner in which interdependence is governed (Dar, 2022). These considerations are especially critical in international construction, where an unsuitable partner can create substantial financial, reputational, operational, and legal risks.

From a network perspective, the value of a partner is not limited to the resources that the partner owns directly. A strategically valuable partner may also provide access to a broader network of clients, investors, regulators, suppliers, professionals, or technology providers. In this way, network position can become a resource in itself. Strategic partnerships may strengthen a firm's international reach by creating connections to actors and opportunities that would otherwise remain inaccessible. The significance of partnership-based access is visible across different organizational settings, where strategic alliances have been used to expand participation, share capabilities, and address complex challenges that cannot be managed effectively by isolated organizations (Rocha et al., 2022). At the same time, collaborative relationships can strengthen organizational reputation and brand legitimacy when firms jointly create and communicate shared values with business partners (Iglesias et al., 2023). For knowledge-based construction firms, these mechanisms can reduce liabilities of foreignness by allowing firms to borrow legitimacy from established network members.

Institutional conditions are another critical determinant of internationalization. Firms from emerging economies often face both supportive and constraining institutional environments at home, and these institutional characteristics can affect their ability to internationalize (Kumari et al., 2025). Similarly, target markets differ substantially in regulatory systems, procurement practices, standards, licensing requirements, investment rules, and stakeholder structures. The ability to interpret such institutional complexity frequently depends on access to local networks. Formal documents may explain official rules, but practical participation often requires knowledge of informal procedures, decision-making patterns, and relational expectations. Research on the internationalization of marketing activities has similarly highlighted the importance of understanding the organizational and environmental conditions under which firms adapt their activities to foreign markets (Ghasem Ghanem al-Wahili, 2024). International marketing research further emphasizes that successful entry into foreign markets requires alignment between market knowledge, strategic positioning, and the mechanisms used to reach and serve customers (Esmaeilpour, 2024).



Diversification of international relationships may also reduce vulnerability to external shocks. Excessive dependence on a small number of foreign partners or markets can transmit international economic fluctuations into the firm, while diversification can provide greater resilience (Mokhtari Shirejini et al., 2023). This is especially important in construction, where projects involve long time horizons and can be exposed to political, currency, regulatory, and supply-chain risks. Internationalization strategies must therefore address not only growth but also resilience. Research on business digitalization and early internationalization has shown that firms can use strategic flexibility and digital capabilities to navigate adverse external conditions (Crespo et al., 2024). Similarly, business partnering in risk management can strengthen organizational resilience by broadening the contribution of internal and external actors to risk identification and response (Tillema et al., 2022). These insights reinforce the need to conceptualize networking not merely as an opportunity-seeking mechanism but also as a means of risk sharing, adaptation, and continuity.

Financial networking is another essential element in project-based internationalization. Construction projects often require guarantees, insurance, credit facilities, working capital, and investment structures that exceed the financial capacity of smaller knowledge-based firms. Strategic partnerships and consortium arrangements may therefore enable firms to pool resources, distribute risks, and improve access to financial institutions. Business partnerships can facilitate resource mobilization and strengthen commercial viability when participating firms possess complementary capabilities (Eslami, 2023). In addition, international expansion strategies for small and medium-sized enterprises require careful management of limited resources and the alignment of internationalization choices with organizational capabilities (Bi et al., 2024). For knowledge-based construction firms, internationalization may therefore depend on the simultaneous development of technical, relational, and financial networks.

A further dimension concerns knowledge absorption and learning. Internationalization exposes firms to new technologies, standards, managerial practices, and market information, but the benefits of such exposure depend on the firm's capacity to recognize, assimilate, and apply external knowledge. Recent evidence demonstrates that absorptive capacity interacts with internationalization and resource configurations in shaping innovation performance (Freixanet & Federo, 2025). In innovative SMEs, export performance is also linked to dynamic managerial capabilities and the capacity to redesign business models in response to international opportunities (Merín-Rodríguez et al., 2025). These findings are particularly relevant to knowledge-based construction companies because participation in foreign projects can function as a learning mechanism through which firms acquire tacit technical knowledge, international standards, project-management practices, and new technological combinations. The strategic value of networks therefore lies not only in access but also in the firm's ability to convert relational exposure into organizational learning.

Dynamic capabilities provide an additional explanation for why some firms benefit more from networks than others. International growth requires the capability to sense opportunities, mobilize resources, reconfigure organizational processes, and adapt rapidly after foreign entry. Research on born-global firms indicates that post-entry growth can be accelerated by dynamic capabilities that enable firms to adjust and develop after initial internationalization (Yang et al., 2025). Similarly, international entrepreneurial orientation and dynamic internationalization capability jointly influence international performance by shaping how firms exploit opportunities across markets (Mostafiz et al., 2025). Digital firms provide another illustration of how internationalization can be accelerated when firms combine scalable technologies with appropriate international strategies and network relationships (Yang & Stoian, 2025). Although knowledge-based construction companies differ from purely digital firms because they remain embedded in physical projects, the underlying logic is comparable: technological assets generate international value only when supported by capabilities for coordination, adaptation, partnership, and opportunity exploitation.

The relationship between internationalization and responsible business behavior is also gaining prominence. Construction firms operating internationally face growing expectations regarding environmental transparency, regulatory compliance, sustainability, and accountability. Evidence from the construction industry indicates that internationalization may affect firms' environmental information disclosure, suggesting that foreign expansion increases exposure to broader stakeholder expectations and institutional pressures (Liu et al., 2025). For knowledge-based companies offering innovative construction technologies, international credibility may therefore depend not only on technological performance but also on compliance



with international standards and the ability to demonstrate environmental, technical, and regulatory legitimacy. Network relationships with certification bodies, laboratories, consultants, and professional institutions can become essential in this regard because they enable firms to validate technologies and align them with destination-market requirements.

The legal architecture of partnerships is equally important. International network relationships can generate disputes over ownership, responsibilities, entry and exit, intellectual property, payment, governance, and risk allocation. Comparative legal work on partner entry and exit in commercial companies illustrates the importance of clear regulatory frameworks governing participation in business relationships (Wafi Nouri, 2023). At the organizational level, poorly defined business-partner roles may also create internal conflicts and ambiguity (Winch, 2021). These challenges indicate that network-based internationalization requires contractual mechanisms capable of balancing flexibility with formal accountability. For international construction projects, this includes governing-law provisions, dispute-resolution procedures, defined roles, risk allocation, and mechanisms for managing changes during project implementation.

Although artificial intelligence and other advanced technologies are increasingly described as strategic partners in specialized decision environments, their value depends on integration with human and organizational expertise rather than technological adoption alone (Visco et al., 2021). This broader observation is relevant to knowledge-based construction companies because technology is embedded in networks of users, decision makers, institutions, and project actors. A technically sophisticated solution cannot generate international success if the surrounding network lacks the capacity, legitimacy, or willingness to adopt it. Thus, the internationalization of knowledge-based firms must be understood as an interaction between technological resources and relational infrastructures.

Despite the growing literature on internationalization, networks, strategic alliances, construction globalization, dynamic capabilities, and knowledge-based entrepreneurship, an important gap remains. Existing studies often examine these dimensions separately: some emphasize internationalization strategies, some focus on partner selection, others address digitalization, absorptive capacity, or project networks, and still others analyze institutional or financial conditions. There remains limited understanding of how these dimensions operate together as an integrated networking-based internationalization system for knowledge-based companies in the construction industry. This gap is particularly important in contexts where firms face simultaneous technological, financial, regulatory, and market constraints and cannot rely solely on internal resources. Previous research on internationalization drivers has emphasized the need to identify and prioritize the multiple factors that shape small and medium-sized firms' expansion into foreign markets (Rahmat, 2022), while studies of internationalization strategies among knowledge-based firms likewise underline the heterogeneity of pathways followed by technologically oriented companies (Yadollahi, 2021). A more integrated model is therefore needed to explain how market entry, partner selection, institutional access, supply-chain participation, legitimacy, risk governance, technology commercialization, finance, knowledge transfer, and inter-project learning interact within a single network-based internationalization process.

Accordingly, the aim of this study was to identify the components and develop a paradigmatic model of network-based internationalization for knowledge-based companies operating in the construction industry.

2. Methods and Materials

This study employed a qualitative, exploratory research design to identify and develop the components of an internationalization model based on a networking approach for knowledge-based companies operating in the construction industry. In terms of purpose, the study was applied-developmental because it sought both to extend the conceptual understanding of internationalization through business networks and to generate a context-sensitive model that could be used by knowledge-based construction companies seeking to develop or strengthen their international activities. A qualitative approach was considered appropriate because internationalization in knowledge-based construction firms is a multidimensional and context-dependent phenomenon involving strategic relationships, interorganizational interactions, access to resources, knowledge exchange, institutional conditions, market connections, and network-based mechanisms that cannot be adequately understood without examining the experiences and interpretations of individuals directly involved in these processes. Accordingly, the study was conducted using the systematic grounded theory approach of Strauss and Corbin, which enabled concepts and relationships to be developed inductively from empirical data rather than imposing a predetermined theoretical structure on participants' experiences. The research was conducted from autumn 2025 to summer 2026 and focused on



knowledge-based companies and leading construction-sector organizations with relevant experience in international activities and interorganizational networking.

The study population consisted of two major groups of knowledgeable participants. The first group comprised university academics and scholars with expertise in areas such as project management, entrepreneurship, international business, internationalization, business networking, construction management, marketing, civil engineering, and related managerial disciplines. The second group consisted of senior managers, executives, and experienced professionals from prominent construction and civil engineering companies with knowledge of international activities and network-based business development. Companies were considered particularly relevant when they demonstrated professional reputation, organizational credibility, access to adequate financial resources, substantial scope and diversity of construction activities, a sustained history of operation in the industry, or prior involvement in international markets and projects. Participants were required to possess sufficient academic expertise, managerial responsibility, professional experience, or direct knowledge of internationalization and networking processes within the construction industry. These eligibility criteria were established to ensure that the data were obtained from information-rich participants capable of providing detailed insight into the mechanisms through which network relationships contribute to the internationalization of knowledge-based construction firms.

Participant selection was undertaken through a combination of purposive, snowball, and theoretical sampling. At the beginning of the study, purposive sampling was used to identify key informants whose academic background, managerial position, professional experience, or organizational involvement indicated substantial knowledge of the phenomenon under investigation. Initial participants were therefore selected deliberately rather than randomly. Snowball sampling was subsequently employed to gain access to additional experts who met the study criteria but were not readily identifiable through formal organizational channels. Participants were asked, where appropriate, to identify other individuals with extensive experience or specialized knowledge of internationalization and network development within knowledge-based or construction-related companies. This procedure was particularly useful for reaching experienced executives and specialists whose expertise was recognized within professional networks but who might otherwise have been difficult to access.

The overarching sampling logic throughout the study was theoretical sampling, consistent with systematic grounded theory. Participant recruitment therefore did not follow a predetermined numerical sampling plan. Instead, data collection and analysis proceeded concurrently, and decisions regarding subsequent participants were informed by concepts and categories emerging from earlier interviews. When preliminary analysis indicated that a particular category required greater conceptual depth, variation, comparison, or clarification, subsequent participants were selected because their backgrounds or experiences were expected to provide relevant information concerning that category. Constant movement between sampling, interviewing, coding, and comparison allowed emerging categories to guide further data collection and strengthened the explanatory adequacy of the developing model. Sampling continued until theoretical saturation was reached, defined as the point at which additional interviews no longer produced substantively new concepts, properties, dimensions, categories, or relationships and primarily confirmed the conceptual structure already developed. Theoretical saturation was achieved after 25 interviews, and the final qualitative sample therefore consisted of 25 participants.

The primary data collection method was an in-depth semi-structured interview. This format was selected because it provided sufficient structure to ensure systematic examination of the central research phenomenon while preserving the flexibility required in grounded theory to pursue emerging concepts, unexpected experiences, and theoretically significant issues raised by participants. Interviews were conducted either face-to-face or by telephone according to participant accessibility and circumstances. The interview process focused on participants' experiences and professional interpretations of the internationalization of knowledge-based construction companies, the role of formal and informal networks in accessing foreign markets, mechanisms of developing and maintaining international business relationships, access to knowledge and resources through networks, collaboration with domestic and foreign partners, institutional and environmental influences, organizational capabilities required for network-based internationalization, barriers to international expansion, strategic responses to these barriers, and the outcomes associated with effective international networking. The interview guide functioned as a flexible framework rather than a rigid questionnaire. As data analysis progressed, interview questions and probes were progressively refined to explore categories and relationships that emerged through theoretical sampling and constant comparison.

In addition to interviews, documentary and scholarly sources relevant to the research phenomenon were reviewed to enhance contextual understanding and support theoretical sensitivity during the research process. These materials included academic



articles, books, professional documents, relevant organizational materials, and other available documents concerning internationalization, business networks, knowledge-based enterprises, construction industry activities, and international business development. Documentary materials were used as complementary qualitative sources and were not treated as substitutes for participants' empirical accounts. Throughout the interviews, probing questions were employed whenever further clarification, illustration, explanation, or comparison was necessary. Participants were encouraged to provide concrete examples and to explain the conditions under which particular networking mechanisms facilitated or constrained international activities. Data collection was therefore iterative, with later interviews increasingly concentrating on conceptual gaps, emerging relationships, contradictory cases, and dimensions requiring further theoretical development.

Several procedures were adopted to enhance the trustworthiness and dependability of the qualitative data. Interview transcripts were reviewed carefully against the original interview records before analysis, and coding decisions were documented throughout the analytical process. Coding consistency over time was assessed through a recoding procedure. Three interviews were selected and independently recoded by the researcher after a 30-day interval. Comparison of the first and second coding rounds produced an overall recoding agreement of 89.96%, indicating a high degree of stability in the identification and assignment of codes over time. Inter-coder agreement was also examined to reduce the possibility that the analytical structure reflected only the interpretations of a single researcher. A doctoral-level researcher familiar with qualitative analysis was trained in the coding framework and independently coded three selected interviews. The codes generated by the researcher and the second coder were then compared at the level of relevant meaning units, producing an overall agreement rate of 90.91%. These procedures indicated satisfactory stability and consistency of the coding process while recognizing that qualitative analysis remained interpretive and conceptually driven rather than mechanically reproducible.

Methodological rigor was further strengthened through continuous comparison between interview data, codes, subcategories, and higher-order categories; attention to cases that did not immediately conform to emerging interpretations; maintenance of analytical notes and memos; repeated movement between raw data and the developing conceptual framework; and progressive refinement of categories until they possessed adequate conceptual density. Theoretical saturation was used not merely as a numerical stopping criterion but as an analytical judgment concerning whether categories had been sufficiently developed in terms of their properties, dimensions, conditions, interactions, and consequences. These procedures were intended to ensure that the final model remained grounded in participants' accounts and reflected the complexity of network-based internationalization within the specific organizational and industrial context under investigation.

Qualitative data were analyzed according to the systematic grounded theory procedures developed by Strauss and Corbin. Data collection and analysis were conducted concurrently rather than sequentially, allowing emerging findings from each interview to guide subsequent sampling, questioning, and conceptual development. Immediately following the preparation and review of interview transcripts, the data were examined through a continuous process of comparison in which incidents were compared with other incidents, codes with codes, codes with categories, and categories with other categories. Analytical memos were prepared throughout this process to document emerging interpretations, possible conceptual relationships, questions requiring further investigation, and decisions concerning theoretical sampling. MAXQDA was used to organize interview transcripts, manage the coding structure, retrieve coded segments, compare codes across participants, organize conceptual categories, and support the development and visualization of relationships among categories. The software was used as a data-management and analytical support environment, while conceptual interpretation and theory development remained the responsibility of the researchers.

Analysis began with open coding. Interview transcripts were examined closely and divided into meaningful units representing experiences, perceptions, actions, conditions, strategies, interactions, or consequences relevant to the study phenomenon. Conceptually meaningful segments were assigned codes that remained as close as possible to the empirical meaning expressed by participants while also allowing progressively higher levels of abstraction. Similar or conceptually related codes were continuously compared, consolidated, differentiated, or reorganized as analysis progressed. Through this procedure, initial concepts were developed and subsequently grouped into more abstract categories and subcategories. Particular attention was paid to the properties and dimensions of each concept so that categories were not defined merely by labels but by their substantive characteristics, variations, and conditions of occurrence. Constant comparison was maintained throughout open coding to identify similarities and differences across participants and to avoid premature closure around early interpretations.



Axial coding was subsequently conducted to reconstruct relationships among categories that had been conceptually fragmented during open coding. At this stage, the analysis focused on determining how categories and subcategories were related and how they collectively explained the phenomenon of network-based internationalization. The emerging categories were examined in terms of the conditions giving rise to the phenomenon, the contextual and intervening circumstances affecting it, the actions and interaction strategies adopted by firms and actors, and the consequences generated by those strategies. Particular attention was devoted to understanding how internal organizational capabilities interacted with external network relationships and environmental conditions in shaping the international development of knowledge-based construction companies. Categories were repeatedly compared with the underlying interview evidence to ensure that proposed relationships were empirically grounded rather than imposed by the researchers. Relationships that initially appeared plausible but lacked sufficient supporting evidence were revised, further investigated through theoretical sampling, or excluded from the developing framework.

Selective coding constituted the final level of analysis. During this stage, the principal categories developed through open and axial coding were integrated around a central category capable of representing the main explanatory theme of the study. Selection of the core category was based on its conceptual centrality, recurrence across participants' accounts, capacity to connect the principal categories, explanatory relevance to the research problem, and ability to accommodate variation within the data. The developing theoretical structure was progressively refined by relating the remaining categories systematically to the core phenomenon, reviewing relationships against the empirical material, identifying conceptual gaps, and returning to relevant coded segments whenever further clarification was necessary. Analytical integration included the construction of a coherent explanatory storyline describing how network-based internationalization develops within knowledge-based companies operating in the construction industry, the conditions that facilitate or constrain this process, the strategic networking actions undertaken by firms, and the organizational and international consequences associated with these actions.

The analytical process remained iterative until theoretical saturation was achieved. Saturation was considered to have occurred when additional interviews no longer generated substantially new codes or altered the properties, dimensions, or relationships of the principal categories, and when the emerging theoretical structure provided a coherent explanation of the studied phenomenon across the available empirical cases. The final outcome of the analysis was therefore an empirically grounded conceptual model specifying the components and interrelationships underlying internationalization through networking among knowledge-based companies in the construction industry. Rather than testing predetermined hypotheses or evaluating a previously specified model, the analytical procedure was directed entirely toward inductive concept generation, category integration, and theory development from qualitative empirical evidence.

3. Findings and Results

Analysis of the 25 semi-structured interviews was conducted through the systematic grounded theory procedure involving open, axial, and selective coding. The analysis proceeded concurrently with data collection and continued until theoretical saturation was achieved. During open coding, interview transcripts were examined line by line and meaningful units related to internationalization, network formation, partner selection, knowledge exchange, technological development, institutional access, financing, supply-chain integration, project coordination, regulatory legitimacy, and interorganizational learning were identified. Continuous comparison across interviews enabled conceptually similar codes to be integrated while preserving distinctions between different network functions. This process ultimately generated 170 open codes, which were organized into 70 initial concepts. Table 1 presents the initial concepts and the corresponding open codes derived from the qualitative data.

Table 1. Classification of Open Codes into Initial Concepts

No.	Initial concept	Related open codes
1	Entry into foreign markets through specialized networks, including consultants, suppliers, associations, universities, and designers	1, 2, 3, 5, 6, 9, 10, 11, 12, 17, 18
2	Network trust and credibility as substitutes for advertising and formal track records	7, 8, 13, 19, 20
3	Reliance on local partners and institutional networks to reduce entry risk	4, 14
4	Analysis of the industry value network and logistics network prior to market entry	15, 16
5	Partner selection based on technical and implementation records and compliance with standards	21, 22, 34, 36
6	Partner selection based on institutional and financial access	23, 24, 27
7	Superiority of partners' social capital and relational networks over physical resources	28, 29, 40



8	Partner membership in professional networks and technological alignment	25, 26
9	Complementarity of technical capabilities and willingness to share knowledge	31, 32, 37, 38
10	Assessment of partners' legal and reputational risks	30, 39
11	Gradual development of trust and expansion of regional networks	33, 35
12	Transfer of technical knowledge and emerging technologies through international collaboration	41, 44, 46, 48, 52
13	Learning tacit knowledge and project-management knowledge through networks	42, 43, 47, 53
14	Learning technical and quality standards through international networks	45, 49, 57
15	Creation of innovation and shared knowledge within networks	50, 51, 54, 55, 58
16	Localization of knowledge and reinforcement of sustainable organizational learning	56, 59, 60
17	Joining networks of suppliers with recognized standards and international experience	61, 62, 65
18	Integration with regional supply networks and specialized logistics	63, 66
19	Suppliers as sources of knowledge and intermediaries for network expansion	64, 68, 69, 70
20	Redesigning supply networks based on sustainability requirements	67
21	Integration of legal consulting and inspection bodies into project networks	71, 75
22	Evaluation and monitoring of network members to control supply and scheduling risks	72, 76, 78
23	Establishment of shared digital infrastructure and cultural alignment within the network	73, 74
24	Collaborative management of risk and crises within project networks	77, 79
25	Acquisition of initial trust and legitimacy through the credibility of network members	81, 84, 87
26	Continuation and deepening of network relationships after project completion	82, 86, 88
27	Transparency during crises as a mechanism for strengthening network trust	83, 89
28	Technology commercialization and validation through networks	91, 92
29	Technology localization and learning from foreign partners	93, 94
30	Alignment of technology with global standards through networks	95, 96
31	Data-driven innovation based on market-network needs	97, 98, 99
32	Identification of market needs and technology redesign through local networks	101, 102
33	Acquisition of informal institutional market knowledge through expatriate and contractor networks	103, 104, 105
34	Assessment of partners' institutional positions and mapping of project stakeholder networks	106, 109
35	Gradual market entry for institutional learning	107, 108
36	Selection of target markets based on network accessibility	110
37	Learning integrated project management and industrialization through networks	111, 112
38	University-industry-contractor synergy within innovation networks	113, 114, 117
39	Consolidation of interorganizational learning and technological upgrading based on network standards	115, 116
40	Utilization of network knowledge memory and reciprocal knowledge exchange	118, 119
41	Access to project investors through international networks	121, 125
42	Strengthening financial and insurance credibility based on network track records	122, 124
43	Financial risk sharing and capacity pooling through consortia	123, 127, 129
44	Participation of local partners in ownership structures to enhance investor confidence	126
45	Learning foreign-exchange risk management through collaborative networks	128
46	Role of financing networks in sustaining internationalization	130
47	Connection to laboratories and certification bodies for product validation	131, 132
48	Alignment of technical documentation and proactive monitoring of standard changes through networks	133, 134, 136
49	Reduction of regulatory non-compliance risk through technical inspection networks	135
50	Development of sustainability documentation and technology registration through local networks	137, 138
51	Continuous reputation management and alignment with global standards systems	139, 140
52	Documentation of experience and establishment of inter-project lessons-learned repositories	141, 142
53	Transfer of successful practices and transformation of experience into shared network knowledge capital	143, 144, 147
54	Learning from implementation errors and sharing managerial experience within networks	145, 146
55	Integration of stakeholder feedback and international circulation of human resources	148, 149
56	Establishment of shared operational coordination mechanisms, including offices, protocols, and reporting systems	151, 152, 154
57	Analysis of activity-dependency networks to control delays	153
58	Technical and linguistic coordination in multinational networks	155, 156
59	Integration of supply and implementation networks and establishment of multilevel decision-making structures	157, 159
60	Management of implementation conflicts and network cohesion as success factors	158, 160
61	Shared and hierarchical dispute-resolution mechanisms within contractual networks	161, 162, 163
62	Legal risk management through choice of governing law and network analysis	164, 167
63	Clarification of roles and responsibilities within contractual networks	165, 166
64	Preventive legal review and formalization of network interactions	168, 169
65	Network governance as a key determinant of project success	80



66	Accumulation of reputation and transformation of relational capital into sustainable competitive advantage	85, 90
67	Technology co-creation as a driver of internationalization	100
68	Capacity to absorb and localize network-based knowledge as a competitive advantage	120
69	Transformation of foreign-project experience into continuous organizational learning capability	150
70	Design of network-based contracts as a mechanism for reducing conflict	170

The open-coding results demonstrated that internationalization among knowledge-based construction companies was not represented by a single market-entry action but by an interconnected set of network processes extending from opportunity recognition and foreign-market access to partner selection, knowledge transfer, technological development, financing, legitimacy acquisition, risk management, operational coordination, and contractual governance. Specialized relationships with consultants, suppliers, universities, designers, contractors, professional associations, laboratories, investors, financial institutions, and local partners enabled firms to obtain resources and capabilities that would otherwise be difficult or costly to develop independently. The findings further indicated that market access depended not merely on identifying customers but on gaining entry into the broader project network within which clients, consultants, contractors, suppliers, regulators, certification bodies, and technical actors collectively influence technology adoption and project participation. Partner value was similarly defined by more than physical or financial resources; the partner's professional reputation, institutional position, access to decision makers, social capital, knowledge-sharing orientation, technical complementarity, and involvement in professional networks were central considerations. The concepts also showed that international networks functioned as important channels for tacit and explicit learning, including technical knowledge, project management, quality standards, digital construction, technological localization, and adaptation to destination-market requirements. Supply-chain relationships, financial networks, regulatory connections, and legal arrangements were likewise integral to internationalization because construction projects require coordinated access to materials, logistics, financing, insurance, certification, contractual protection, and execution capabilities. Across these dimensions, trust, reputation, transparency, continued interaction, knowledge retention, and network governance emerged as mechanisms through which project-specific relationships could gradually be transformed into enduring internationalization capabilities.

Following open coding, the 70 initial concepts were examined through axial coding. Concepts sharing a common function, meaning, or position within the internationalization process were compared and integrated at a higher level of abstraction. This procedure resulted in 15 axial categories representing the principal dimensions through which networking affected the internationalization of knowledge-based construction companies. Table 2 shows the relationship between the initial concepts and the axial categories.

Table 2. Relationships Between Initial Concepts and Axial Categories

Axial category	Related initial concepts	Related open codes
Networking for foreign-market entry	Entry into foreign markets through specialized networks; network trust and credibility as substitutes for advertising and formal track records; reliance on local partners and institutional networks to reduce entry risk; analysis of industry value and logistics networks before market entry	1–20
Networking for strategic partner and consortium selection	Partner selection based on technical and implementation records and compliance with standards; institutional and financial access; superiority of partners' social capital and relational networks over physical resources; membership in professional networks and technological alignment; complementarity of technical capabilities and willingness to share knowledge; assessment of legal and reputational risk; gradual development of trust and expansion of regional networks	21–40
Networking for knowledge transfer and technological learning	Transfer of technical knowledge and emerging technologies through international collaboration; learning tacit and project-management knowledge through networks; learning technical and quality standards; creation of innovation and shared knowledge; localization of knowledge and reinforcement of sustainable organizational learning	41–60
Relational capital and network legitimacy	Acquisition of initial trust and legitimacy through members' credibility; continuation and deepening of relationships after project completion; transparency during crises as a mechanism for strengthening network trust	81, 82, 83, 84, 86, 87, 88, 89
Institutional networking and target-market knowledge	Identification of market needs and technology redesign through local networks; acquisition of informal institutional knowledge through expatriate and contractor networks; assessment of partners' institutional positions and stakeholder-network mapping; gradual market entry for institutional learning; target-market selection based on network accessibility	101–110
International supply-chain networking	Joining standardized suppliers with international experience; integration with regional supply and specialized logistics networks; suppliers as sources of knowledge and intermediaries for network expansion; redesigning supply networks based on sustainability requirements	61–70



Networking for risk management and project governance	Integration of legal consultants and inspection bodies into project networks; evaluation and monitoring of network members for supply and schedule risk control; establishment of shared digital infrastructure and cultural alignment; collaborative management of project risk and crises	71–79
Networking for standardization and regulatory legitimacy	Connection to laboratories and certification bodies for product validation; alignment of technical documentation and proactive monitoring of standards; reduction of regulatory non-compliance through technical inspection networks; development of sustainability documentation and technology registration; continuous reputation management and alignment with global standards	131–140
Operational networking and implementation coordination	Establishment of shared operational coordination mechanisms; analysis of activity-dependency networks to control delays; technical and linguistic coordination in multinational networks; integration of supply and implementation networks with multilevel decision structures; implementation-conflict management and network cohesion	151–160
Legal and contractual networking	Shared and hierarchical dispute-resolution mechanisms; legal risk management through governing-law selection and network analysis; clarification of roles and responsibilities; preventive legal review and formalization of network interactions	161–169
Networking for technology development and commercialization	Technology commercialization and validation through networks; localization and technological learning from foreign partners; alignment of technology with global standards; data-driven innovation based on market-network needs	91–99
Technological collaboration and interorganizational innovation networking	Learning integrated project management and industrialization through networks; university–industry–contractor synergy; consolidation of interorganizational learning and technological upgrading; utilization of network knowledge memory and reciprocal knowledge exchange	111–119
Financial networking and international capital mobilization	Access to project investors through international networks; strengthening financial and insurance credibility; sharing financial risks and pooling capacity through consortia; local partners' participation in ownership structures; learning foreign-exchange risk management; financing networks as a basis for sustainable internationalization	121–130
Knowledge-management networking and inter-project learning	Documentation of experience and establishment of inter-project lessons-learned repositories; transfer of successful practices and creation of shared knowledge capital; learning from implementation errors and managerial experience; integration of stakeholder feedback and international circulation of human resources	141–149
Outcomes of network-based internationalization	Network governance as a determinant of project success; accumulation of reputation and transformation of relational capital into sustainable competitive advantage; technology co-creation as a driver of internationalization; absorption and localization of network knowledge as a competitive advantage; transformation of foreign-project experience into continuous organizational learning; design of network-based contracts as a mechanism for reducing conflict	80, 85, 90, 100, 120, 150, 170

The axial-coding results revealed that the identified concepts represented functionally distinct but mutually dependent dimensions of network-based internationalization. Foreign-market entry and strategic partner selection constituted the initial mechanisms through which companies established access to international opportunities and assembled complementary resources. Once relationships were established, networks served as channels for technological learning, knowledge exchange, commercialization, institutional adaptation, and development of relational legitimacy. At the same time, successful international activity required an enabling infrastructure composed of international supply chains, regulatory and standardization networks, project-governance mechanisms, operational coordination, and contractual arrangements. The categories related to technological collaboration, financing, and inter-project knowledge management represented mechanisms through which firms actively exploited their networks to develop capabilities rather than merely maintain relationships. Importantly, the results suggested that internationalization was cumulative. Reputation developed in one project facilitated access to subsequent opportunities; knowledge acquired from foreign partners became embedded in organizational routines; relationships with investors and suppliers expanded access to resources; and experience accumulated across projects strengthened the company's capacity to participate in increasingly complex international networks. Thus, networking functioned simultaneously as an access mechanism, a learning mechanism, a governance structure, and a capability-development process.

In the selective-coding stage, relationships among the axial categories were examined using the Strauss and Corbin paradigmatic framework. The analysis identified network-based internationalization in knowledge-based companies in the construction industry as the central phenomenon capable of integrating the different dimensions emerging from the data. This central phenomenon refers to a process through which knowledge-based firms create, develop, govern, and utilize interorganizational relationships to acquire the knowledge, technology, legitimacy, resources, market access, financing, supply capacity, and implementation capabilities necessary for entry into and sustained participation in foreign markets. The 15 axial categories were subsequently organized according to their respective functions as causal conditions, contextual conditions, intervening conditions, strategies, and consequences. Table 3 presents the resulting paradigmatic organization.



Table 3. Axial Coding of Categories Based on the Paradigmatic Model

Paradigmatic element	Axial category	Relationship with the central phenomenon
Causal conditions	Networking for foreign-market entry	Establishing relationships with specialized actors in the construction industry enables identification of foreign opportunities and provides initial access to international markets and projects, thereby initiating the network-based internationalization process.
Causal conditions	Networking for strategic partner and consortium selection	Actual participation in foreign projects requires partners that complement the knowledge-based firm's technical, implementation, institutional, financial, and relational capabilities. Partner selection and consortium formation establish the initial structure of the firm's international network.
Central phenomenon	Network-based internationalization in knowledge-based companies in the construction industry	A process through which knowledge-based companies establish, develop, and utilize interorganizational relationships to obtain access to knowledge, markets, technology, resources, legitimacy, and complementary capabilities required for entry into and sustained activity in foreign markets.
Contextual conditions	Institutional networking and target-market knowledge	Destination-market institutions, stakeholder relationships, tendering practices, decision-making structures, and access to formal and informal information create the specific environment within which network-based internationalization occurs.
Contextual conditions	International supply-chain networking	Access to suppliers, logistics capacities, materials, equipment, and specialized services provides the implementation context necessary for deploying the firm's technology and undertaking foreign projects.
Intervening conditions	Relational capital and network legitimacy	Trust, professional credibility, prior collaboration, and legitimacy within the network can facilitate or constrain access to new opportunities and the continuation of collaboration.
Intervening conditions	Networking for risk management and project governance	The quality of risk management, information flows, decision-making structures, and governance of relationships among network members influences the effectiveness with which internationalization strategies can be implemented.
Intervening conditions	Networking for standardization and regulatory legitimacy	Acceptance of the firm's technology in the target market depends on conformity with technical and regulatory standards and validation by recognized institutions, which may facilitate or constrain international commercialization.
Intervening conditions	Operational networking and implementation coordination	Coordination among design, procurement, execution, and other project actors affects network performance and determines the firm's ability to utilize partners' capabilities within international projects.
Intervening conditions	Legal and contractual networking	Clarity of responsibilities, contractual design, dispute-resolution mechanisms, and legal-risk management affect the stability of network relationships and the continuity of collaboration among project actors.
Strategies	Networking for knowledge transfer and technological learning	Knowledge-based firms use interactions with network members to acquire technical and managerial knowledge, exchange experience, learn international standards, and localize knowledge for domestic and foreign projects.
Strategies	Networking for technology development and commercialization	Relationships with partners, clients, consultants, and specialized organizations are used to validate, adapt, improve, and commercialize technologies in foreign markets.
Strategies	Technological collaboration and interorganizational innovation networking	Firms collaborate with universities, contractors, technology companies, and other network members to combine knowledge, develop joint solutions, and create innovation within construction projects.
Strategies	Financial networking and international capital mobilization	Relationships with investors, financial institutions, insurers, and financially capable partners provide access to funding, facilitate risk sharing, and enable implementation of projects exceeding the independent financial capacity of the knowledge-based company.
Strategies	Knowledge-management networking and inter-project learning	Experiences gained from foreign projects are preserved and reused through documentation, dissemination of lessons learned, mobility of specialized personnel, stakeholder feedback, and knowledge sharing across projects.
Consequences	Outcomes of network-based internationalization	Effective network governance contributes to project success; accumulated reputation and relational capital become sustainable competitive advantages; technology co-creation promotes further internationalization; absorption and localization of network knowledge strengthen competitive capability; foreign-project experience develops continuous organizational learning; and network-oriented contractual design reduces conflicts.

The paradigmatic analysis demonstrated that network-based internationalization develops through a coherent process rather than through isolated networking activities. Networking for foreign-market entry and strategic partner selection constituted the principal causal conditions because they initiated access to international opportunities and created the basic relational architecture required for international activity. However, these causal mechanisms operated within specific contextual conditions. Institutional networking determined the firm's capacity to understand formal and informal rules, stakeholder structures, tendering mechanisms, and decision-making processes in the destination market, while international supply-chain networking provided access to the materials, services, logistics, and implementation resources required to translate market entry into an executable project. The effects of these conditions were further shaped by intervening factors. Relational capital and legitimacy affected whether the firm was trusted by other actors; risk-management and governance arrangements



influenced network stability; regulatory and standardization networks determined the acceptability of the firm's technologies; operational coordination influenced execution effectiveness; and legal and contractual structures shaped the durability and predictability of collaboration.

Within these conditions, firms adopted five major categories of network-based strategies. Knowledge transfer and technological learning enabled companies to acquire explicit and tacit knowledge from international collaboration and subsequently localize that knowledge. Technology-development and commercialization networking allowed firms to validate technologies, obtain market feedback, redesign products, and align technological solutions with international requirements. Interorganizational innovation networking enabled knowledge-based firms to combine the expertise of universities, contractors, technology providers, and other specialized actors in creating new solutions. Financial networking provided access to capital, insurance, guarantees, investors, and mechanisms for distributing financial risk. Knowledge-management and inter-project learning ensured that international experience was retained rather than disappearing at project completion. Together, these strategies transformed network participation into organizational capabilities.

The consequences identified in the data further indicated that successful network-based internationalization produced effects beyond immediate foreign-market participation. Effective network governance improved the probability of project success, while successful collaboration accumulated reputational and relational capital that facilitated entry into subsequent markets and projects. Joint technological development strengthened the innovative position of the company and generated further opportunities for international participation. The ability to absorb and localize network-based knowledge gradually became an organizational competitive capability, while systematic conversion of foreign-project experience into organizational knowledge strengthened continuous learning. Finally, contractual arrangements designed around network relationships reduced ambiguity and conflict among participating organizations. The final model therefore indicates a recursive and cumulative process in which networking enables initial internationalization, international experience generates knowledge, reputation, and capabilities, and these accumulated resources subsequently strengthen the firm's position in international construction networks and facilitate further internationalization.

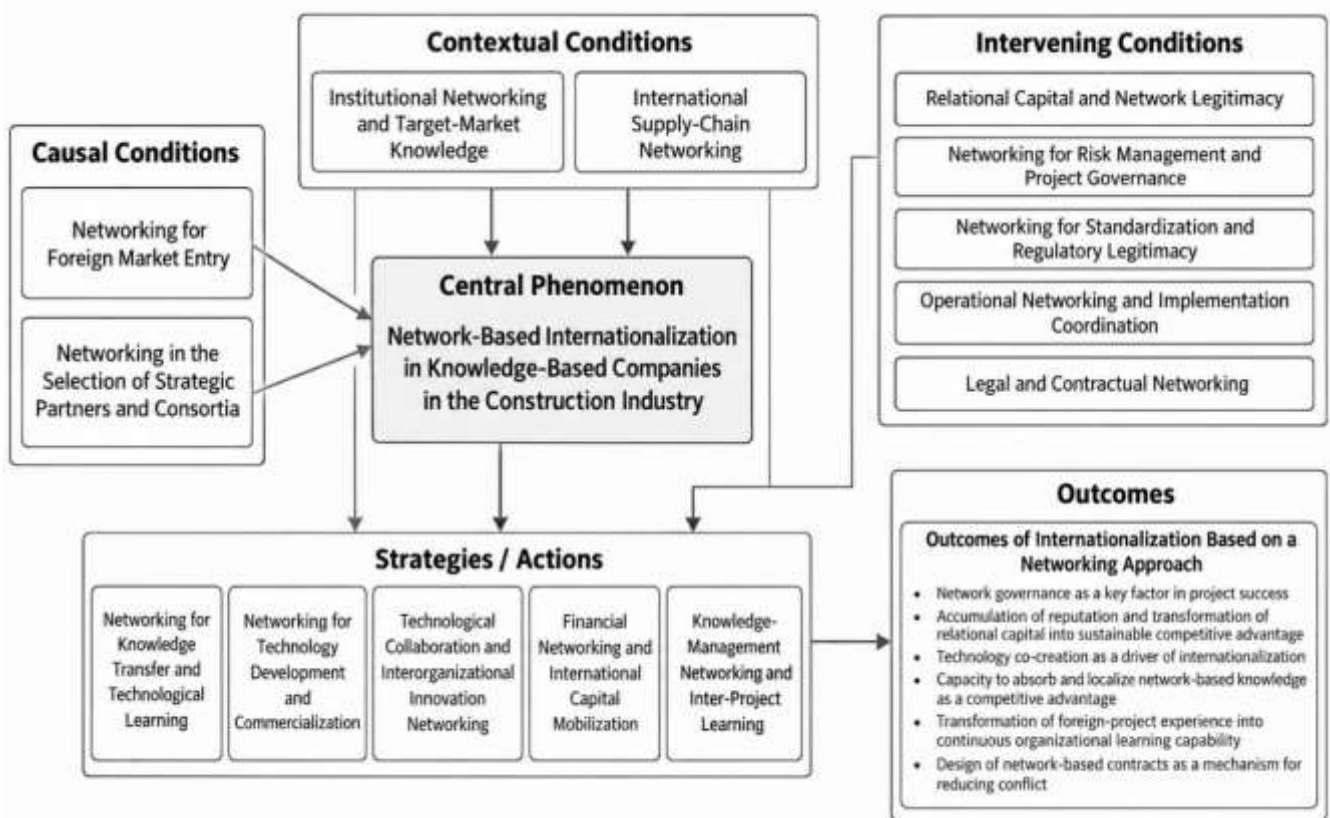


Figure 1. Paradigmatic Model of Network-Based Internationalization in Knowledge-Based Companies in the Construction Industry

4. Discussion and Conclusion

The present study sought to identify the components of an internationalization model based on networking for knowledge-based companies operating in the construction industry. The findings indicated that internationalization in this context is not a discrete act of foreign-market entry but a cumulative, relational, and capability-building process in which firms progressively acquire access to markets, legitimacy, knowledge, technology, finance, supply resources, institutional information, and implementation capacity through interorganizational networks. The grounded-theory analysis produced 70 initial concepts and 15 axial categories that were subsequently organized within a paradigmatic structure consisting of causal conditions, contextual conditions, intervening conditions, strategies, and outcomes. The central phenomenon was identified as network-based internationalization in knowledge-based companies in the construction industry. This finding is consistent with the broader internationalization literature, which increasingly emphasizes that firms, particularly smaller and knowledge-intensive organizations, internationalize through combinations of dynamic capabilities, entrepreneurial orientation, network embeddedness, and external resource mobilization rather than through internally controlled assets alone (Han et al., 2024; Mostafiz et al., 2025; Yang et al., 2025). The result also corresponds with evidence that internationalization strategies in small and medium-sized enterprises are strongly shaped by the ability to align internal competencies with external opportunities and collaborative arrangements (Bi et al., 2024; Rahmat, 2022).

The first major finding concerned the causal conditions of the model, namely networking for foreign-market entry and networking in the selection of strategic partners and consortia. The interviews showed that access to foreign markets was facilitated through relationships with consultants, suppliers, universities, professional associations, designers, contractors, and local intermediaries, while the selection of partners depended on technical experience, institutional access, financial capacity, professional reputation, network position, and willingness to share knowledge. This finding supports the argument that internationalization frequently begins through existing social and business networks that reduce informational uncertainty and provide firms with access to opportunities that would be difficult to identify independently (Gupta et al., 2022; Han et al., 2024). It is also aligned with studies showing that partner selection in strategic alliances requires attention to prior experience, complementarity, compatibility, and the complexity of the intended collaboration (Vaez-Alaei et al., 2022). The importance of partner reputation and relational resources is similarly consistent with findings from research on strategic alliance success and strategic partner selection, which emphasize trust, complementary capabilities, organizational fit, and access to wider business networks (Abramian & Harandi, 2022; Jadid al-Eslami & Arbabi, 2021). In the construction context, these relationships are particularly important because foreign projects are usually executed through temporary multi-actor structures rather than by a single firm acting independently.

A related interpretation is that strategic partners are valuable not only because of what they directly own but also because of the actors, institutions, and opportunities to which they provide access. The present findings showed that the social capital and network position of a prospective partner could be more strategically valuable than its physical resources. Such a finding extends conventional resource-based explanations of internationalization by demonstrating that relational resources can function as indirect assets. This is consistent with evidence that partnerships can improve organizational access to opportunities, resources, and capabilities beyond the boundaries of the firm (Dar, 2022). It also reflects findings that firms can strengthen legitimacy and market standing through collaboration with credible business partners, thereby reducing uncertainty among external stakeholders (Iglesias et al., 2023). In this respect, the internationalization of knowledge-based construction companies may be viewed as a process of gaining entry into established networks rather than simply gaining entry into geographic markets.

The second major set of findings concerned the contextual conditions of internationalization, consisting of institutional networking and target-market knowledge and international supply-chain networking. The results indicated that firms needed access to both formal and informal knowledge about target markets, including tendering practices, stakeholder structures, decision-making processes, regulatory requirements, local business norms, supply channels, logistics, and project-specific institutional arrangements. This finding accords with research demonstrating that emerging-market SMEs are strongly influenced by the institutional environments in which they originate and operate internationally (Kumari et al., 2025). It is also compatible with work emphasizing the importance of market understanding and strategic adaptation in international



marketing activities (Esmaeilpour, 2024; Ghasem Ghanem al-Wahili, 2024). The fact that some of this knowledge was accessible primarily through local partners and professional networks reinforces the idea that institutional knowledge is partly tacit and relational rather than fully codified.

International supply-chain networking also emerged as a contextual requirement rather than a peripheral operational issue. Knowledge-based construction companies were found to depend on networks of suppliers, specialized logistics providers, equipment vendors, and service organizations in order to operationalize their technologies in foreign projects. This is consistent with studies of construction internationalization that conceptualize the industry as part of a broader global value chain in which firms rely on interconnected flows of materials, technology, expertise, and implementation capacity (Niu et al., 2023). The result also aligns with research showing that construction performance increasingly depends on network embeddedness across multiple organizational levels (Wang et al., 2025). Thus, possession of a proprietary technology alone is insufficient for successful internationalization if the company cannot integrate that technology into the supply, procurement, and execution networks of the target market.

The intervening conditions identified in the model included relational capital and network legitimacy, risk management and project governance, standardization and regulatory legitimacy, operational coordination, and legal and contractual networking. The finding that trust, credibility, and accumulated reputation shape the effectiveness of network-based internationalization is strongly supported by the broader literature on alliances and interorganizational relationships. Strategic relationships tend to become more productive when participants perceive one another as reliable and legitimate, whereas reputational uncertainty increases transaction and coordination costs (Dar, 2022; Iglesias et al., 2023). The present study adds that, in international construction, relational legitimacy can substitute partly for a limited foreign track record. A newly internationalizing knowledge-based company may therefore overcome initial credibility deficits by entering projects through reputable consortium partners, recognized consultants, or established network members.

Risk management and network governance were also found to affect the success of internationalization. Participants emphasized the importance of monitoring network members, establishing shared information systems, coordinating responses to crises, and developing mechanisms for managing supply and scheduling risks. This finding is consistent with research that views business partnering as an important means of strengthening resilience in risk management (Tillema et al., 2022). It also supports evidence that network structures and embeddedness can influence project outcomes in highly complex construction environments (Wang et al., 2025). In project-based internationalization, the network must therefore be governed rather than merely expanded. A large network without coordination, information transparency, and decision mechanisms may increase rather than reduce uncertainty.

The importance of standardization and regulatory legitimacy represents another significant finding. The results showed that foreign commercialization of construction technologies required links with laboratories, certification bodies, technical inspection organizations, professional institutions, and other actors capable of validating technological performance and regulatory compliance. This is especially relevant for knowledge-based construction companies because their offerings often involve technologies that must satisfy safety, quality, sustainability, and technical requirements before market acceptance. The finding corresponds with research showing that internationalization increases firms' exposure to institutional and stakeholder expectations, including environmental disclosure and accountability requirements in the construction sector (Liu et al., 2025). It also complements work on the digital transformation of construction, where technologies such as BIM, IoT, and digital twins depend on shared technical standards and interoperable information environments (Shishehgharkhaneh et al., 2022). Regulatory legitimacy can therefore be interpreted as a relationally constructed resource that is developed through connections with recognized technical and institutional actors.

Operational and legal coordination similarly emerged as important intervening mechanisms. The findings demonstrated that multinational construction networks require shared protocols, coordinated reporting, clear decision hierarchies, technical and linguistic alignment, and mechanisms for managing implementation conflict. These issues are structurally related to the project-based nature of construction, where multiple organizations must perform highly interdependent tasks within fixed time and cost constraints. The legal findings further showed that governing law, role clarity, dispute-resolution procedures, and preventive contract review contribute to network stability. This is consistent with studies emphasizing the legal significance of

partner entry, exit, and role definition in commercial relationships (Wafi Nouri, 2023). It also resonates with research demonstrating that poorly structured business-partner roles can become a source of conflict within organizations (Winch, 2021). Network-based internationalization therefore requires both relational trust and formal contractual safeguards.

The strategic dimension of the model consisted of networking for knowledge transfer and technological learning, technology development and commercialization, interorganizational innovation, international financing, and knowledge management across projects. Among these, knowledge transfer and technological learning were particularly prominent. Participants described international networks as channels through which firms learned technical standards, project management practices, advanced construction technologies, quality systems, and tacit implementation knowledge. This result closely corresponds with the absorptive-capacity literature, which indicates that the benefits of internationalization depend on the firm's ability to recognize, assimilate, and apply externally acquired knowledge (Freixanet & Federo, 2025). The findings also align with studies demonstrating that managerial capabilities and innovation processes influence international performance among innovative SMEs (Merín-Rodrigáñez et al., 2025). Internationalization may thus produce learning advantages only when firms possess mechanisms for converting network exposure into internal capability.

The role of technological collaboration and interorganizational innovation was also evident. Participants emphasized cooperation among universities, contractors, technology firms, and other specialized actors in creating new or adapted technological solutions. This finding is strongly aligned with evidence on collaborative innovation networks in the construction industry, where innovation develops through evolving relationships among multiple organizations rather than through isolated internal R&D (Wang & Cheng, 2025). It also supports the logic of strategic alliances in which organizations pool complementary knowledge and capabilities to achieve outcomes that would be difficult to realize independently (Rocha et al., 2022). For knowledge-based construction firms, this means that internationalization can simultaneously function as a commercialization process and an innovation process.

Networking for technology development and commercialization additionally showed that companies use market relationships to validate, adapt, and redesign technologies in response to foreign customer and project requirements. This is consistent with research emphasizing the importance of business-model innovation and dynamic managerial capabilities in improving export performance (Merín-Rodrigáñez et al., 2025). It also reflects evidence that digitalization can strengthen firms' ability to adapt their international strategies under uncertain conditions (Crespo et al., 2024). Although knowledge-based construction firms differ from fully digital businesses, digital technologies increasingly support cross-border coordination, technical adaptation, remote collaboration, and knowledge exchange. The internationalization of digital firms therefore provides a relevant conceptual parallel, particularly regarding the role of scalable technological capabilities and adaptive market strategies (Yang & Stoian, 2025).

Financial networking constituted another important strategy. Firms in the study relied on investors, insurers, financial institutions, consortium partners, and local equity participation to mobilize capital and share financial risks. This result is consistent with research demonstrating that business partnerships can be structured to mobilize complementary resources and improve organizational viability (Eslami, 2023). It is also compatible with the view that SMEs require strategic management of scarce resources during internationalization (Bi et al., 2024). In construction, where project financing, guarantees, insurance, and working capital requirements may be substantial, network-based access to finance can be a prerequisite for international participation rather than merely a support function.

The findings related to knowledge management and inter-project learning further demonstrated that internationalization becomes sustainable when firms retain and reuse experience gained from foreign projects. Documentation of lessons learned, circulation of specialists, learning from errors, and transferring successful practices across projects allowed project-specific experience to become organizational knowledge. This result is compatible with the dynamic-capabilities perspective, according to which international growth depends on the ability to reconfigure and redeploy capabilities after entry (Yang et al., 2025). It also supports the configurational view that international performance emerges through the interaction of entrepreneurial orientation and dynamic internationalization capabilities rather than through any single resource (Mostafiz et al., 2025). In



this sense, repeated international activity can create path-dependent learning that gradually reduces the liabilities associated with foreign-market participation.

Finally, the outcomes identified in the model included project success through network governance, accumulation of reputation and relational capital, technology co-creation, absorption and localization of external knowledge, continuous organizational learning, and reduction of conflict through network-oriented contractual design. These outcomes demonstrate that the benefits of network-based internationalization extend beyond the acquisition of foreign sales or projects. They include the creation of capabilities that improve the firm's future international competitiveness. This interpretation corresponds with evidence that internationalization, absorptive capacity, and firm resources can interact to enhance innovation performance (Freixanet & Federo, 2025). It also aligns with the argument that dynamic internationalization capability contributes to sustainable international performance (Mostafiz et al., 2025). The results therefore suggest a reinforcing cycle: networks enable internationalization, international projects produce knowledge and reputation, these assets enhance organizational capabilities, and strengthened capabilities improve the firm's position in subsequent international networks. Such a cumulative interpretation is also consistent with studies of knowledge-based companies emphasizing the importance of entrepreneurial orientation and strategic capability development (Mohtasham et al., 2026; Yadollahi, 2021). Overall, the developed model contributes to the literature by integrating market entry, partner selection, institutional access, supply networks, legitimacy, risk governance, technological collaboration, financing, contractual coordination, and organizational learning into a unified explanation of how knowledge-based construction companies internationalize through networking.

The main limitations of this study arise from its qualitative and context-dependent design. The findings were generated from 25 expert interviews and therefore reflect the experiences and interpretations of participants familiar with knowledge-based and construction-related international activities. Although theoretical saturation was achieved, the resulting model should be understood as an analytically grounded explanation rather than a statistically generalizable representation of all knowledge-based construction companies. The study also depended substantially on retrospective accounts, which may be influenced by selective recall or participants' individual interpretations of successful and unsuccessful international experiences. Furthermore, the construction industry encompasses considerable diversity in technology type, company size, project scale, target country, and institutional environment, and some network mechanisms identified in the study may vary in importance across these different contexts.

Future research should examine how the proposed categories operate across different segments of the construction industry and across countries with different institutional, economic, and regulatory environments. Comparative qualitative studies could investigate whether technology developers, engineering consultants, material producers, digital construction firms, and project contractors follow distinct networking pathways to internationalization. Longitudinal research would also be valuable for observing how networks evolve from the initial foreign-market entry stage to repeated project participation and how trust, reputation, learning, and network position accumulate over time. Future studies could further explore negative or unsuccessful network experiences, including partner opportunism, network lock-in, overdependence on key intermediaries, knowledge leakage, failed consortia, and contractual disputes, because these phenomena may reveal important boundary conditions for effective network-based internationalization.

In practice, managers of knowledge-based construction companies should approach internationalization as a network-development process rather than as an isolated export or sales initiative. Before entering a foreign market, firms should map the relevant project ecosystem, including clients, consultants, contractors, suppliers, regulatory bodies, certification organizations, universities, financial institutions, and potential local partners, and then identify which relationships are necessary to compensate for internal capability gaps. Partner selection should evaluate relational capital, institutional access, technical complementarity, legal credibility, knowledge-sharing orientation, and financial capacity alongside conventional technical criteria. Companies should also formalize mechanisms for capturing knowledge from each international project, maintain relationships after project completion, develop shared digital and operational protocols, integrate legal and regulatory expertise early in project formation, and treat trust, reputation, and interorganizational learning as strategic assets that can be deliberately accumulated and leveraged in subsequent international opportunities.



Ethical Considerations

All procedures performed in this study were under the ethical standards.

Acknowledgments

Authors thank all who helped us through this study.

Conflict of Interest

The authors report no conflict of interest.

Funding/Financial Support

According to the authors, this article has no financial support.

References

- Abramian, R., & Harandi, A. (2022). Ranking Factors Affecting Strategic Partner Selection in the Upstream Oil and Gas Industry. *Strategic studies in the oil and energy industry*(15), 1-20.
- Bi, S., Sass, M., & Gáspár, T. (2024). Internationalization strategy management for small and medium-size enterprises: A case study of LED industrial enterprise. *Corporate & Business Strategy Review*, 5(1), 204-215. <https://doi.org/10.22495/cbsrv5i1art19>
- Crespo, N. F., Crespo, C. F., & Silva, G. M. (2024). Every cloud has a silver lining: The role of business digitalization and early internationalization strategies to overcome cloudy times. *Technological Forecasting and Social Change*, 200, 123084. <https://doi.org/10.1016/j.techfore.2023.123084>
- Dar, A. A. (2022). Effect of partnership on business: A case study. *Journal of Economics, Trade and Marketing Management*, 4(1), 45-55. <https://doi.org/10.22158/jetmm.v4n1p45>
- Eslami, S. F. (2023). *Modeling Business Partnerships Using Data Envelopment Analysis* University of Birjand, Faculty of Mathematical Sciences and Statistics].
- Esmailpour, H. (2024). *International Marketing Management* (15 ed.). Negah Danesh.
- Freixanet, J., & Federo, R. (2025). A configurational analysis of internationalization, absorptive capacity, and resource-based factors explaining firms' innovation performance. *International Business Review*, 34(4), 102449. <https://doi.org/10.1016/j.ibusrev.2025.102449>
- Ghasem Ghanem al-Wahili, A. (2024). *Developing a Model for the Internationalization Process of Marketing Activities in Iraqi Companies* University of Mohaghegh Ardabili, Faculty of Social Sciences].
- Gupta, V., Rubalcaba, L., Gupta, C., & Pereira, L. F. (2022). Library social networking sites for fostering startup business globalization through strategic partnerships. *The Journal of Academic Librarianship*, 48(6), 102504.
- Han, X., Goxe, F., & Freeman, S. (2024). Internationalization through social networks: A systematic review and future research agenda. *International Business Review*, 33(4), 102292. <https://doi.org/10.1016/j.ibusrev.2024.102292>
- Iglesias, O., Mingione, M., Ind, N., & Markovic, S. (2023). How to build a conscientious corporate brand together with business partners: A case study of Unilever. *Industrial Marketing Management*, 109, 1-13.
- Jadid al-Eslami, S., & Arbabi, H. (2021). Explaining the Main Factors Affecting the Success of Strategic Alliances in Project-Based Organizations in Iran. *Science and Technology Policy Letters*(2), 137-149.
- Kumari, S., Shirodkar, V., & McGuire, S. (2025). The impact of home institutions on the internationalization of emerging market SMEs: A systematic review. *Multinational Business Review*, 33(1), 68-96. <https://doi.org/10.1108/MBR-03-2024-0045>
- Liu, M., Luo, X., Zhang, R., Ding, Y., & Lu, W. Z. (2025). Coming clean: The impact of firm internationalization on environmental information disclosure in the construction industry. *Journal of Management in Engineering*, 41(3), 04025006. <https://doi.org/10.1061/JMENE.MEENG-6312>
- Merín-Rodríguez, J., Alegre, J., & Dasí, À. (2025). International entrepreneurship in innovative SMEs: Examining the connection between CEOs' dynamic managerial capabilities, business model innovation and export performance. *International Business Review*, 34(2), 102321. <https://doi.org/10.1016/j.ibusrev.2024.102321>
- Mohtasham, S. S., Alidoust Zoghi, P., Gholipour Soleimani, A., & Ghanbarian Boroujeni, A. (2026). Presenting a Paradigmatic Model of Entrepreneurial Orientation in Knowledge-Based Companies. *Technology in Entrepreneurship and Strategic Management*, 5(2), 1-22.
- Mokhtari Shirejini, J., Hadian, E., Samadi, A. H., & Sadraei Javaheri, A. (2023). The Role of Trade Partner Diversification in the Impact of International Economic Fluctuations on Iran's Economy. *Economic Research: Sustainable Growth and Development*, 23(4), 71-106.
- Mostafiz, M. I., Ahmed, F. U., Tardios, J., Hughes, P., & Tarba, S. Y. (2025). Configuring international entrepreneurial orientation and dynamic internationalization capability to predict international performance. *International Business Review*, 34(2), 102275. <https://doi.org/10.1016/j.ibusrev.2024.102275>
- Niu, W., Xu, Z., Liu, B., & Liu, C. (2023). Internationalization of the construction industry in the global value chain. *Technological and Economic Development of Economy*, 29(4), 1336-1352. <https://doi.org/10.3846/tede.2023.19426>
- Odediran, S. J., Ojo, G., Oladunmoye, F. R., & Bayo-Adegoke, E. A. (2025). Exporting construction services to West Africa: A study of Nigerian firms' resources and capabilities. *Frontiers in Built Environment*, 11, 1695401. <https://doi.org/10.3389/fbuil.2025.1695401>
- Rahmat, H. (2022). *Designing a Model to Identify and Rank Drivers of Small and Medium-Sized Business Internationalization* Payame Noor University of Bushehr Province, Asaluyeh Center].



- Rocha, J., Castillo-Lavergne, C. M., Byrd, M. J., Carnethon, M. R., Miller, R., & Lin, M. (2022). Reimagining educational equity through strategic alliance partnerships in response to the USA STEM-M diversity gap. *Health Promotion International*, 37(2), daab094.
- Shishehgharkhaneh, M. B., Keivani, A., Moehler, R. C., Jelodari, N., & Laleh, S. R. (2022). Internet of Things (IoT), Building Information Modeling (BIM), and Digital Twin (DT) in construction industry: A review, bibliometric, and network analysis. *Buildings*, 12(10), 1503. <https://doi.org/10.3390/buildings12101503>
- Tillema, S., Trapp, R., & van Veen-Dirks, P. (2022). Business partnering in risk management: A resilience perspective on management accountants' responses to a role change. *Contemporary Accounting Research*, 39(3), 2058-2089.
- Page | 19 Vaez-Alaei, M., Deniaud, I., Marmier, F., Gourc, D., & Cowan, R. (2022). A partner selection framework for strategic alliances based on project complexity and partner's past experience. *Enterprise Information Systems*, 16(6), 1889038. <https://doi.org/10.1080/17517575.2021.1889038>
- Visco, V., Ferruzzi, G. J., Nicastro, F., Virtuoso, N., Carrizzo, A., & Galasso, G. (2021). Artificial intelligence as a business partner in cardiovascular precision medicine: An emerging approach for disease detection and treatment optimization. *Current Medicinal Chemistry*, 28(32), 6569-6590.
- Wafi Nouri, S. (2023). *Legal Regulations Governing Partner Entry and Exit in Commercial Companies in Iraq, Lebanon, and the United Arab Emirates* University of Religions and Denominations, Faculty of Law].
- Wang, F., & Cheng, M. (2025). How does the collaborative innovation network in construction industry evolve? Evidence from China. *Journal of Civil Engineering and Management*, 31(2), 97-112. <https://doi.org/10.3846/jcem.2025.23017>
- Wang, S., Chong, H. Y., Zhang, W., Xia, X., & Liu, Y. (2025). Effects of dual network embeddedness in distinct organizational network levels on megaproject performance [Advance online publication]. *Engineering, Construction and Architectural Management*. <https://doi.org/10.1108/ECAM-01-2025-0075>
- Winch, S. (2021). Human resource business partner as a source of conflicts in an enterprise—Research results. *JEEMS Journal of East European Management Studies*, 26(2), 198-213.
- Yadollahi, S. (2021). *Examining Internationalization Strategies through Structural Classification of Knowledge-Based Companies* University of Kurdistan, Faculty of Humanities and Social Sciences].
- Yang, B., Bai, W., Chen, Y., & Rong, K. (2025). Internationalization of digital firms: A systematic review and research agenda. *Journal of Business Research*, 189, 115124. <https://doi.org/10.1016/j.jbusres.2024.115124>
- Yang, H., & Stoian, M. C. (2025). Post-entry internationalization of born globals: The role of dynamic capabilities in accelerating growth. *International Business Review*, 34(2), 102299. <https://doi.org/10.1016/j.ibusrev.2024.102299>

