Effect of Inter-organizational Learning on Construction SMEs Performance

A M Alashwal¹, W W Low² and N A M Kamis³

¹ School of Computing, Engineering and Mathematics, Western Sydney University, NSW, Australia
² Department of Civil and Construction Engineering, Curtin University Malaysia, Miri Sarawak
³ Department of Quantity Surveying, University of Malaya, Kuala Lumpur

Abstract. Construction small and medium-sized enterprises (SMEs) face different challenges pertaining to their competitiveness and capabilities. Inter-organizational learning (IOL) is a key activity that contributes to organizational development and long-term survival. The purpose of this paper is to investigate whether IOL has an influence on SMEs performance. A questionnaire survey was used to collect data from 81 construction SMEs in Malaysia. Partial least square-structural equation modeling (PLS-SEM) was used to analyze the data. The results showed a strong and positive relationship between IOL and SME performance. Based on the findings, a new model has been proposed to explain how performance can be enhanced through three activities of IOL, namely internalization, externalization, and intra-organization learning. Enhancing the performance of SMEs is essential for the performance of the whole construction industry and this paper has contributed toward this main goal.

1. Introduction

Small and medium-sized enterprise (SME), under the services and other sectors category, is defined as an organization in which its annual sale turnover is less than 20 million Malaysian Ringgit (equivalent to about 5 million USD) or has full-time employees of not exceeding 75 [1]. Construction SMEs play a critical role in the development of Malaysian economy as they form about 90% of the construction industry size [9] and support various activities of construction projects [10]. Although SMEs play a significant role in the construction supply chain, they are vulnerable to high level of risk [11]. They are also facing challenges in absorbing, transferring and implementing new knowledge and technology [9].

According to the study report of Small and Medium Industry Development Plan 2001-2005 [2], SMEs face various challenges that influence their performance including low productivity, low-quality output, and limited capacity for knowledge acquisition. Knowledge is an important resource for any organization to remain competitive and achieve success in business [6, 7]. However, SMEs are established with weak structures, systems and normal routine which cause difficulty in knowledge diffusion within the enterprise [3]. In addition, SMEs are facing behavioral issues such as reluctance to delegate power and share knowledge [4]. Besides having a minimal mechanisms for knowledge-sharing, SMEs depend highly on external knowledge [5]. Thus, to remain competitive in the market, SMEs need
to develop mechanisms for identifying, acquiring and exploiting new knowledge [5]. Most of the successful SMEs depend on external supports [8].

Considering the above challenges and the fragmented nature of the construction industry, inter-organizational learning (IOL) seems a significant tool to support SMEs development and success. IOL is closely related to the external environment and has direct transactions with the organization such as competitors, suppliers, customers, regulators, and unions [12]. IOL contributes to knowledge creation in organizations through the development of strong inter-organizational relationship [13, 14]. Establishing external links is important for effective learning [15]. Regardless of the importance of this topic, very few studies have investigated the interplay between IOL and SME performance. For examples, Bouncken and colleagues [16] explored the impact of IOL on pioneer and follower strategy from the perspective of firms’ innovativeness. Choi and Ko [17] focused on the capability of IOL on e-collaboration and firm performance. Therefore, the purpose of this paper is to shed more light into the influence of IOL on SME performance in construction.

2. SME Features and Performance

Most of SMEs are sole-proprietorship enterprises in which they are dominated by owner-manager that has full authority on the enterprise [15]. Owner-manager plays an important role in incorporating new knowledge [5] but SMEs rarely have qualified owner-managers [8]. Organizations cannot evolve individually without acquiring additional resources [18]. However, SMEs have a minimum structural mechanism for knowledge sharing and power delegation [4]. Jones and Macpherson [5] suggest that owner-manager needs to practice proactive approach and incorporate appropriate inter-organizational relationship. Thus, owner-manager has a key role in developing methods to relate and adapt external knowledge and distributing responsibility or knowledge through formal system [4]. SMEs cannot depend solely on developing internal knowledge. Most successful SMEs are established by external supports that often contribute benefits to them [8]. As shown in Figure 1, the main factor contributing to SMEs success is external environment. The external environment in this context is defined as sectors that affect organizations and is comprised of economic, technological, socio-cultural, and political-legal factors.

SMEs are usually established with limited structures, systems, and resources that cause difficulty in knowledge diffusion within the enterprise [3]. In Malaysia, SMEs have been affected by major deficiencies such as low productivity, relatively low business formation, and low growth rate [19]. In addition, SMEs are facing difficulties to sustain in the market due to high competition, poor preparation, and relying on the support from the government [20]. As such, IOL seems an important factor in the development of SMEs and its performance. The following section explains the concept of IOL and highlights its association with SMEs performance.

The entrepreneurial (owner-manager) characteristics

The organizational context

The external environment

Success of SMEs

Figure 1. Strategic model of SMEs [12]
3. Inter-organizational Learning

Inter-organizational learning (IOL) was introduced possibly during the mid-1990s, shifting the focus of learning in a single organization to multiple-organizations and inter-organizational networks. An organization’s internal learning is completed by external learning, which occurs through interdependencies among organizations [21, 22]. The process of best learning occurs via dense interconnected social networks [23]. IOL is defined as a set of actions in which organizations through designated teams involved in acquiring, sharing, and combining knowledge with other organizations [24]. Ingram [25] defined IOL as the process occurs when an organization causes a change in another organization, either by sharing of experience or making innovations.

According to Baum and Ingram [22], the main source of performance improvement for an organization is learning from other organizations' experience. Learning output that can be gained via IOL is greater compared with individual, group or organizational level. For instance, by practicing IOL activities, an organization has more chances of learning success and failure factors from other organizations [24]. Nembhard [24] further stated that learning session in collaborative meeting provides chances for sharing technologies and experiences among firms. If compared with organizational learning, inter-organizational relationship enables further exploration in learning. Child [26] stated that cooperation with more partners supports shared identity development and organizational receptivity. IOL assists in clients and personnel exchange, knowledge and information sharing, innovation, strategic choices, and performance [21, 27].

SMEs are facing barriers in applying cross-organizational learning. Wyer et al. [28] mention culture, firm’s size, firm’s owner (or manager), and political issues as factors that distract learning in SMEs. Vieira [29] states that learning between organizations is restricted by confusing objectives and reluctance of taking risk. Baum and Ingram [22] state that lack of trust, uncertainty, and afraid of opportunism should be removed first to enable IOL. Martin and Schijven [30] support this opinion and address that organizations within the same industry are reluctant to disclose valuable information due to competition. Holmqvist [31] argues that learning in partnerships seems loose as organizations have different levels of experience and capabilities.

4. Socialization, externalization, combination, and internalization (SECI) model

According Nonaka [32], information and knowledge are different in which the former refers to “flow of messages” and the latter “is created and organized by the very flow of information, anchored on the commitment and beliefs of its holder” (p. 15). In general, there are two basic types of knowledge, namely, tacit and explicit knowledge. Explicit knowledge is “knowledge that is transmittable in formal, systematic language” and tacit knowledge is “hard to formalize and communicate…deeply rooted in action, commitment, and involvement in a specific context” [32, p. 16]. Nonaka and Takeuchi [33] developed a knowledge conversion model in which knowledge is converted from one type to the other using four modes, namely socialization, externalization, combination and internationalization (SECI). Knowledge can be converted into (1) tacit knowledge to tacit knowledge (socialization); (2) explicit knowledge to explicit knowledge (combination); (3) tacit knowledge to explicit knowledge (externalization); and (4) explicit knowledge to tacit knowledge (internalization) [32]. The concerns of this study is how to convert between tacit knowledge to explicit knowledge and explicit knowledge to tacit knowledge as knowledge is “complementary and can expand over time through a process of mutual interaction” [32, p. 19]. Externalization can be achieved via “writing of rules, procedures, instruction and communication” [34]. Externalization is critical as it could prevent knowledge loss [35] if an experienced personnel is no longer provide their service in an organization and it is significant especially in the construction industry which has high staff turnover rate. While, internalization can be achieved through the learning process such as case-based reasoning by identifying new tacit knowledge based on the existing explicit knowledge that one’s has [34].
5. Research Method

5.1. Context and Data Collection

A quantitative research strategy [36] was selected to determine the influence of IOL on SMEs performance. A questionnaire survey was developed to collect data from construction SMEs in the Federal Territory of Kuala Lumpur, Malaysia. Due to the difficulty in identifying all construction SMEs, only firms registered under the Construction Industry Development Board (CIDB) were selected. The contractors are categorized in CIDB based on their ability to procure for construction projects. Contractors of grade 1 to grade 5 were deemed small to medium firms and selected as the population of this study. Altogether, there were 2373 constructor firms, in which the random sample was taken from.

The questionnaire survey comprised of five sections. Section one is about respondents’ background including age, years of experience, and position in the enterprise. Section two included multiple-choice questions about enterprise business type (sole-proprietorship, limited, or partnership); number of employees (less than 5, 5 to less than 30, or 30 to 75); sales turnover (less than RM300,000, RM300,000 to less than RM3 million, or RM3 million to RM20 million); sub-sector type (residential buildings, non-residential buildings, civil engineering works, or special trades); and number of years of enterprise establishment. Section three included 11 items to measure enterprise performance using four aspects of the balanced scorecard [37]. The selected items are 1) Financial Aspect [systematic financial control, strong cash flow position, achieved financial planning]; 2) Customer Aspect [effective products and services delivery to customer, relationship with existing customer, quality of services provided to customer]; 3) Human Resource Aspect [employees productivity, enhance employee ability, motivation of employees]; and 4) Learning and Growth Aspect [employees and enterprise’s development opportunities and enterprise becomes more competitive]. These items were measured based on a 5-point Likert scale representing ‘bad’, ‘fair’, ‘neutral’, ‘good’ and ‘excellent’ performance. This is a balanced scale and was used to avoid distortions in the results as retraction of a mid-point may result in more negative ratings compared to when a mid-point is applied [38]. Section four included 15 items to measure IOL activities adapted from previous studies [5, 22-24, 27, 39, 40], which include meetings to learn best practice, conference calls, exchange of monthly reports with other enterprises, staff training, team-initiated telephone calls to other enterprises, collaborative extranet, presentation of business case by customer, consultations, involvement in Knowledge Transfer Partnership program, open discussion, import of experienced management skills, exhibition or congress, learning through research and development contract, learning through joint development agreement or joint venture, and sending employees to academic institution or research institute. These items were also measured using 5-point Likert scale representing ‘never’, ‘sometimes’, ‘neutral’, ‘often’ and ‘very often’ practices of IOL. Lastly, section five comprised of 11 barriers of IOL extracted from previous studies [21, 22, 39, 41], which are lack of trust, communication problem, formality of learning, diversity background between organizations, lack of appropriate method or tools, culture, short duration of learning, low absorptive capacity, reluctance of potential knowledge provider to share, focus on short-term performance and high competition. These items were rated using the degree of agreement of respondents with each item including ‘strongly disagree’, ‘disagree’, ‘neutral’, ‘agree’, and ‘strongly agree’.

The questionnaires were distributed to 160 SMEs, among them, 100 sets (62.5%) were distributed by hand using drop-off and pick up method, and 60 sets (37.5%) were distributed by e-mails. Eighty-one (50.6%) questionnaires were satisfactorily collected after two weeks of follow-ups. The returns from the drop-off and pick-up method were 63 sets (77.8%) while the returns from the online survey method were 18 sets (22.2%). According to Akintoye and Fitzgerald [42], the response rate of 20% to 30% for mail surveys in construction is acceptable.

5.2. Data Analysis

Descriptive data analysis used to identify the main barriers of IOL implementation based on mean values. Besides, the partial least squares structural equation modeling (PLS-SEM) used to determine the influence of IOL (predictor construct) on SME performance (dependent construct). PLS-SEM was selected due to its robustness in many aspects. First, PLS-SEM is more appropriate for exploratory
studies [43]. This is because the influence of IOL on construction SME performance is not supported by strong theoretical base. Second, PLS-SEM is useful when the purpose of the analysis is to obtain a maximum prediction of the dependent variable [44] such as how much SME performance is affected by IOL. Lastly, PLS-SEM is appropriate when the sample size is small and when the distribution of data is not normal or unknown [45, 46]. The sample size of this study is 81 respondents but was considered sufficient to achieve a good prediction. Based on the rule of thumb of Hair [47, p. 21], this sample size is sufficient for a statistical power of 80% for detecting values of $R^2$ between 0.25 to 0.50 with a 5% probability of error (considering a minimum of 10 arrows pointing to a construct in the model).

6. Results and Discussion

6.1. Background of Respondents and SMEs

Table 1 shows the demographic results of the respondents and participated enterprises. About 60% of the respondents are owner-managers, owners, or managers of SMEs. However, about half of the respondents have less than 5 years of experience in construction. This might be attributed to the high staff turnover of SMEs in construction [48] and the difficulty to retain experienced staff [49]. The major types of business of SMEs include sole-proprietorship and limited firms but only a small percentage of enterprises (about 10%) are in partnership with other firms. In addition, about 60% of SMEs have been operating for more than 10 years.
Table 1. Demographic information of the respondents and SMEs

| Item                                | Characteristics | Percentage (%) |
|-------------------------------------|-----------------|----------------|
| **Background of the respondents**   |                 |                |
| Age                                 | 20-29           | 45.7           |
|                                     | 30-39           | 25.9           |
|                                     | 40-49           | 16.0           |
|                                     | 50-59           | 11.1           |
|                                     | Above 59        | 1.2            |
| Position in the enterprise          | Owner-manager   | 29.6           |
|                                     | Owner           | 4.9            |
|                                     | Manager         | 24.7           |
|                                     | Others          | 40.7           |
| Years of experience                 | 1-5             | 55.6           |
|                                     | 6-10            | 23.5           |
|                                     | 11-15           | 3.7            |
|                                     | 16-20           | 12.3           |
|                                     | 21-25           | 2.5            |
|                                     | 26 and above    | 2.5            |
| **Background of SME**               |                 |                |
| Type of business                    | Sole proprietorship | 59.3 |
|                                     | Limited firm    | 30.9           |
|                                     | Partnership     | 9.9            |
| Type of sub-sector                  | Residential buildings | 32.1 |
|                                     | Non-residential buildings | 22.2 |
|                                     | Civil engineering | 17.3           |
|                                     | Special trades  | 28.4           |
| Years of enterprise established     | Below 5 years   | 12.3           |
|                                     | 5-9 years       | 27.2           |
|                                     | 10-14 years     | 24.7           |
|                                     | 15-19 years     | 4.9            |
|                                     | 20-24 years     | 12.3           |
|                                     | 25 years and above | 18.5 |
| Number of employees in enterprise   | Less than 5     | 9.9            |
|                                     | 5-30            | 44.4           |
|                                     | 30-75           | 45.7           |
| Annual sales turnover               | Less than RM 300,000 | 17.3 |
|                                     | RM 300,000 - less than RM 3 million | 48.1 |
|                                     | RM 3 million - RM 20 million | 34.6 |

6.2. Influence of IOL on SME Performance

SmartPLS software (version 3) was used to analyze the data and develop the model of IOL using the following criteria: maximum iteration of path weighting scheme is 300, stop criterion is 7, and bootstrapping run is 500 resample [50]. The model was validated at two levels, namely measurement and structural models.
As shown in Table 2, construct reliability of IOL and PERFORM measured as the level of Cronbach’s Alpha and composite reliability is greater than 0.70 [47]. Outer loadings of items measuring IOL and PERFORM less than 0.55 were excluded from the model [51]. Convergent validity of the model was good as indicated by the average variance extracted (AVE), which is above the threshold 0.5 [47]. Discriminant validity was based on the Fornell-Larcker criterion [47] in which the square root of the AVE of each construct is higher than its correlation coefficients as shown in Table 3. The discriminant validity of the model was tested based on the Heterotrait-Monotrait (HTMT), which is suitable for research with low sample sizes and multi-item scales [52]. The result of HTMT is 0.664, which is lower than the threshold 0.85 [53].

Table 2. Factor loadings, reliability, and validity of constructs

| Construct                    | Item (Label)                                      | Loading | Cronbach Alpha | Composite Reliability | AVE  |
|------------------------------|---------------------------------------------------|---------|----------------|-----------------------|------|
| Inter-organizational Learning (IOL) | Meetings to learn best practice (L1) | 0.591   | 0.908          | 0.922                 | 0.522|
|                              | Conference calls (L2)                            | 0.627   |                |                       |      |
|                              | Staff training - external (L4)                    | 0.809   |                |                       |      |
|                              | Collaborative extranet (L6)                       | 0.593   |                |                       |      |
|                              | Presentation of business case by customer (L7)    | 0.564   |                |                       |      |
|                              | Consultations (L8)                               | 0.799   |                |                       |      |
|                              | Open discussion (L10)                             | 0.635   |                |                       |      |
|                              | Import of experienced management skills (L11)     | 0.788   |                |                       |      |
| Performance                  | Exhibition or congress (L12)                      | 0.798   |                |                       |      |
|                              | Research and development contract (L13)           | 0.794   |                |                       |      |
|                              | Academic institution or research institute (L15)  | 0.864   |                |                       |      |
|                              | Systematic financial control (P1)                 | 0.778   | 0.952          | 0.959                 | 0.679|
|                              | Strong cash flow position (P2)                    | 0.796   |                |                       |      |
|                              | Achieved financial planning (P3)                  | 0.820   |                |                       |      |
|                              | Effective products and services delivery to customer (P4) | 0.847 | | | |
|                              | Relationship with existing customer (P5)          | 0.777   |                |                       |      |
|                              | Quality of services provided to customer (P6)     | 0.756   |                |                       |      |
|                              | Employees productivity (P7)                       | 0.846   |                |                       |      |
|                              | Enhance employee ability (P8)                     | 0.849   |                |                       |      |
|                              | Motivation of employees (P9)                      | 0.758   |                |                       |      |
|                              | Employees and enterprise’s development opportunities (P10) | 0.932 | | | |
|                              | Enterprise becomes more competitive (P11)         | 0.889   |                |                       |      |

*Some items of IOL construct were eliminated as they scored low factor loading

Table 3. Correlations matrix and the square root of AVE

| Constructs     | IOL     | Performance |
|----------------|---------|-------------|
| IOL            | 0.723   |             |
| Performance    | 0.703   | 0.824       |
After validating the measurement models, the predictive relevance and structural model relationship of the path model were examined. The $R^2$ of PERFORM is 0.494, which is moderate [47]. In other words, about 49 percent of the changes in SME performance can be explained by IOL. As shown in Figure 2, the path coefficient linking IOL to PERFORM is positive and strong ($\beta=0.703$, $t=21.90$ and $p<0.01$) [47]. However, the model showed poor goodness-of-fit with SRMR value at 0.174 which is above 0.10 threshold [53, 54]. Nonetheless, Hooper [55] highlighted that SRMR must be carefully interpreted as a high number of parameters and larger sample size contribute to lower SRMR.

The final model includes eleven items of IOL, namely sending employees to academic institution or research institute (L15), staff training (L4), external consultations (L8), exhibition or congress (L12), learning through research and development contract (L13), import of experienced management skills (L11), open discussion (L10), conference calls (L2), collaborative extranet (L6), meetings to learn best practice (L1), and presenting of business case by customer (L7). The model also includes eleven items to measure the performance of SME. The descending order of performance items based on loading are employees and enterprise’s development opportunities (P10), enterprise becomes more competitive (P11), enhance employee ability (P8), effective products and services delivery to customer (P4), employees productivity (P7), achieved financial planning (P3), strong cash flow position (P2), systematic financial control (P1), relationship with existing customer (P5), motivation of employees (P9), and quality of services provided to customer (P6).

The result of this study clearly shows a positive and significant influence of IOL on the performance of SMEs. Consistently, previous studies proved empirically the effect of learning on organizations in different contexts. Laursen and Salter [56] stated that IOL from customers and competitors effects organizational performance. Similarly, Hernandez-Espallardo [57] found a positive impact of knowledge sharing and learning on supply chain performance and suggested that competitiveness of supply chain depends on the adequate governance of inter-organizational relationship. Zhang et al. [58] identified that IOL has a significant and positive relationship with SME innovation performance in technology alliance. Coliandris and Rogers [59] further addressed that learning within and between entities does not maintain effective performance only but organizational transformation.
6.3. Barriers of IOL Implementation

Table 4 shows the barriers of implementing IOL in SMEs sorted based on mean values. The strongest barriers are lack of trust, unwillingness of potential knowledge provider to share, and high competition. In contrast, short duration of learning, low absorptive capacity, and diversity of background scored the lowest mean values. Trust is a fundamental element in the inter-organizational relationship and has shown a positive and significant effect on SME competitive advantage [60]. Lack of trust and high competition make IOL practice more challenging. Similar to the note of [30], the result of this study affirmed that knowledge providers, within the construction industry, are reluctant to share valuable knowledge and information due to competition.

**Figure 2.** Final model of the effect of IOL on SME performance

- The path model includes the values of R² (parentheses under Performance construct), path coefficient (parentheses in the rectangular-shaped objects), t-value (parentheses on the respective path), and the significant level of the paths (represented by asterisks).
- ** Significant at p<0.01
### Table 4. Inter-organizational learning barriers

| Variables                                      | Mean | SD  | Ranking |
|------------------------------------------------|------|-----|---------|
| Lack of trust                                 | 4.11 | 1.00| 1       |
| Unwillingness of potential providers to share knowledge | 3.94 | 0.91| 2       |
| High competition                              | 3.85 | 1.00| 3       |
| Lack of appropriate method or tool             | 3.79 | 0.86| 4       |
| Formality of learning                         | 3.69 | 0.94| 5       |
| Culture                                        | 3.59 | 0.97| 6       |
| Focus on short-term performance                | 3.53 | 1.03| 7       |
| Communication problems                        | 3.46 | 1.13| 8       |
| Diversity of background                       | 3.43 | 0.99| 9       |
| Low absorptive capacity                       | 3.03 | 1.19| 10      |
| Short duration of learning                    | 2.81 | 1.16| 11      |

### 6.4. New Perspective of IOL

The final items measuring IOL can be classified into externalization, internalization, and intra-learning as shown in Figure 3. First, externalization includes SME efforts to increase its knowledge base or employees’ skill using training, sending staff for research or academic institutions, attending exhibitions or conferences, and other activities. Second, internalization is about bringing external knowledge and skills to the enterprise using some tools such as introducing experienced management skills and external consultants. Third, intra-learning represents activities that are performed within the organization and aimed at reflecting on external knowledge and bringing benefits from both externalization and internalization activities. Knowledge gained from external links has to be adapted using procedures within the organization so they become part of its routine for effective knowledge exploitation [15]. However, it is important to balance knowledge exploration and exploitation for organizational survival [61]. Intra-learning activities are required to complete learning cycle and include basic activities such as open discussion and research and development programs. In addition, the external relationship between SMEs and industry communities is important and need to be addressed to maintain and improve their competitive advantage. According to Easterby-Smith and colleagues [62], learning may be “equally about how to negotiate current relationships” (p. 13). However, learning is not necessary occurred in the inter-organizational relationship as it depends on factors such as the type of relationship, duration of the relationship, and trust [27]. As such, this relationship has to be established in a beneficial way and handled in a more discreet manner to avoid conflict. The model presented in Figure 3 provides a new perspective of IOL as an integrated approach of knowledge within the enterprise and its external environment as well as processes to make sense of the new knowledge.
7. Conclusion
This study has enforced the importance of IOL in the development of construction SMEs. Owners or managers can practice IOL-related activities to attain better performance of their enterprises. The new perspective model presented in this paper provides an easy way to understand IOL concept as three interrelated processes including externalization, internalization, and intra-learning. Besides, the model shows the main barriers to implementing IOL, so owners or managers of SME have to overcome these barriers to achieve better performance. IOL, as shown in this paper, supports SMEs long-term growth and survival. For instance, by acquiring external knowledge and processing it internally, SMEs can improve areas pertaining to finance, customer relationship, human resource, and organizational development. Enhancing the performance and survival of construction SMEs is essential for the development of the whole construction sector. This is supported by different initiatives and plans such as the Construction Industry Transformation Programme (CITP: 2015-2020) aiming at enhancing productivity, internalization, and competitiveness of Malaysian contractors. Future research can be conducted to develop a framework for the implementation of IOL considering the barriers highlighted in this study. Lastly, an interesting study will be to determining capabilities of SMEs to perform the three processes of IOL highlighted in this paper.

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