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MANAGEMENT | RESEARCH ARTICLE

Exploring the mediating role of dynamic capabilities in the relationship between intellectual capital and performance of information and communications technology firms

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Abstract: Recent studies suggest a potential relationship between intellectual capital dimensions and dynamic capabilities in achieving superior performance. However, these studies have made little effort to develop a framework for understanding this relationship, which is unsettling for managers. To examine this potential, this paper proposes and tests a conceptual model to explain how three types of dynamic capabilities—learning, integration, and reconfiguration capability—mediate the impact of intellectual capital dimensions, including human, social, and organizational capital, on firm performance. This study, using a sample of 350 Vietnamese firms in the information and communications technology sector, found that dynamic capabilities play a mediating role in the relationship between intellectual capital dimensions and firm performance. Among dynamic capabilities, learning capability has the most significant mediating effect. Furthermore, the important roles of human, social, and organizational capital are addressed due to their direct effects on performance based on resource-based view theory, as well as their indirect effect via the mediation of dynamic capabilities.

Subjects: Education - Social Sciences; Business, Management and Accounting; Information Technology

Keywords: Intellectual capital; human; social; organizational capital; dynamic capabilities; learning; integration; reconfiguration capability

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PUBLIC INTEREST STATEMENT

Intellectual capital is currently a topical issue, especially in developing countries where firms are seeking for ways to improve efficiency in business operation. However, this has not been achieved given the fact that most of the managers in those countries do not understand the mediating role of dynamic capabilities in the relationship between intellectual capital and performance. Due to its complexity and the higher costs involved in the development of the intellectual capital. This study, therefore, suggests that developing intellectual capital and improving the role of dynamic capabilities will lead a positive impact on firm performance, especially in the ICT sector.

1. Introduction

Many countries are in the process of transforming from manufacturing- to knowledge-based economies. This trend has created a need for innovative industries in which information and communications technology (ICT) has had an increasingly large impact on economic and social life. The development of ICT has enabled "information societies" of more than three billion people to access the Internet, with eight out of 10 Internet users owning a smartphone (VietNamNet, 2020). The demand for ICT services is increasing by leaps and bounds (VietNamNet, 2020). This rapid growth has led ICT to become the one of the main drivers of economic growth as well as a cornerstone of daily life in many countries. Vietnam is no exception: Vietnam's ICT sector grew substantially between 2010 and 2016, with its total revenue reaching US 59.9 USD billion in 2016 as the country emerged as a production center for ICT hardware and software products and services (VietNamNet, 2020). The government of Vietnam has increasingly recognized the important impact of the ICT industry on social and economic activities and recently devised a master plan for ICT called the "taking-off strategy," which specifies targets for 2020 and aims to continue the transformation of Vietnam into an advanced ICT country (VietNamNet, 2020).

However, in term of inputs and management knowledge, unlike other manufacturing industries ICT involves short product life cycles, high customer demand, and very unpredictable technological changes. Accordingly, acquiring and managing "valuable, rare, inimitable, and non-substitutable" (VRIN) sources like intellectual capital (IC) is crucial to achieving outstanding performance in ICT (Z. Wang et al., 2018). To follow the worldwide ICT trend, ICT firms that are able to survive and develop in a highly competitive and uncertain institutional environment must increase their capabilities in terms of IC development. IC is often referred to as the value created by three types of intangible resources: *human capital*, which describes individual knowledge, skills, and education; *organizational capital*, which includes all non-human knowledge containers (e.g. information and communication systems, databases, process manuals, strategies, routines); and *social capital*, which refers to the social relationships within an organization as well as individual relationships with customers, investors, competitors, or suppliers (Z. Wang et al., 2018). While Western empirical research on IC is popular, it is built on the assumption that IC is the key source of superior performance. Very few studies have been conducted to validate or operationalize this assumption in developing countries where the business environment is highly unstable, such as Vietnam.

The interaction between the external environment—especially the dynamic environment—and firm strategies is expected to be related to performance (Hsu & Wang, 2012). To maximize performance, managers must pursue competitive strategies that best match the conditions of the external environment. In other words, managers' perceptions of the external environment are expected to affect firm strategy. Therefore, a firm's strategy must involve deploying its resources, especially IC, to seize opportunities in the market. Dynamic capabilities (DCs) offer a bridge to debates in the strategy field proposing either a resource-based view (RBV) that a firm's resources, particularly those that are intangible, are more likely to contribute to the firm's ability to sustain superior performance or the emerging discourse surrounding the dynamic environment (Hsu & Wang, 2012). While there is a wealth of literature on IC (Zhou et al., 2019), very few studies have addressed how DCs mediate the impact of IC on firm performance. Drawing on previous studies related to dynamic theories (Singh & Rao, 2016; Zhou et al., 2017), this paper proposes an alternative mechanism for the IC–performance relationship whereby DCs mediate the effect of IC on firm performance.

This research makes several contributions to the strategic management literature. First, this study extends previous research by offering insights into the relevance of human, organizational, and social capital for ICT firms in achieving outstanding performance in the face of dynamic environments such as Vietnam. Second, it advances existing research in this field by explicitly discussing how DCs mediate the effect of human and social capital on performance. Finally, it measures and evaluates the effects of IC on the development of various DCs in the ICT sector—

that is, the impact of uncertainty on the relationship between organizational capital and ultimately (through social and human capital) performance.

2. Theoretical background and development of hypotheses

2.1. Dynamic capabilities

Since DC was first conceptualized (Teece et al., 1997), numerous scholars have explored the definitions, precursors, processes, and aftermaths of DCs (Lin & Wu, 2014; Prena & Kustina, 2020; Tseng & Lee, 2014). However, there is still no consensus regarding its conceptualization. Originally, DC was defined as a "firm's ability to integrate, build and reconfigure internal and external competences to address rapidly changing environment" (Teece et al., 1997). DCs were described as an organization's behavioral orientation constantly to integrate, reconfigure, renew, and recreate its resources and capabilities to the changing environment to attain and sustain competitive advantage (Fainshmidt et al., 2019).

Based on previous literature, this research conceptualizes DC as a firm's capability to learn, integrate, and reconfigure its resource base to address changing business conditions. Learning capability refers to a firm's capability to make its operations more efficient and effective by acquiring, changing, and discarding resources in accordance with environmental changes (Oliva et al., 2019). Integration capability denotes the ability of a firm to evaluate the value of existing resources, integrate them, and thereby develop a new resource base and capabilities which further determine the firm's ability to meet environmental challenges (Oliva et al., 2019). Reconfiguration capability refers to the recombination and transformation of existing resources that empower a firm to acclimatize to fluctuating market conditions (Oliva et al., 2019).

2.2. Intellectual capital

In 1969, Galbraith proposed the term "intellectual capital" and described it as the knowledge, skills, and brainpower activity that create value whenever utilized. Since then, numerous interpretations of the term have arisen. IC has been defined as useful knowledge that is convertible into profit and value (Inkinen, 2015). It has also been considered as a critical intangible asset for future competitiveness that firms should manage and deploy in order to achieve desired outcomes (Osinski et al., 2017). In this study, IC is defined as the sum of all organizational knowledge resources, which resides within as well as outside the organization. It is comprised of three constructs, namely human capital, social capital, and organizational capital, which represent the knowledge resources embedded in individuals, networks, and organizations, respectively.

2.3. Intellectual capital and dynamic capabilities

The existing literature indicates a significant association between knowledge and DCs. Some scholars identified knowledge as a significant factor for a firm's DCs and posited that endogenous and exogenous knowledge were impactful in developing DCs in both manufacturing and service firms (Hussinki et al., 2017). Lin and Wu (2014) noted the contributory role of VRIN resources in different DCs in Taiwanese companies. The knowledge resources embedded in individual, network, and organizational structures and processes constitute a unique configuration of a firm's resources, and the possession of knowledge resources builds different types of DCs. Drawing on this evidence, this study analyzes the effect of human, social, and organizational capital on learning, integration, and reconfiguration capabilities.

2.3.1. Human capital and dynamic capabilities

The primary component of IC is human capital. Knowledge is intrinsic to human capital (Inkinen, 2015). Human capital is defined as the knowledge, skills, and abilities residing in and used by the employees or members of an organization (Youndt et al., 2004). Taking into consideration the personal aspect of knowledge resources, existing studies have yielded sufficient evidence to show that a firm's learning, integration, and reconfiguration capabilities are highly dependent on its having knowledgeable, skilled, and experienced employees (Hussinki et al., 2017). Experienced

employees can identify changes and make superior decisions regarding resource allocation and pathfinding strategy, thereby predicting outcomes precisely. In turn, firms are more capable of adapting to changes in the business environment (Eriksson, 2014). It follows that capability has bearing on an individual's knowledge, motivation, skills, experiences, and probabilistic judgments (Singh & Rao, 2016). Hence, human capital supports the evolution of DCs.

Some researchers posited that experienced managers support the identification and exploration of opportunities, which is central to developing integration capability (Salunke et al., 2019). Tsou and Chen (2020) highlighted that an individual's knowledge and experience act as dynamic contributors in knowledge accumulation and utilization, founding to be significantly associated with integration and reconfiguration capability. Nieves and Haller (2014) maintained that employees' knowledge and skills encourage resource renewal as well as learning and reconfiguration capabilities.

Accordingly, this paper proposes the following hypotheses:

H1a: Human capital has a positive effect on learning capability.

H1b: Human capital has a positive effect on integration capability.

H1c: Human capital has a positive effect on reconfiguration capability.

2.3.2. Human capital and firm performance

Human capital brings value to a company as a criterion of competency and creativity possessed by employees which allows them to identify business opportunities, create new knowledge, and solve problems (Inkinen, 2015). A firm does not have its own human capital but rather leases the acquired knowledge, skills, and experience of its employees. The quality of human capital in a firm is influenced by its hiring practices and training activities (Gilbert et al., 2017). The economic value of human capital is dependent on how an employer uses and develops it. Scholars have deemed human capital the most important intangible resource for a firm's performance, especially in innovative sectors like ICT.

Therefore, the following hypothesis is proposed:

H1d: Human capital has a positive effect on firm performance.

2.3.3. Social capital and dynamic capabilities

Regarding the relational facet of knowledge resources, researchers have defined social capital as an essential form of knowledge located in the interactions between individuals and networks of relationships (Hongyun et al., 2019), conceptualizing it as the contingent factor behind the occurrence of social ties, new alliances, and partnerships. The literature on social exchange theory highlights that strong ties and alliances play a vital role in the development of a firm's integration and reconfiguration capabilities (Eisenhardt & Martin, 2000). Strong social networks enable an organization to acquire information related to new opportunities, gain new experience and expertise, and create new processes that enhance its capabilities to grasp opportunities. Accordingly, network relationships contribute to the processes and routines that play an indispensable role in releasing, acquiring, and integrating resources. As such, social capital plays an important role in the development of DCs.

Some scholars maintained that experiences with prior alliances drive learning, create knowledge, prevent mistakes, facilitate information and resource advantage, support the identification of new opportunities and threats, and thereby develop learning capabilities (Singh & Rao, 2016). Eriksson (2014) noted that network-generated learning gives rise to resource configuration. Based on the above, it is clear that a high level of social capital enhances an organization's ability to learn, integrate, and reconfigure, thus encouraging the development of DCs.

Accordingly, the following hypotheses are proposed:

H2a: Social capital has a positive effect on learning capability.
H2b: Social capital has a positive effect on integration capability.
H2c: Social capital has a positive effect on configuration capability.

2.3.4. Social capital and firm performance
Social capital encompasses the context and stock of relationships, interpersonal trust, and the norms that allow for certain behaviors and sustainable relationships between individuals and ensure conditions conducive to organizational development and knowledge exchange (Nhon et al., 2018). As such, the way that social capital facilitates accessing, processing, synthesizing, and exchanging knowledge within and across organizations influences the performance of knowledge-based organizations like ICT firms.

Thus, the following hypothesis is proposed:

H2d: Social capital has a positive effect on firm performance.

2.3.5. Organizational capital and dynamic capabilities
Organizational capital is described as "institutionalized knowledge and experience" that is codified and warehoused in systems, databases, processes, manuals, routines, and patents (Inkinen, 2015). A high level of institutionalized knowledge facilitates the smooth flow of communication among partners in relationship networks, creates learning, and accelerates the acquisition of new resource bases (Prena & Kustina, 2020) which is central to the notion of knowledge integration, enhancement, and utilization. This suggests the role of organizational capital as an enabling factor for DCs.

The literature highlights that organizational structure and processes act as formalized mechanisms to impart learning and internalize, utilize, share, and articulate organizational resources (Y. Wang et al., 2019) that further enhance the capabilities of a firm. Youndt et al. (2004) argued that codified knowledge permits organizations to reinforce their prevailing expertise and helps develop innovative capabilities. Y. Wang et al. (2019) maintained the plausible role of information technology in integration capabilities, while Prena and Kustina (2020) recommended knowledge codification as an essential factor for developing integration and reconfiguration capabilities. It is argued for the positive effect of organizational capital on knowledge acquisition and integration. Hsu and Wang (2012) also stated that organizational processes and IT facilitate knowledge accumulation and utilization in an organized way, which is considered a requisite component of DC. Hsu and Wang (2012) argued that new knowledge generated through experiences is a vital element in DC. For instance, organizational capital provides a positive culture (a contingent factor for learning), encourages individuals to acquire new knowledge, and facilitates an environment that enhances an organization's ability to create knowledge and leverage that knowledge to produce value and achieve the organization's potential.

Based on the above, this paper hypothesizes the following:

H3a: Organizational capital has a positive effect on learning capability.
H3b: Organizational capital has a positive effect on integration capability.
H3c: Organizational capital has a positive effect on reconfiguration capability.

2.3.6. Organizational capital and firm performance
The purpose of organizational capital is to coordinate communication and action between individuals in an organization (Gilbert et al., 2017). A review of the literature indicates three distinct dimensions of organizational capital: (a) structural; (b) cultural; and (c) knowledge

(Gilbert et al., 2017). The structural dimension of organization capital includes the organization's formal procedures and processes that provide decision-making guidelines. This also includes human resources policies and guidelines for labor-management practices such as hiring, task management, staffing, and disciplinary action (Gilbert et al., 2017). The cultural dimension accounts for processes that serve the long-term strategies of a firm, including formal objectives, strategic plans, missions, values, and vision (Djuric et al., 2019) organizational culture and conceptions of corporate social responsibility traditions (Asiaei & Jusoh, 2015). The knowledge dimension refers to the processes through which knowledge and information are created, utilized, exchanged, and preserved, including investment in research and development as well as copyrights and patents (Nhon et al., 2018). Most major ICT firms are of small and medium size and are thus able to develop organizational capital that is less hierarchical in nature and allows for the autonomy and independence in decision-making that is necessary to increase innovation and absorb new knowledge.

Based on the above arguments, the following hypothesis is proposed:

H3d: Organizational capital has a positive effect on firm performance.

2.4. Mediating effects of the different dynamic capabilities

2.4.1. Mediating effects of learning capability

Learning in this context refers to the process of making firm operations more effective and efficient through repetition and review. In product development, learning capability allows firms to avoid repeating mistakes by using information from past lessons and enables them to explore new knowledge and develop new products (Obeidat et al., 2018). Some scholars indicated that a firm can enhance its performance by learning new knowledge, concepts, and expertise through external cooperative alliances. In addition, learning orientation has been found to improve innovative capability (Lee & Falahat, 2019). Lin and Wu (2014) suggested that a firm should modify its business direction through internal and external learning by changing, acquiring, or discarding resources. Internal learning can be achieved through training, knowledge database maintenance, and knowledge sharing programs. In addition, a firm can enhance its external learning capability by anticipating industry knowledge and becoming involved in learning seminars or communities.

Accordingly, the paper posits the following hypotheses:

H4: Learning capability has a positive influence on firm performance.

H5a: Learning capability mediates the positive effect of human capital on firm performance.

H5b: Learning capability mediates the positive effect of social capital on firm performance.

H5c: Learning capability mediates the positive effect of organizational capital on firm performance.

2.4.2. Mediating effects of integration capability

Yang et al. (2019) showed that firm acquirers can gain resource exchange and integration expertise through successful alliance activities and thus improve their performance. These results provide examples of how integration capability positively transforms value resources into improved performance.

In light of this research, the paper proposes the following hypotheses:

H6: Integration capability has a positive influence on firm performance.

H7a: Integration capability mediates the positive effect of human capital on firm performance.

H7b: Integration capability mediates the positive effect of social capital on firm performance.

H7c: Integration capability mediates the positive effect of organizational capital on firm performance.

2.4.3. Mediating effects of reconfiguration capability

To deal with a rapidly changing industry environment, a firm must reassemble or transform its internal and external resources (Farzaneh et al., 2020). However, firms must also develop a more cost-effective process than their competitors to reconfigure and transform their resource. As a result, reconfiguration capability is generally considered a key capability for monitoring market and technology trends and for ensuring timely responses through resource transformation (Teece et al., 1997).

Lin and Wu (2014) indicated that strategic flexibility, which stresses the flexible use and reconfiguration of resources, strengthens the positive effects of technological capability and thus improves firm performance. To deal with fast-changing industry environments, firms should rapidly respond to the market and competitors. Additionally, firms should efficiently and effectively communicate with their alliance network to create competitive advantages.

Accordingly, the following hypotheses are proposed:

H8: Reconfiguration capability has a positive influence on firm performance.

H9a: Reconfiguration capability mediates the positive effect of human capital on firm performance.

H9b: Reconfiguration capability mediates the positive effect of social capital on firm performance.

H9c: Reconfiguration capability mediates the positive effect of organizational capital on firm performance.

2.5. Conceptual framework

Based on the literature review and synthesis of IC and DC theory as well as the proposed hypotheses, this paper suggests a conceptual framework (Figure 1).

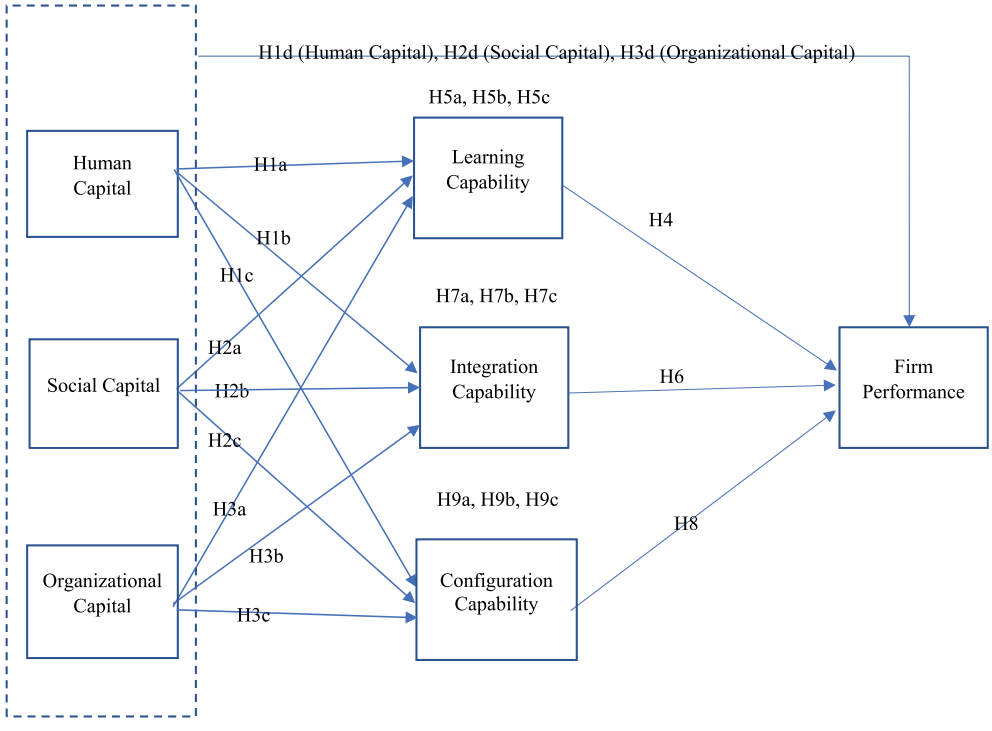

Figure 1. Conceptual framework

3. Methodology

3.1. Sample size determination

In academic research, it is impossible to collect data from every participant in a study population due to limited time, costs, and human resources. The list of ICT firms used in this study was obtained from the website www.vietask.com. Determining sample size depends on the proportion of the total sample variation in the dependent variable. A sample size larger than 30 and smaller than 500 is appropriate for quantitative studies (Creswell, 2009). The required minimum sample size for factor analysis is at least 10 times the largest number of the construct used to measure a construct, or 10 times the largest number of structural paths directed at a particular construct in the structural model (Creswell, 2009).

In the first step of sample size determination, the target population is defined. Once the decision to sample has been made, the first question related to sampling concerns is identifying the target population—that is, the complete group of specific population elements relevant to the research project. The website www.vietask.com indicates a total of 4,483 ICT firms in 64 provinces in Vietnam. In the second step, the sampling frame is applied. A sampling frame is the list of elements from which the sample may be drawn. For the sampling frame step, the number of sampling units drawn from each stratum is proportional to the population size of that stratum. For this research, a sample was selected of 350 ICT firms across all provinces in proportion to population size.

3.2. Measures

The questionnaires used in this study were developed based on validated scales. However, as the survey was conducted in Vietnam, two academic domain experts who were fluent in both Vietnamese and English were recruited for the translation process. The questionnaire was pre-tested in meetings with 10 academic domain experts and 10 senior managers from Vietnamese ICT firms. The purpose of the pretest was to evaluate the content validity of the measures and whether respondents understood the instructions, items, and scales. Throughout the questionnaire, 7-point Likert scales were used, ranging from 1 (*strongly disagree*) to 7 (*strongly agree*).

3.2.1. Measures of intellectual capital

IC comprises three dimensions: human capital, organizational capital, and social capital (Youndt et al., 2004). Each dimension individually determines the distinctive aspect of the conceptual realm. Items measuring human capital indicate the level of knowledge embedded in individuals, social capital items indicate the level of organizational knowledge residing in networks and relationships, and organizational capital items indicate the level of knowledge embedded in organizational structures, databases, processes, and patents. All items are available in Appendix A.

3.2.2. Measures of dynamic capabilities

As noted above, DCs comprise three dimensions: learning, integration, and reconfiguration (Eisenhardt & Martin, 2000; Teece et al., 1997). Each dimension individually determines the distinctive aspect of the conceptual realm. The measurement items of the learning, integration, and reconfiguration scales were developed based on studies by Eisenhardt and Martin (2000) and Teece et al. (1997). All items are available in Appendix A.

3.2.3. Measures of firm performance

Subjective measures of firm performance were used, as respondents are generally reluctant to provide accurate information pertaining to objective measurements. Additionally, it has been demonstrated in many studies that the application of subjective measures of firm performance is reliable and valid (Ross et al., 2012). All items are reported in detail in appendix A.

3.3. Data description

We distributed 448 questionnaires to CEOs, project managers, and other executives at Vietnamese ICT firms and ultimately received 350 responses. All participants were male. According to table 1, background, the majority of respondents (76%) held only bachelor's degrees, followed by those holding master's

Table 1. Demographic description

Variable	Category	*N*	Percentage (%)
Age	20s	10	3
	30s	255	73
	40s	81	23
	≥ 50	5	1
Education	Vocational school	13	4
	Bachelor's degree	267	76
	Master's degree	71	20
ICT category	Software services	200	57
	Hardware services	31	9
	Hardware manufacturing	10	3
	Digital media	80	23
	Telecommunication	30	9

degrees (20%). Demographic information also indicated that the majority of participants in the survey (76%) were younger than 40 years old. Regarding participants' specific ICT subcategory, 66% worked in software or hardware services, 23% worked in digital media, and only 9% worked in telecommunications. In general, the Vietnamese ICT sector is a young sector with extensive opportunities for development.

4. Results

4.1. Results of construct reliability and validity evaluation

Cronbach's α was initially used for reliability analysis to measure the internal consistency of the measurement scales. A reliability coefficient above 0.6 is considered acceptable (Hair et al., 1998). The α values for the human, social, and organizational capital scales were 0.861, 0.805, and 0.773, respectively, representing good scale reliability. The learning, integration, and configuration scales had α values of 0.920, 0.900, and 0.898, respectively, also representing good reliability. The firm performance scale had an α value of 0.880, indicating good reliability.

Next, we used exploratory factor analysis (EFA) to conduct dimensionality analysis as indicated by factor loading score. The general purpose of factor analytic techniques is to condense the information contained in the original construct into a smaller set of new composite dimensions or factors (Hair et al., 1998). All factor loading scores meeting the suggested level of 0.5 result in the satisfaction of the condition of unidimensionality confirmation (Hair et al., 1998). In this study, which had an original set of 35 measurement items, 30 items met the factor loading score threshold of 0.5, with a minimum score of 0.598.

4.2. Results of convergent and discriminant validity evaluation

Before verifying the hypotheses, confirmatory factor analysis (CFA) was conducted to assess how the conceptual model fit the data using the AMOS software. To ensure that the data fit the model well, the root-mean-square error of approximation (RMSEA) should be less than or equal to 0.08 (Hair et al., 1998). The goodness-of-fit index (GFI) and comparative fit index (CFI) should satisfy thresholds of 0.9 (Hair et al., 1998). Our CFA resulted in an acceptable fit for our data set (GFI = 0.909; CFI = 0.975; RMSEA = 0.034). Further, we used CFA to test convergent and discriminant validity. We checked average variance extracted (AVE) and composite reliability (CR). The CRs for human capital, social capital, organizational capital, learning, integration, reconfiguration, and firm performance were 0.864, 0.908, 0.808, 0.920, 0.902, 0.901, and 0.884, respectively. All were higher than the suggested level of 0.7 (Hair et al., 1998). The AVEs for human capital, social capital, organizational capital, learning, integration, reconfiguration, and firm performance were 0.561,

Table 2. Validity

	Reconfiguration capability	Firm performance	Integration capability	Learning capability	Human capital	Social capital	Organizational Capital
Reconfiguration capability	**0.696***	0.460	0.332	0.503	0.541	0.334	0.364
Firm performance	0.460	**0.605***	0.500	0.448	0.397	0.310	0.254
Integration capability	0.332	0.500	**0.699***	0.560	0.392	0.281	0.294
Learning capability	0.503	0.448	0.560	**0.741***	0.430	0.350	0.332
Human capital	0.541	0.397	0.392	0.430	**0.561***	0.380	0.423
Social capital	0.334	0.310	0.281	0.350	0.380	**0.711***	0.309
Organizational capital	0.364	0.254	0.294	0.332	0.423	0.309	**0.513***

*AVE values

0.711, 0.513, 0.741, 0.699, 0.696, and 0.605, respectively. All were likewise above the proposed threshold of 0.5 (Hair et al., 1998). Therefore, the test of convergent validity was satisfied.

For the test of discriminant validity, if the AVE of each construct is larger than the squared correlation coefficient of that construct compared with any other construct in the model, the constructs are deemed different from one another (Cheung et al., 2010). The results of this test (Table 2) demonstrate that all constructs had discriminant validity.

4.3. Hypothesis verification

In the hypothesis verification step, we tested all hypotheses using process software developed by Hayes (2013). Collectively, H1a, H2a, and H3a propose direct individual effects of human, social, and organizational capital on learning capability; H1b, H2b, and H3b propose direct individual effects of human, social, and organizational capital on integration capability; and H1c, H2c, and H3c propose direct individual effects of human, social, and organizational capital on reconfiguration capability. H1d, H2d, and H3d represent direct individual effects of human, social, and organizational capital on firm performance, and H4, H6, and H8 propose direct individual effects of learning, integration, and reconfiguration capability on firm performance. H5a–H5c suggest indirect effects whereby the associations among human, social, and organizational capital and firm performance are mediated by learning capability; H7a–H7c suggest indirect effects whereby the associations among human, social, and organizational capital and firm performance are mediated by integration capability; and H9a–H9c suggest indirect effects whereby the associations among human, social, and organizational capital and firm performance are mediated by reconfiguration capability. The mediation effects were tested using bootstrapping analysis—a powerful method to determine the statistical significance of mediation—to confirm a significant indirect effect, following the work of Preacher and Hayes (2013).

4.4. Test results of direct and indirect effects

The study tests direct and indirect effects. First, human, social, and organizational capital and learning, integrating, and configurating capability were regressed on firm performance. As shown in Table 3, all constructs excluding reconfiguration capability (H8) were significantly related to firm performance. Therefore, H1a, H2d, H3d, H4, and H6 are supported. Among these constructs, learning capability had the most significant influence on firm performance.

Second, human, social, and organizational capital were regressed on learning, integrating, and configurating capability. According to the test results for model 2 (Table 4), H1a, H2a, and H3a are supported. In this model, among human, social, and organizational capital, human capital had the strongest influence on learning capability. The test results for model 3 (Table 4) likewise revealed that H1b, H2b, and H3b are supported. Among the three IC dimensions, social capital had the

Table 3. Regression Analysis 1

Model 1

	B	SE	*p*	LLCI	ULCI
Constant	2.7227	.2389	.0000	2.2528	3.1926
Human capital → firm performance (H1d)	.0888	.0335	.0085	.0229	.1548
Social capital → firm performance (H2d)	.0663	.0260	.0113	.0151	.1175
Organizational capital → firm performance (H3d)	.0690	.0301	.0224	.0098	.1281
Learning capability → firm performance (H4)	.2422	.0343	.0000	.1667	.3177
Integration capability → firm performance (H6)	.0971	.0343	.0049	.0297	.1645
Reconfiguration capability → firm performance (H8)	.0565	.0458	.2181	−.0336	.1466

Table 4. Regression Analysis 2

Model 2					
	β	**SE**	***p***	**LLCI**	**ULCI**
Constant	4.1838	.1992	.0000	3.7919	4.5757
Human capital → learning capability (H1a)	.1768	.0423	.0000	.0937	.2599
Social capital → learning capability (H2a)	.1177	.0341	.0006	.0507	.1847
Organizational capital → learning capability (H3a)	.1262	.0398	.0017	.0478	.2046
Model 3					
	β	SE	*p*	LLCI	ULCI
Constant	4.1432	.2285	.0000	3.6939	4.5926
Human capital → integration capability (H1b)	.1245	.0485	.0010	.0291	.2198
Social capital → integration capability (H2b)	.1375	.0390	.0005	.0407	.2143
Organizational capital → integration capability (H3b)	.0770	.0457	.0159	.0188	.1986
Model 4					
	β	SE	*p*	LLCI	ULCI
Constant	2.7605	.2452	.0000	2.2782	3.2428
Human capital → reconfiguration capability (H1c)	.3554	.0520	.0000	.2531	.4578
Social capital → reconfiguration capability (H2c)	.1438	.0419	.0007	.0614	.2262
Organizational capital → reconfiguration capability (H3c)	.1215	.0490	.0137	.0251	.2180

strongest impact on integration capability in this model. The last model in Table 4, model 4, shows that H1c, H2c, and H3c are confirmed. In this model, human capital had the most significant effect on firm reconfiguration capability.

Finally, we tested the indirect effects of human, social, and organizational capital on firm performance through learning, integration, and reconfiguration capability. The test outcome (Table 3) revealed that H8 was not supported—in other words, human, social, and organizational capital do not have an indirect effect on firm performance through reconfiguration capability. Consequently, H9a, H9b, and H9c are not supported. Meanwhile, the path analyses (Table 5) confirmed H5a, H5b, H5c, H7a, H7b, and H7c. Among the three DCs, learning capability had the most significant mediating effect. In

Table 5. Regression and mediation analysis

Model 5	***β***	**Boot-SE**	**Boot-LLCI**	**Boot-ULCI**
Human capital → learning capability → firm performance (H5a)	.0345	.0180	.0026	.0733
Human capital → integration capability → firm performance (H7a)	.0301	.0185	.0013	.0724
Model 6	*β*	Boot-SE	Boot-LLCI	Boot-ULCI
Social capital → learning capability → firm performance (H5b)	.0140	.0084	.0009	.0333
Social capital → integration capability → firm performance (H7b)	.0333	.0151	.0092	.0687
Model 7	*β*	Boot-SE	Boot-LLCI	Boot-ULCI
Organizational capital → learning capability → firm performance (H5c)	.0118	.0084	.0174	.0812
Organizational capital → integration capability → firm performance (H7c)	.0263	.0136	.0039	.0566

addition, based on the test outcomes, we confirmed that there were no full mediation effects in this study. Full mediation effects would occur if constructs had no direct influence on firm performance (Hayes, 2009). Learning and integration capability thus have only partial mediation effects on the relationship between human, social, and organizational capital and firm performance.

5. Conclusion

Overall, this study reduces ambiguity regarding the mediating mechanism of DCs through which IC improves firm performance. Specifically, these findings provide evidence that learning and integration capability serve as important mediating mechanisms between IC dimensions and firm performance. By accumulating human, social, and organizational capital and developing DCs to mediate IC, firms can improve their competitive advantage and performance. In addition, among the three DCs, learning capability had the most significant mediating effect. Therefore, it is crucial to develop learning capability by creating mechanisms to absorb information and knowledge through iterative business practice. Moreover, developing learning capability internally via human resources development programs and externally via strategic cooperative alliances is also critical for improving firm competence.

5.1. Theoretical and managerial contributions

This article makes several contributions to the literature on DCs and IC. First, the paper provides an understanding of the indirect effects of IC dimensions on firm performance by adding to the argument that the mediating effects of DCs are not identical. Rather than treating DCs as a whole, the study deconstructed DCs into three dimensions and separately examined the effects of each dimension. Our findings suggest that, unlike learning and integration capability, reconfiguration capability does not have a significant effect on firm performance. Second, in combining RBV and DCV, the analytical results of this study also demonstrate an integrated consideration of both IC and DCs. Competitive advantage results not only from the accumulation of IC dimensions but also from the development of DCs, particularly learning capability.

In term of its managerial contributions, the paper makes the following suggestions. The outcome of this study shows that among IC dimensions, human capital has the greatest direct and indirect effect on firm performance, especially in the ICT sector. Today, the success of any firm is measured in terms of continuous innovation, which relies on retaining employees with skills and knowledge and avoiding high employee turnover. Our findings regarding the importance of learning capability support this. Learning capabilities involve the combination of problem-solving and coordinated search strategies and may require the skills and knowledge of individuals. Learning capability is also accumulated and path-dependent; what is learned and practiced is stored and exposed in a firm's economic performance.

Next, the direct and indirect effects of social capital on firm performance found here are consistent with previous discussions on the main source of firm performance. This is a significant finding due to its strategy implications, namely that social capital must be involved in growing learning and integration capability for research and development and marketing activities. Therefore, the outcome of this study offers a relational view of competitive advantage that focuses on network routines and processes.

Previous literature has stressed the positive link between organizational capital and performance. Interestingly, our findings also show that learning and integration capability play a mediating role in this relationship. This finding supports the idea that DCs should be used as a significant means of renewing resources and restoring capability diversity, as well as avoiding the inertia and simplicity that result from a scarcity of long-term efficient resource deployment within an organizational structure.

In sum, our findings provide guidance in answering the question: What are the dimensions of IC, and what types of DCs effectively mediate them in competitive environments? Strategic management should consider RBV and DCV together rather than separately.

5.2. Limitations and future research

First, this study is limited by its use of perceptual data. Therefore, managers may be unable to identify many examples of practical managerial actions based on the study results. Second, the study did not consider dynamic environment as a variable under which IC and DCs are relevant to improving firm performance. Therefore, a potential extension of this study could employ a longitudinal study design to empirically confirm causality and assess IC dimensions, DCs, and firm performance over time. Future research could also examine the role of environment dynamism in the relationship among DCs, IC dimensions, and firm performance.

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Appendix A
Questionnaire Items

Firm Performance (7-point Likert scale, adapted from Ross and Grade (2012))
Organization demonstrated more profitability than other market competitors
Organization has greater capacity in developing new products or services than other competitors
Organization has higher quality of products or services than other competitors
Organization has greater capability in developing new products, service or programs
Organization has greater ability to attract and retain essential employees
Organization achieved greater satisfaction among customers or clients
Organization experienced a greater growth in sales than other market competitors
Social, Organizational, and Human Capital (7-point Likert scale, adapted from Youndt et al. (2004))
Social Capital
Employees are skilled at collaborating with each other to diagnose and solve problems
Employees share information and learn from one another
Employees interact and exchange ideas with people from different areas of the organization
Employees interact with customers, suppliers, alliance partners, etc., to develop solutions
Employees apply knowledge from one area of the company to problems and opportunities that arise in another
Organizational Capital
Organization use patents and licenses as a way to store knowledge
Organizational knowledge is contained in manuals, databases, etc.
Organization's culture (stories, rituals) contains valuable ideas, ways of doing business, etc.
Organization embeds much of its knowledge and information in structures, systems, and processes
Human Capital
Employees are highly skilled
Employees are widely considered the best in our industry
Employees are creative and bright
Employees are experts in their jobs and functions
Employees develop new ideas and knowledge
Learning, Integration, and Reconfiguration Capabilities (7-point Likert scale, adapted from Teece et al. (1997) **and** Eisenhardt and Martin (2000))
Learning Capabilities
Frequent industry knowledge learning program
Frequent internal educational training
Frequent knowledge sharing and establishment of learning groups
Frequent internal cross-department learning program
Integration Capabilities
Focus on customer information collection and potential market exploration
Employ specialized firms to collect industry information for managerial decisions
Focus on integrating industry-related technologies to develop new products
Record and integrate historical methods and experiences in handling firm issues
Reconfiguration Capabilities
Clear human resource reallocation procedure
Fast organizational response to market changes
Fast organizational response to competitor's actions
Efficient and effective communication with cooperative organization

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MANAGEMENT | RESEARCH ARTICLE

The effects of intellectual capital on information communication technology firm performance: A moderated mediation analysis of environmental uncertainty

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Abstract: The impact of intellectual capital on firm performance is one of the key aspects of strategic management. This is particularly crucial for firms in the high-tech or service sectors. Intellectual capital dimensions, including human, organisational and social capital, are key to developing outstanding performance. *From a strategic management perspective*, there are still debates on the interrelationships between these dimensions, and on the moderating role of environmental uncertainty on their impacts on performance. In the context of an unstable environment like Vietnam, this study involved a survey of 350 information communication technology (ICT) firm's directors and managers, which was used to analyse the impacts of intellectual capital dimensions on firm performance, the indirect effects of organisational capital on performance via human and social capital, and the moderating role of environmental uncertainty. Findings indicate that all dimensions of intellectual capital had direct impacts on firm performance. In addition, we found that the human and social capital mediated significantly the relationship between firm performance and organisational capital, and the environmental uncertainty moderated significantly the relationship between intellectual capital dimensions and firm performance.

Subjects: History of Economic Thought; Business, Management and Accounting; Industry & Industrial Studies;

Keywords: Firm performance; intellectual capital; human capital; social capital; organisational capital; environmental uncertainty; mediate and moderate

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PUBLIC INTEREST STATEMENT

Intellectual capital is currently a topical issue, especially in developing countries where firms are seeking for ways to improve efficiency in business operation. However, this has not been achieved given the fact that most of the managers in those countries do not understand the impact of the environmental uncertainty on the relationship between intellectual capital dimensions on firm performance. Due to its complexity and the higher costs involved in the development of the intellectual capital. This study, therefore, suggests that in improvement in intellectual capital development will lead positive impact on firm performance, especially in ICT sector.

1. Introduction

Information communication technology (ICT) has an increasingly large impact on economic and social lives (VietNamNet, 2020). The development of ICT enables "information societies" of over 3 billion people to access the Internet, of which 8 of 10 Internet users own a smartphone (VietNamNet, 2020). The demand for ICT services is increasing by leaps and bounds (VietNamNet, 2020). This rapid growth has led ICT to become one of the main drivers of economic growth, as well as a keystone of daily life in many countries; Vietnam is included in this movement. Vietnam's ICT sector grew substantially during 2010–2016, and total 2016 revenue reached 59.9 USD billion USD, as Vietnam emerges as a production centre for ICT hardware and software products and services (VietNamNet, 2020). The government of Vietnam has increasingly recognized the important impacts of ICT industry on social and economic activities, and has recently devised a master plan for ICT which is called the "Taking-off strategy", which specifies targets for 2020 and aims to continue the transformation of Vietnam into an advanced ICT country (VietNamNet, 2020). However, unlike other manufacturing industries in term of inputs, firm size, management knowledge, ICT involves short product life cycles, high customer demand, and very unpredictable technological changes. Thus, acquiring and managing "valuable, rare, inimitable, and non-substitutable" (VRIN) sources like intellectual capital are very important to achieve outstanding performance (Cao & Wang, 2015). To follow the worldwide ICT trend, ICT firms that survive and grow in a highly competitive and uncertain institutional environment must increase their efforts in intellectual capital development. Intellectual capital is often referred to as the value created by three types of intangible resources: that is, *human capital* such as individuals' knowledge, skill and education; *organisational capital* including all non-human knowledge containers (e.g., information and communication systems, databases, process manuals, strategies, routines); and *social capital*, which refers to the social relationships of an organisation, as well as individual relationships with customers, investors, competitors, or suppliers (Dadfar et al., 2013). Western empirical research on intellectual capital are popular but have built on the assumption that intellectual capital is the key source of superior performance. There are very few studies conducted in developing countries that validate or operationalize this assumption where the business environment is very unstable, such as Vietnam. Therefore, in the context of Vietnam's ICT industry, it is beneficial to examine environmental uncertainty as a moderator in the relationship between intellectual capital dimensions and firm performance.

This research can make several contributions to the strategic management literature, as follows. First, this study *extends the* existing literature by offering insights into the relevance of human, organisational, and social capital in achieving ICT firms' outstanding performance in unstable environment like Vietnam. Second, it advances existing studies in this field by explicitly discussing how organisational capital *effects* the development of human and social capital, which lead in turn to outstanding performance. Lastly, it measures and evaluates the moderating effects of environmental uncertainty on the indirect relationship between organizational capital and firm performance (through human and social capital). In sum, this research builds and validates a conceptual model of the interrelationships among intellectual capital dimensions, environmental uncertainty, and firm performance, and then suggests how to use effectively the outcome of model tests.

2. Literature review

2.1. Firm performance

Firm performance has been examined by academia for a considerable time as a way to measure the health of a firm. The reliability and validity of measurements of performance are critical for empirical studies. From an initial reliance on purely financial perspectives, firm performance measurement has gradually extended to consider multiple dimensions. Venkatraman and

Ramanujam (1986) proposed that firm performance should be measured in terms of financial *and* operational aspects. Financial performance is measured by indicators such as sales growth, earnings per share, profitability, efficiencies and effectiveness which is reflected by return on investment, return on sales and return on equity (Taouab & Issor, 2019). However, operational (or non-financial) performance emphasizes indicating factors such as product quality and productivity, market share and marketing effectiveness (Demirbag et al., 2006). To ensure that firm performance is measured accurately, Dess and Robinson (1984) recommended that firms should employ both financial and operational performance measurement indicators: utilizing multiple indicators enables firms to measure performance via more complex and informative measures, and to assess the contribution of each indicator to the latent variable.

2.2. Resource-based view (RBV)

Knowledge on how to manage effectively intellectual capital is vital, especially in sectors that are innovation oriented and non-manufacturing, and thus possess more intangible than tangible resources (Zeglat & Zigan, 2013). ICT sector is part of the service sector, and thus possesses intangible, intellectual capital resulting from the knowledge, experience, and skills of employees, as well as processes, information systems, and customer relationships. One may argue that, with strong intangible resources, ICT can achieve sustainable advantages, and differentiate themselves from competitors (Mathews, 2019). For this reason, the current study uses a resource-based view (RBV) as its theoretical framework. RBV is an economic tool used to determine the strategic resources available to a firm: looking closely at a company's resources enables a firm to strategically improve its efficiency and effectiveness, especially by identifying rare resources that crucial to superior performance are, but which are rare, irreplaceable, imperfectly imitable, difficult to implement, and not available to competitors (Wernerfelt, 1984). Therefore, it is argued here that the management and development of intellectual capital are vital to ICT firm's strategic management and performance.

2.3. Intellectual capital

The first definition of intellectual capital was suggested by an economist, John Kenneth Galbraith, in 1969. Galbraith believed that intellectual capital is not only an intangible asset but also an ideological process (Edvinsson & Sullivan, 1996; Huang & Wu, 2010). Other scholars suggest that intellectual capital is the accumulation of all knowledge, information, intellectual property, experiences, social networks, capabilities and competencies that enhance organisational performance—not only as held by individuals, but also as embedded in business processes (Subramaniam & Youndt, 2005). Rastogi (2003) offered a comprehensive definition describing intellectual capital "as the holistic or meta-level capability of a company to coordinate, orchestrate and deploy its knowledge resources toward creating value in pursuit of its future vision". Over the past years, the concept of intellectual capital has been defined in multiple ways, often resulting in a lack of consensus regarding its components (Choo Huang et al., 2010). A synthesises of extant academic discussions argues that a widely applicable definition of intellectual capital should have three dimensions: human, organisational and social capital (Aramburu & Saenz, 2011; Hsu & Fang, 2009; Phusavat et al., 2011; Sharabati et al., 2010).

2.4. Environmental uncertainty

The concept of uncertainty has been a central variable in many studies focusing on the features of the relationship between firm performance and its internal and external effects (Yu et al., 2016). Environmental uncertainty is a situation that cannot be predicted (Latan et al., 2018). With a rising frequency of environmental dynamism and complexity in business operations, firms are operating in environments that are becoming increasingly unpredictable. Therefore, the management (i.e., reduction or avoidance) of uncertainty is one of the main tasks of a successful business. Uncertainty includes macro-environmental, competitive, customer demand and technological dimensions. "Macro-environmental" uncertainty includes political, regulatory, and economic conditions, and may weaken an organisation's capacity to map and pursue strategic choices (Miller &

Friesen, 1984). "Competitive" uncertainty reflects the intensity of competition and the relative powers of competitors, as well as competitors' strategies and future courses of action (Tushman & Anderson, 1986). "Customer demand" uncertainty is caused by the lack of clarity in market information, and by supply-and-demand imbalances in the industry (Tushman & Anderson, 1986). "Technological" uncertainty links to unpredictable and continuous trends in the technology (Tushman & Anderson, 1986).

3. Hypothesis development

3.1. The impact of human, organizational and social capital on firm performance

Embedded in employees, "human" capital may be defined as the summation of abilities, skills, attitudes, commitments, experience and educational background of employees, which enables them to act in ways which are economically valuable to both individuals and to their firm (Shih et al., 2010). Human capital brings value to the company as a criterion of competency and creativity possessed by employees, which allows them to identify business opportunities, to create new knowledge, and to solve problems (Boon et al., 2018). Firms do not possess human capital directly, but rather lease the acquired knowledge, skills and experiences of employees. The quality of human capital available to a firm is influenced by hiring practices and training activities (Gilbert et al., 2017). The economic value of human capital is dependent on how effectively the employer is able to use and develop it. Therefore, scholars have confirmed that it is deemed to be the most important intangible resource for the development of the firm itself, especially in innovative sectors such as ICT. Hence, the first hypothesis proposed here is:

H1: *Human capital has positive and significant influences on firm performance*

Organisational capital is defined as the institutionalized knowledge and codified experiences preserved in organisational images, culture, routines, procedures, information systems and patents (Gilbert et al., 2017), and as such is a strategic intangible asset. The purpose of organisational capital is to coordinate communication and action between individuals in an organisation (Gilbert et al., 2017). From a review of the literature, scholars suggest three distinct dimensions of organisational capital: (a) structural, (b) cultural and (c) knowledge dimensions (Gilbert et al., 2017). The first "structural" dimension includes the formal procedures and processes of the organisation providing decision-making guidelines. This also includes human resource policies and guidelines for labour management practices such as hiring, tasking, staffing and disciplinary actions (Gilbert et al., 2017; Nahapiet & Ghoshal, 1998; Nonaka & Von Krogh, 2009). The "cultural" dimension accounts for processes serving the long-term strategies of a firm. This includes formal objectives, strategic plans, missions, values, and vision (Djuric & Filipovic, 2015), organisational culture and traditions (Asiaei & Jusoh, 2015; Baughn et al., 2011; Dess & Shaw, 2001) and conceptions of corporate social responsibility (Ferreira-Lopes et al., 2012). The "knowledge" dimension of organisational capital accounts for processes through which knowledge and information is created, utilized, exchanged and preserved, including investment in research and development (Youndt et al., 2004), as well as copyrights and patents (Ellinger et al., 2011).

As compared to human and social capital, organisational capital is the least flexible (Gilbert et al., 2017). Even major ICT firms are of small and medium size, and thus are able to develop organisational capital that is less hierarchical in nature, and that allows for the autonomy and independence in decision making necessary to increase innovation and absorb new knowledge. Based on these arguments, hypothesis is proposed as the following:

H2: *Organisational capital positively relates to firm performance*

The relevant literature acknowledges that the influence of social capital on firm performance has been increasing (Kianto et al., 2013). However, the concept of social capital has been much debated in terms of definition, measurement, and operationalisation (Hsu et al., 2011). So far, scholars have proposed three distinct theoretical perspectives of social capital: functional, network and multidimensional perspectives (Gilbert et al., 2017). The "functional" perspective developed, as by Coleman (1988) and Putnam (1993) defines social capital as a functional resource that enhances collaboration among individuals in an organisation. The "network" perspective of social capital theory, as suggested by Bourdieu (2011), defines social capital as resources embedded in social networks in which individuals or organisations are members: when member's network is expanded and trust is established, members are more willing to share intellectual resources within the network and, in turn, more motivated to participate in knowledge-exchange activities. The third perspective, the "multidimensional" perspective, was developed by synthesizing the functional and network perspectives (Gilbert et al., 2017), and conceptualizes social capital as a resource both inherent in a network and as a resource facilitating action among network members that it is available for productive purposes (Grootaert, 2004). In general, social capital encompasses the context, stock of relationships, interpersonal trust, and shared norms that allow certain behaviours and sustainable relationships between individuals and ensure favourable conditions for organisational development and knowledge exchanges (Donate et al., 2019). Hence, how social capital enables the access, processing, synthesis, and exchange of knowledge within and across organisations will significantly impact performance, especially in knowledge-based organisations like ICT firms. From this, we hypothesize the following:

H3: *Social capital positively relates to firm performance*

3.2. The impact of organisational capital on human and social capital development, and the mediating role of organisational capital

Investment in research and development (R&D) (i.e., a type of investment in organisational capital) is fundamental for the creation of new knowledges, products and services. R&D investment activities increase the opportunities and avenues for organisational members to identify and apply technology in products and services (Zack et al., 2009). This also improves members' own understanding and learning about new knowledge and technologies (Youndt et al., 2004). Accordingly, the more an organization invests in R&D, the more it supports member individuals as they enhance their expertise, knowledge. Thus, this form of investment in organisational capital builds human capital.

The other major type of investment in organisational capital is the provision for regular employee training. It is broadly accepted that firms can increase their human capital by providing comprehensive training activities to current employees. Training activities that focus on developing personal knowledge and skills may not only increase employees' human capital, but also help employees to maximize social capital by building relationships and sharing knowledge with their colleagues (Tseng et al., 2014). Likewise, as individuals learn and increase their human capital, they may create knowledge that potentially forms the foundation for organisational learning and knowledge accumulation (Youndt et al., 2004).

Investment in information systems (IS) is also important for human and social capital. There is a general consensus that IS represents the infrastructure of many organisations (Youndt et al., 2004). At a primary level, IS creates repositories where knowledge can be codified and institutionalized; IS investments also enable the creation and diffusion of knowledge from and across dispersed and globalized sources (Youndt et al., 2004). Today, computer networks (a type of IS) remove physical and temporal limitations to communication and connect people to create online social networks (Youndt et al., 2004). These online connections enhance cooperation, and the sharing of knowledge not only among employees within a firm, but also across multiple firms (Youndt et al., 2004).

The fourth and last major type of investment in organisational capital is investment in organisational culture. A significant body of literature regards organisational culture as having an important impact on the development of the components of intellectual capital, especially on human and social capital (Ellinger et al., 2002; Kostopoulos et al., 2015). Mouritsen et al. (2001) argued that organisational culture is pivotal to realising the value of intellectual capital. Guthrie et al. (2004) advocate that corporate culture is crucial toward a firm's success and is capable of increasing intellectual capital within that firm. Different kinds of organisational culture would have different impacts on intellectual capital—developing the type of organisational culture that allows flexibility, openness, quick adaptability, and responsiveness is appropriate for knowledge-based organisations like ICT firms, and is an important driver for supporting the development of the components of intellectual capital, especially human and social capital (Gilbert et al., 2017). From the above arguments, the following hypotheses are proposed:

H4: *Investment on organisational capital positively affects human capital*

H5*: Investment on organisational capital positively affects social capital*

H6*: Organisational capital mediates the relationship between social capital and firm performance*

H7*: Organisational capital mediates the relationship between human capital and firm performance*

3.3. The moderation effect of the environmental uncertainty

The nature, source, and extent of environmental uncertainty will have clear impacts on firms' strategic management and development. The current study proposes a measurement technique for a given uncertainty construct. It begins by establishing different levels of the extent of environmental uncertainty as (a) low uncertainty or (b) high uncertainty (Jabnoun et al., 2003). In "low uncertainty" environments, changes are relatively small and causes are fairly predictable (Jabnoun et al., 2003). When environmental changes are insignificant, firms are little motivated to improve firm performance; in such environments, physical resources suffice to achieve business processes efficiently, with minimal reconfiguration, customization and updates; intellectual capital has few opportunities to demonstrate its importance in term of acquiring and sustaining competitive advantages (Jabnoun et al., 2003). In contrast, environments with high degrees of uncertainty are characterized by unpredictable changes, and unclear relationships between environmental components and the organisation; in such contexts, intellectual capital and intangible resources demonstrate more flexibility than physical resources, and should be dynamically managed to achieve superior performance (Jabnoun et al., 2003). In such environments, firms in traditional industries may quickly become incompatible with new business requirements, and their tangible resources may become obsolete; consequently, such firms are no longer able to sustain good performance—whereas high-tech firms are managed dynamically, and are agile enough to reconfigure their existing intellectual capital and acquire new capital to cope with external changes (Jabnoun et al., 2003). Therefore, these additional hypotheses are proposed:

H9: *Environmental uncertainty significantly moderate the effects of human capital on firm performance*

H10*: Environmental uncertainty significantly moderates the effects of organisational capital on firm performance.*

H11: *Environmental uncertainties significantly moderates the effects of social capital on firm performance*

In addition, it is assumed here that the environmental uncertainty may have conditional impacts on the strength of indirect relationships between the organisational capital and firm performance. In other words, the mediating effects of organisational capital on firm performance may be moderated by environmental uncertainty, thereby demonstrating a moderated mediation effect. The paper proposes that a strong indirect influence of the organisational capital on firm performance when the moderating degree of environmental uncertainty are high. Therefore, the following hypotheses are presented:

H12: *Human capital positively mediates the indirect relationship between organisational capital when the moderating effect of environmental uncertainty is high.*

H13: *Social capital positively mediates the indirect relationship between organisational capital when the moderating effect of environmental uncertainty is high.*

4. Model formulation

Based on the above theoretical backgrounds and hypotheses, the paper proposes the following integrated model (Figure 1)

5. Methodologies

5.1. Data collection and respondent characteristics

A survey of ICT firms in Ho Chi Minh City and Ha Noi was conducted. The majority of firms are 5 years old or younger. The targeted respondents were directors, project managers and senior managers who represented the best source of information for our study. Eventually, 370 responses were directly collected from 450 distributed questionnaires. After excluding missing data and outliers based on boxplot analyses, 350 responses were retained for analysis. Table 1 presents the demographic information of respondents in the research sample.

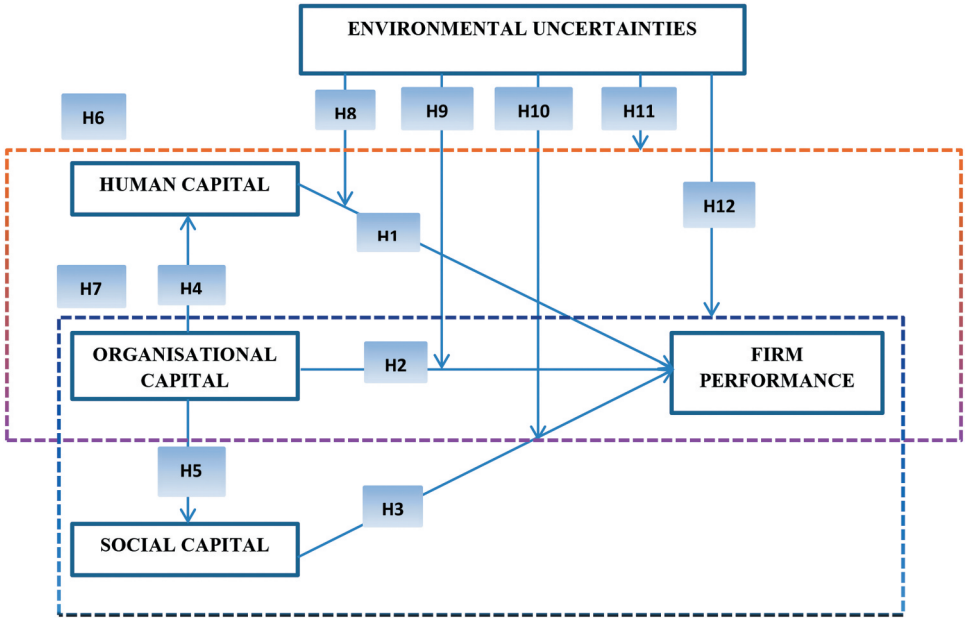

Figure 1. Research model.

Table 1. The demographic information of respondents in the research sample

Variable	Category	N	Percentage (%)
Age	20s	10	3
	30s	255	73
	40s	81	23
	≥50	5	1
Education	Vocational school	13	4
	Bachelor's degree	267	76
	Master's degree	71	20
ICT category	Software services	200	57
	Hardware services	31	9
	Hardware manufacturing	10	3
	Digital media	80	23
	Telecommunication	30	9

5.2. Measurement scales

The questionnaire was developed from validated scales to ensure content validity; however, due to the predominantly Vietnamese setting, the survey was translated into Vietnamese, with the help of two academic domain experts fluent in Vietnamese and proficient in English. The questionnaire was pre-tested in meetings with 10 academic domain experts and 10 senior managers from Vietnamese ICT firms. The purpose of the pre-test was to evaluate the content validity of the translated measures, and whether the respondent understood the instructions, items and scales.

To measure the intellectual capital dimensions, firm performance and environmental uncertainty, 5-point Likert-scale items ranging from '1' (strongly disagree or strong dissatisfaction) to '5' (strongly agree or strong satisfaction) were created. (All items are reported in detail in Appendix A.) *This is the simple sum or average of questionnaire responses over the set of individual items (questions). In so doing, Likert scaling assumes distances between each choice (answer option) are equal*. The measurement of the three dimensions of intellectual capital (human, organisational and social capital) was mainly derived from measurement scales developed by Subramaniam and Youndt (2005). Firm performance measurements were adapted from scales used, developed and validated by Wiklund and Shepherd (2003). Environmental uncertainty measurement scales were developed based on the basis of studies by Atuahene-Gima and Murray (2004).

6. Results

6.1. The result of the construct reliability and validity evaluation

We began tests with Cronbach alpha (**α)** for reliability analysis in order to measure the internal consistency of the measurement scales (Hair et al., 1998). Acceptable values of **α** are above 0.6 (Hair et al., 1998): the **α** of human, social and organisational capital were 0.89, 0.90 and 0.60, representing reasonable scale reliability. For firm performance and environmental uncertainty, **α** was 0.61 and 0.70, also represent good scale reliability. Next, we used an exploratory factor analysis (EFA) technique to conduct dimensionality analyses as indicated by factor loading score. The general purpose of factor analysis techniques is to condense the information contained in an original construct into smaller set of new composite dimensions or factors (Hair et al., 1998). All factor loading scores meeting a suggested level of 0.5 satisfy the condition of unidimensionality (Hair et al., 1998). In this study, with an original set of 35 measurement items, there were only 23 items which qualified with a factor loading score of 0.5, with a minimum score of 0.677.

6.2. The result of convergent and discriminant validity evaluation

Confirmatory factor analysis (CFA) is a statistical technique used to verify the factor structure of a set of observed variables. CFA allows the researcher to test the hypothesis that a relationship between observed variables and their underlying latent constructs exists. To test the hypothesis that a relationship between observed variables and their underlying latent constructs exists, confirmatory factor analyses (CFA) were conducted to assess how the conceptual model fit data with the help of *AMOS software version* 23. Regarding overall model fitness, to make sure data fit well to model, the root means square error of approximation (RMSEA) should be smaller than or equal to 0.08 (Hair et al., 1998). Goodness-of-fit index (GFI), and Comparative fit index (CFI) should satisfy thresholds of 0.9 (Hair et al., 1998). Our test results show an acceptable fit for data set (GFI = 0.9, CFI = 0.91 and RMSEA = 0.08). Further, we used a CFA technique to test convergent and discriminant validity. We checked all average variances extracted (AVEs) and composite reliabilities (CRs). All AVEs were higher the suggested level of 0.5, and CRs were also above the proposed level of 0.7 (Hair et al., 1998). Therefore, convergent validity was satisfied. For the test of the discriminant validity, Cheung et al. (2010) suggested that if the AVE of each construct is larger than the squared correlation coefficient of that construct compared with any other construct in the model, constructs indeed are different from one another. The test result in Table 2 demonstrates that all constructs carry sufficient discriminant validity.

6.3. Hypotheses verification

In the hypothesis verification step, we tested all hypotheses using process software. Collectively, H1, H2, H3, H4 and H5 represent direct individual effects, H6 and H7 represent indirect effects whereby the association between organisational capital and firm performance is mediated by human and social capital, respectively. Such mediated effects were tested using a bootstrapping analysis: a powerful method for determining the statistical significance of mediation to confirm a significant indirect effect as proposed by Preacher and Hayes (2013). In H9, H10 and H11, we assumed the moderating effect of environmental uncertainty on the relationship between human, social and organisational capital and firm performance. In H12 and H13, we assumed as the moderating effect of environmental uncertainty on indirect effect of organisational capital on firm performance via human and social capital. Such moderated and moderated mediation effects were tested by hierarchical regression analysis.

6.3.1. The tests of the direct and indirect effects

The study adopted Hayes's suggestion to test direct and indirect effects (H1, H2, H3, H4, H5, H6 and H7). At first, organisational, human and social capital should be regressed on firm performance. The results in Table 3 showed that organisational ($\beta = 0.308$, $p < 0.001$) and human capital ($\beta = 0.28$, $p < 0.001$) were positively related to firm performance, while social capital were less positively related to firm performance than two other dimensions ($\beta = 0.0983$, $p < 0.05$). Thus, H1, H2 and H3 are statistically supported. Organisational capital is positively related to human and to social capital (($\beta = 0.2630$, $p < 0.01$) and ($\beta = 0.404$, $p < 0.001$), respectively), so H4 and H5 are supported. Based on the test outcomes above, the study confirms that there are no full mediation effects in this model: full mediation effects will occur if organisational capital has no direct influence on firm performance (Hayes, 2009). Therefore, there may be only partial mediation effects of human and social capital on the relationship between organisational capital and firm performance. The test outcomes showed that the partial mediation effects of human and social capital are confirmed (($\beta = 0.0755$, $p < 0.001$) and ($\beta = 0.0680$, $p < 0.001$)), so H6 and H7 are supported.

6.3.2. Moderation and moderated mediation effect of environmental uncertainty

H8, H9 and H10 postulated that the influence of human, social and organisational capital would be positive for firm performance in conditions of high degrees of environmental uncertainty. To test H8, H9 and H10, the interactions of (human capital x environmental uncertainty), (organisational capital x environmental uncertainty) and (social capital x environmental uncertainty) were included in regression analysis. The results in Table 4 indicate that environmental uncertainty

Table 2. The test result demonstrates that all constructs carry sufficient discriminant validity

	Human capital	Organisational capital	Social capital	Firm performance	Environmental uncertainties
Human capital	**0.593***	0.207	0.263	0.504	0.352
Organisational capital	0.207	**0.664***	0.263	0.405	0.137
Social capital	0.263	0.301	**0.598***	0.396	0.319
Firm performance	0.504	0.405	0.396	**0.646***	0.362
Environmental uncertainty	0.352	0.137	0.319	0.362	**0.657***

*: Diagonal entries are AVE values

Table 3. Regression analysis of moderating effects

Model 1

	B	se	P	LLCI	ULCI
Constant	.7361	.1931	.0002	3.562	1.1159
Human capital = > Firm performance (H1)	.2946	.0369	.0000	.2219	.3672
Organisational capital = > Firm performance (H2)	.3085	.0519	.0000	.2064	.4106
Social capital = > Firm performance (H3)	.1683	.0335	.0000	.1024	.2341

Model 2

	B	se	P	LLCI	ULCI
Constant	2.7772	.2293	.0000	2.3263	3.2281
Organisational capital = > Human capital (H4)	.2630	.00735	.0004	.1185	. 4075

Model 3

	B	se	P	LLCI	ULCI
Constant	3.3659	.2531	.0000	1.7802	2.7756
Organisational capital = > Social capital (H5)	.4040	.0811	.0000	.2445	.5636

Model 4

	B	Boot-se	P	BootLLCI	BootULCI
Organisational capital = >Human capital = > Firm performance (H6)	.0775	.0226	.0000	.0340	.1238
Organisational capital = > Social capital = > Firm					
performance (H7)	.0680	.0193	.0000	.0340	.1070

Table 4. Regression analysis of moderating effects

Model 5

	β	Se	p	LLCI	ULCI
Constant	3.3659	.0355	.0000	3.2960	3.4357
Human capital = > Firm performance	.2796	.0376	.0000	.2057	.3535
Social capital = > Firm performance	.0983	.0350	.0044	.0294	.1672
Organisational capital = > Firm performance	.3080	.0501	.0000	.2094	.4066
Environmental uncertainty = > Firm performance	.2188	.0516	.0000	.1173	.3202
Interaction-1 = > Firm performance (H8)	−.0252	.0510	.6216	−.1256	.0752
Interaction-2 = > Firm performance (H9)	−.1035	.0618	.0947	−.2250	.0180
Interaction-3 = > Firm performance (H10)	−.1545	.0453	.0007	−.2437	−.0654
Interation-1: Human capital x Environmental uncertainty					
Interation-2: Organisational capital x Environmental uncertainty					
Interation-3: Social capital x Environmental uncertainty					

only moderate the influence of social capital on firm performance. That is, H8 and H9 are not supported. For H10, in contrast with what was assumed for H10, the outcome of a slope test indicated that social capital has strong impact on firm performance analysis when the degree of environmental uncertainty is low, not high. Therefore, H10 is not fully supported.

After confirming that H10 was partially significant, moderated mediation impacts (H11 and H12) were analysed. Process software was used to measure moderated mediation impacts. The output of analyses provided detailed results of the indirect effects by presenting statistical significance relating to the degree of environmental uncertainty. This allowed us to verify the values of environmental uncertainty for which conditional indirect effects of the organisational capital on firm performance via human and social capital were significant at $\alpha = 0.05$. The results in Table 5 demonstrate that both moderated mediation effects were significant when the level of environmental uncertainty is low but not when high. Therefore, H11 and H12 are not fully supported.

7. Discussion

The main contributions of this study are to interpret the mediating effect of human and social capital between organisational capital and Vietnamese ICT firm performance, and the moderating effects of environmental uncertainty. First, this article reveals that intellectual capital dimensions have significant impacts on firm performance, in which findings confirm that human capital makes the most important contributions to forming these influences. Therefore, any innovative or creative activity must focus on human resource development.

Table 5. Index of moderated mediation of the environmental uncertainty

Mediator	Index	SE(Boot)	BootLLCI	BootULCI
Human capital	−.0066	.0128	−.0385	.0126
Social capital	−.0624	.0220	−.1174	−.0265

Second, this article has drawn a conceptual framework based on RBV and intellectual capital theory to complement the limitations of both. Prior studies relied on RBV and intellectual capital for explaining better business performance in well-developed countries and in traditional industries (Radjenović & Krstić, 2017). By developing intellectual capital dimensions' deployment as an aspect of RBV, the current study provides an answer to why, with similar amounts of intellectual capital, Western ICT firms use intellectual capital more successfully than Vietnamese ICT companies. The key point here is the moderating role of environmental uncertainty in Vietnam on the relationship between intellectual capital and firm performance. Therefore, the moderating role of environmental uncertainty was confirmed. Major local ICT firms are micro-, small, or medium firms; they work in a business environment in which they face a number of challenges in terms of regulatory frameworks and intellectual property protection, plus quality and availability of skilful persons and financial supporters, all of which are barriers to the development of the Vietnamese ICT sector. Therefore, they can expect long-term development and improved performance only if such environmental factors are improved. Otherwise, Vietnamese ICT firms are not strong enough to survive in a business environment with highly dynamic markets and uncertain conditions.

Third, the mediating roles of human and social capital should be considered key sensors in explaining how organisational capital positively improves firm performance. ICT staffs are highly educated and creative experts who prefer working as non-managerial staff—and as employees work under significant time management pressure, firms' organisational culture, environment, and structure will influence their performance as well as the performance of their firms as a whole. Because of this special feature of ICT jobs, staffs must actively build their own social networks to support their work independently. In addition, their major communication and information exchanges are online and carried out in multi-culture environments, when mutual trust in social network is established, people are willing to share intellectual resources, which in turn motivate innovation activities and consequently build a positive corporate culture, as well as improving firm performance. In addition, ICT advances applied to organisational changes and operations are considered to play a central role in enhancing working environments as well as fostering staff productivity. The discussion of the impact of ICT advancements on growth and productivity was inspired here by the famous sentence by Robert Solow: "You can see the computer age everywhere but in the productivity statistics" (Solow, 1987). We argue, therefore, that the effective accumulation of organisational capital is necessary to help employees create and acquire knowledge derived from the range of intangible assets that comprise a firm's competitive advantages. Concretely, organisational capital should not be seen as the sole factor influencing on firm performance: the integration of interrelationships among social, organisational, and social capital explain firm performance in specific contexts, and will provide a clear picture of how crucial intellectual capital is to the successful development of ICT firms.

8. Implications

The findings in this paper provide meaningful theoretical and practical contributions to the intellectual capital literature by extending prior findings. The first theoretical contribution pertains to dimensions of intellectual capital as they apply to Vietnam-like emerging economies. Because of inadequate markets and legal support, dysfunctional behaviours of competitor firms are widespread; the evaluation of intellectual capital should not be the same as in Western countries.

Second, despite extensive discussions of the influence of organisational capital on firm performance, there are very few studies on its impacts on firm performance via other intellectual capital dimensions within the context of the ICT sector. These findings show that values of corporate cultures form the foundation of the "valuable, rare, inimitable, and non-substitutable" (VRIN) assets, and that there are needs for building mutual trust in social-network extensions.

In addition, these findings also provide practical implications for ICT management. Facing global trends and an unpredictable environment, ICT managers must develop their own human, organisational, and social capital to meet customers' challenging demands, and must also maintain and build strong network ties with employees, customers, suppliers, and competitors, to observe rapidly changing environments—and in response, to adjust their own business direction quickly, flexibly, and effectively.

9. Conclusion

Vietnam is on the road to a knowledge-based economy in which ICT will be a key sector. This study gives brief insights into factors shaping the Vietnamese ICT sector in terms of the interrelationships among social, human, and organisational capital on one hand, and firm performance on the other. By refining objectives in business operations, ICT firms must understand their own capabilities—especially their internal strengths—in order to face unpredictable changes in the environment. Social, organisational, and human capital, as dimensions of intellectual capital, are recognized as key intangible resources for firms' long-term performance.

Accordingly, this study investigating the central role of organisational capital as the key factor for the sustainable development of the ICT firms, especially in a future in which firms become larger and better structured. However, the initiative of Vietnamese ICT firms to motivate innovation activities and to develop intellectual capital is still in its infancy. Hence, we hope that the findings presented here will be helpful to top managers and policy makers in Vietnam, and in developing countries, as they work to find a good path to enhance the long-term performance of ICT firms.

10. Limitations and further research

This research also reflects some limitations. First, this study explores primarily definitions of the dimensions of intellectual capital, and its impact on firm performance. This study employs static data at one point in time, which has inevitable drawbacks in describing the long-term patterns in ICT's development and performance. The use of panel data may be advisable for follow-up studies. Second, other dimensions of intellectual capital (such as customer capital) could be included in future research. Lastly, other stakeholders such as employees and managers are involved in the relationship between intangible capital and firm performance; further studies should also take into account their perspectives.

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Appendix A. Questionnaire items

Firm performance
We demonstrated more profitability than other market competitors
We have greater capacity in developing new products or services than other competitors
We have higher quality of products or services than other competitors
We have greater capability in developing new products, service or programs
We have greater ability to attract and retain essential employees
We achieve greater satisfaction among customers or clients
We experienced a greater growth in sales than other market competitors
Social capital
Our employees are skilled at collaborating with each other to diagnose and solve problems
Our employees share information and learn from one another
Our employees interact and exchange ideas with people from different areas of the organisation
Human capital
Our employees are active in upgrading employee's skills
Our employees are bright
Our employees are satisfied with working conditions
Our employees always come up with new ideas
Organisational capital
We has the know-how to improve the organisational capability
Our organisational culture includes a clear organisation structure
Our organisation invest abundant resources to acquire new knowledge and information system
Our organisation always provide trainings for employees
Environmental uncertainty
Marco policies is highly uncertain
Technological development are highly unpredictable
Product market is a very complex environment
Customer demand is hard to forecast
Customer tend to look for new products all the time

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Using the AHP Approach to Evaluate Criteria for the 3PL Service of Four Southeast Asian Nations

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Abstract

Outsourcing becomes one of the most significant strategies in the logistics industry to provide related services undertaken by third parties. Currently, The Southeast Asian region is emerging as one of the attractive destinations for 3PL activities including some typical countries like Vietnam, Thailand, Indonesia and The Philippines. Nevertheless, 3PLs always has potential risks, so it requires a thorough assessment based on important criteria. Therefore, which criteria will help decision makers rely on to evaluate and choose the right destination for their global logistics activities is always a difficult question. For these reasons, the research establishes a model with the application of AHP theory that covers criteria at the national level including cost structure, workforce ability, supporting industry, and government policy. Based on these criteria, industry experts are interviewed directly to make their assessments with respect to four emerging countries in the Southeast Asia. After the data analysis, the results show that the cost structure is always top consideration and Vietnam is the best country to meet this criterion. As a result, managers or decision makers in the given field will have a better view of the criteria to assess a destination for 3PL services. In general, with a new approach from the national level, the study has contributed to the existing literature with the new model to assess and select destinations for 3PL services which might aid managers in improving evaluation process and reducing risks in the given field.

Keywords: 3PL, third party logistics, criteria, emerging countries, the AHP

I. INTRODUCTION

With the purpose of perfecting the supply chain, 3PL utilization is becoming one of the critical strategies for companies today in solving complex problems related to logistics activities such as transportation, warehousing, customs, etc... (Jothimani and Sarmah, 2014). Hence,

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through the outsourcing of 3PL services, it will not only save time and costs, but also help to maximize the resources for key business activities (Sahu et al., 2015, Govindan et al., 2016). Thereby, it can be said that 3PL is a vital outsourcing strategy of businesses in the context of global competition nowadays (Domingues et al., 2015). However, before taking advantage of 3PL services, managers or decision-makers must solve two problems as well as two big questions, which are: 1) how to choose a suitable destination for 3PL service in countless destinations around the world? and which criteria will help to make decisions quickly and accurately to minimize risks and costs?

In the last decades, along with the development of the logistics industry, a major number of researches have been studied in the 3PL services' decision-making field (Aguezzoul, 2014; Singh et al.,2018). However, the number of studies has mostly focused only on 3PL selection criteria at the company or industry level, but lacking guidance with criteria that belong to the national level (Pham et al., 2018). Hence, this research will analyze and address the gap between the two levels.

In so doing, the authors build the model according to the concept of the AHP approach including the criteria at the national level. With respect to those criteria, there will be four selected Southeast Asian countries to compare and find the most suitable destination in 3PL service. In the meantime, the selected criteria are evaluated by industry experts to consider their important role in decision making. Hence, this research will enrich both theoretically and empirically evidences to support decision-makers to critically evaluate and select suitable destinations for their global logistics activities.

2. LITERATURE REVIEW

2.1. Third-party logistics (3PL)

3PL has been a popular term since the 1990s as it was defined as suppliers providing logistics activities to their clients (Sink et al., 1996). According to Daugherty (1996), enterprises' supply chain will become more efficient, beneficial and economical due to outsourcing their logistics activities to third parties rather than in-house. Later, Aktas et al., (2011) further added that 3PL will not only bring benefits to companies in cost reduction and quality enhancement, but also mitigate challenges in operation and focus more on core functions instead of non-core business activities (Vasiliauskas & Jakubauskas, 2007; Aktas, et al., 2011). In addition, several works have been studied and pointed out that 3PL selection strategy is to meet companies' objectives which are service improvement (Aktas, et al., 2011; Rajesh et al., 2011; Rahman et al., 2017; Batarlienė & Jarašūnienė, 2017), supply chain's responsiveness and flexibility enhancement (Hung & Zhang, 2006), and lead-time reduction (Zhang and Okoroafo, 2015). Besides the benefits of 3PL, there are some challenges of outsourcing logistics activities to 3PL which may lead to the loss control and security (Hung & Zhang, 2006), advantage competitiveness reduction (Jennings, 2002; Beaumont & Sohal, 2004), lacking information systems compatibility (Ansari & Modarress, 2010), or government regulation violation (Rahman et al., 2017). Overall, the foregoing pros and cons of 3PL are undeniable, so this paper

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uses these points of view to provide the research model with comprehensive evaluation criteria in order to help decision-makers have a more general picture of the 3PL field, and thereby facilitate decisions based on the direct pair-wise comparison.

2.2. Criteria to evaluate the 3PL service

As mentioned above, most researchers in the field agreed that there are common criteria used to evaluate a destination for 3PL services including the competition of cost structure (such as freight costs, labor costs, and transaction costs) (Sahu et al., 2015; Zhu et al., 2017). To explain, Hwang et al. (2016) also added that enterprises will gain both profits and competitive advantages by reducing logistics costs through outsourcing. Therefore, this is the indispensable criterion that this study will utilize to build the research model. Additionally, the effectiveness and availability of labor forces (such as workforce efficiency, technology readiness and English ability…) are also important criteria (Rahman et al., 2017).

If this criterion is satisfied, it will create sustainable value in the supply chain. In addition, although in the Southeast Asia region, costs saving is an advantage, underdeveloped infrastructure and supporting industries (such as warehousing, technology, etc) (Mothilal et al, 2012), which is also current issues in operating their logistics activities (Sangka et al, 2019). As a result, the 3PL supporting industry including infrastructure, timeliness, and strategic flexibility has become one of the top criteria ... (Aguezzoul and Pires, 2016). Lastly, government policies (such as regulations, incentives, tariff preferences, and intellectual property protection, etc..) is seen as one of the most influential criteria for a 3PL service destination (Bansal et al., 2014; Rahman et al., 2017).

This criterion plays a key role in creating an attractive destination for 3PL services, but it is difficult to assess due to its complexity and variation over time, especially in developing countries (Kumar and Singh, 2012; Sangka et al., 2019). Recently, many Southeast Asian countries are using this criterion to attract international investors in an effort to turn their countries into one of the important links in the global supply chain (Chen at el., 2016).

Therefore, this study makes use of the aforementioned analyses and criteria to develop a theoretical evaluation model of the AHP method. This model will help decision-makers review and choose the most suitable destination to outsource their logistics activities.

In order to facilitate the mentioned assessments, the authors select four emerging countries in Southeast Asia including Indonesia, Vietnam, Thailand and The Philippines, which will be targeted destinations for considering related criteria. The reasons for this choice are due to the rapid development and economic growth of developing countries in South-East Asian in recent years (Banomyong et al., 2015; Jomo, 2019). In addition, many studies have pointed out that these countries are the economic tigers in the region and become positive destinations in the southern policy of many countries such as Korea, Japan, Taiwan, etc. (eg. Chen et al., 2016; Pham et al., 2017, Pham et al., 2018).

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3. METHODOLOGY

3.1. The application of the AHP

Based on the abovementioned discussion, the national-level criteria will be used to classify into four main criteria to evaluate 3PL's performance including cost structure, workforces, 3PL supporting industry, and government policies. Each main criterion will be explained by a group of sub-criteria, which have been popularly addressed in the previous studies (eg. Sangka et al, 2019; Rahman et al., 2017; Aguezzoul and Pires, 2016). With respect to those criteria and sub-criteria, there are four typical 3PL destinations are selected to be the alternatives, which are indicated in Figure 1.

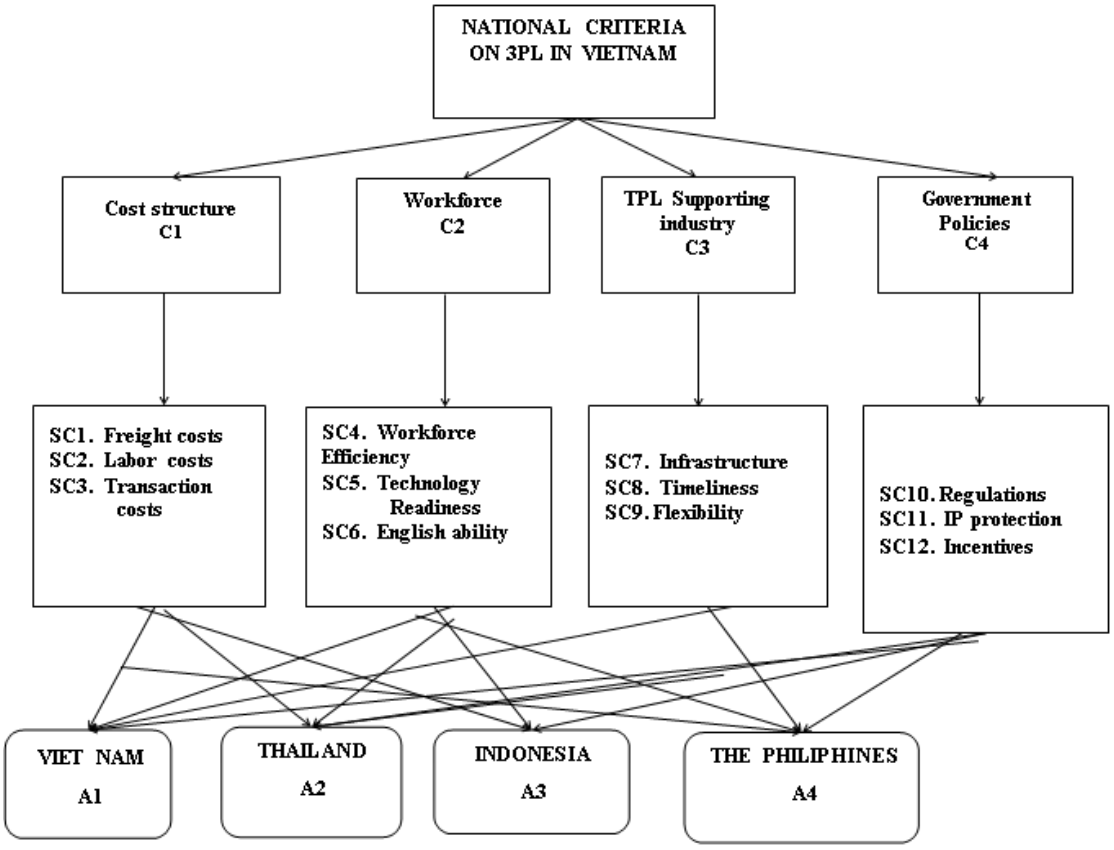

Figure 1: The research model

3.2. The summary of AHP theory

The AHP (analytical hierarchy process) has been firstly introduced by Saaty since 1971, then it has become a famous method to deal with decision-making issues in the economics field. In this study, to adopt the AHP, we firstly build a hierarchy expressing all criteria and alternatives mentioned previously. Decision-makers will use the AHP scale to evaluate their priorities between every pairwise comparison in the questionnaire. The AHP scale helps to evaluate this criterion is of equally concerned (1:1), moderately concerned (3:1), essentially concerned (5:1),

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very much more concerned (7:1) or absolutely concerned (9:1) to another. 1, 3, 5, 7, 9 are quantitative values given in pairwise comparison matrices.

The matrix of pairwise comparison is implemented for elements presented in the constructed hierarchy. The list of relative weights and the importance of the factors (eigenvector) are then calculated based on the pairwise comparison's outcome using the 5-stage process as follows:

(1) Computing the criterion weight (wi) as follows: $wi = \sqrt[n]{\prod_{j=1}^{n} aij} \;\; i = (1, \dots, n)$ (1)

(2) Normalizing wi as: $wi = \frac{\overline{wi}}{\sum_{i=1}^{n} \overline{wi}} \; ; i = (1, \dots, n) where \;\; \overline{wi} \; is \; vector \; of \; the \; priorities$ (2)

(3) Drawing the maximal Eigen value as: $\lambda \, max = \sum_{i=1}^{n} \frac{\sum_{j=1}^{n} aijwj}{nwi}$ (3)

(4) Then, obtaining a consistency index (CI) by using the equation as

$$CI = \frac{\lambda \, max - n}{n - 1}, n \; is \; the \; order \; of \; matrix \quad (4)$$

Based on the CI drawn from (4), the consistency ratio (CR) is calculated by equation (5). The CR should be smaller than 0.1 to indicate the reliable comparison matrices.

$$CR = \frac{CI}{RI}, where \; RI \; is \; random \; index \; of \; judment \; matrix \quad (5)$$

(5) Eventually, calculating the global priority (GPi) based on given criteria applying the following equation:

$$Pi = \sum wj \; .lij \quad (6)$$

Where: Pi is the global priority of criterion i; lij is the local priority (LP)

3.3. Building Expert-Questionnaire and collecting data

To collect data using the pairwise comparisons method, the expert questionnaire is created based on the said nine-point scale (1, 3, 5, 7, 9). Specifically, selected criteria and sub-criteria in the constructed hierarchy were used to the pairwise comparisons. After completing the AHP questionnaire, 11 experts were then selected to answer the questionnaires based on their experience and expertise in the logistics industry as well as the 3PL outsourcing status in terms of countries. The collected data were then inputted into Expert Choice software to support the data analysis in the next stage. The experts' backgrounds are summarized in Table 1.

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Table 1: a summary of experts' information

Expert No.	Gender	Age	Education	Position	Company field	Company size
1	Male	21-30	Msc	Manager	Researching	
2	Female	34-40	Bsc	Manager	Pharmaceutical	500-1000
3	Male	21-30	Bsc	Senior executive	Aviation	100-300
4	Female	34-40	Bsc	Manager	Coatings Manufacture	300-500
5	Male	21-30	Bsc	Senior executive	Logistics	>1000
6	Female	21-30	Bsc	Senior executive	Tires Manufacture	300-500
7	Male	41-50	Msc	Supervisor	Logistics	>1000
8	Female	21-30	Bsc	Supervisor	Electric Manufacture	>1000
9	Male	34-40	Bsc	Manager	Logistics	>1000
10	Male	34-40	Msc	Director	Logistics	300-500
11	Female	34-40	Bsc	Manager	Food retail	100-300

4. DATA ANALYSIS AND RESULTS

1. The test of reliability

Based on the AHP theory, the reliability of collected data is tested by the consistent ratio (CR). As suggested, small inconsistency is allowed and the CR is acceptable when it is less or equal to 0.1. After analyzing data on Expert Choice software, 11 outcomes are evaluated as consistent with CR less than 0.1 as displayed in Table 2. Overall, among 11 experts, there are some difference in opinion over criteria. All results were then combined in the entire hierarchy and displayed in detail in the next step.

Table 2: Overall CR of 11 experts

Experts	Criteria								CR	
	C1		C2		C3		C4			
	W	Rank	W	Rank	W	Rank	W	Rank	Total	CR
Facilitator	0.409	1	0.165	3	0.104	4	0.322	2	1.000	0.05
2	0.151	3	0.047	4	0.279	2	0.523	1	1.000	0.01*
3	0.149	3	0.045	4	0.287	2	0.519	1	1.000	0.01*
4	0.108	3	0.06	4	0.296	2	0.536	1	1.000	0.00*
5	0.343	1	0.172	4	0.243	2	0.243	3	1.000	0.05*

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6	0.570	2	0.055	4	0.280	2	0.095	3	1.000	0.01*
7	0.149	3	0.071	4	0.296	2	0.484	1	1.000	0.00*
8	0.338	1	0.169	4	0.288	2	0.205	3	1.000	0.02*
9	0.640	4	0.250	3	0.388	1	0.299	2	1.000	0.06
10	0.086	4	0.099	3	0.383	2	0.432	1	1.000	0.01
11	0.086	4	0.099	3	0.383	2	0.432	1	1.000	0.01

* CR$\leq$ 0.1, it is acceptable.

2. The priority (P) of Criteria and sub-criteria

The inconsistency problems related to the questionnaire were tested to ensure their reliability and validity. After that, the next phase was to synthesize the pairwise comparison judgment matrices of outsourcing country selection problems; following by combining 11 questionnaires to the goal as well as each criterion in the four-level hierarchy.

As discussed in the abovementioned part, the pairwise comparison judgment were converted into the corresponding most significant eigenvalue problem and calculated the priority weight by using Expert Choice evaluation system (See Table 3). Each pairwise comparison judgment matrix shows the consistency ratio of 0.00 (<0.01), which are acceptable and that the weights calculated are significant utilizable. With respect to the overall goal, the 11-outcome combined results (see Table 3) showed that C1 (cost structure) is the most preferred criteria, with 0.338. Hence, cost structure can be evaluated as the most important criteria for decision makers to select 3PL service vendor, followed by C3 (3PL supporting industry-0.288) and C4 (Government policies – 0.205). The least important one is C2 (labor force-0.169).

Table 3: The priority of Criteria and sub-criteria

C	P	C1	P	C2	Priority	C3	P	C4	P
C1	**0.338**	SC1	**0.486**	SC4	0.344	SC7	0.296	SC10	0.362
C2	0.169	SC2	0.242	SC5	**0.469**	SC8	0.343	SC11	**0.409**
C3	0.288	SC3	0.272	SC6	0.188	SC9	**0.361**	SC12	0.228
C4	0.205	Total	1	Total	1	Total	1	Total	1

3. Computing the global weight (GW)

In this step, the global priority was explored by synthesizing the local priorities across all criteria. As a result, Table 4 displayed global priorities calculated by synthesizing the local priority weights for each pairwise judgment matrix.

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Table 4: the calculation of global weight (GW)

Ranking	Cs	Original W	SCs	Local W	GW
1st	**C1**	**0.338**	SC1	0.486	0.164
			SC2	0.242	0.082
			SC3	0.272	0.092
4th	**C2**	**0.169**	SC4	0.344	0.058
			SC5	0.469	0.079
			SC6	0.188	0.032
2nd	**C3**	**0.288**	SC7	0.296	0.085
			SC8	0.343	0.099
			SC9	0.361	0.104
3rd	**C4**	**0.205**	SC10	0.362	0.074
			SC11	0.409	0.084
			SC12	0.228	0.047

After calculating the global priority weight of criteria and sub-criteria, the descending order based on intensity importance of each sub-criterion is displayed in Table 5. The results illustrate that cost structure is the most important criterion (weight = 0.338) and freight costs reflect the highest evaluation from experts. The second criterion is 3PL supporting industry (weight = 0.288) which focus on the flexibility and timeliness of 3PL service providers. The third importance is government policies with the weight being not so different from the second (weight = 0.205). In this criterion, IP protection from the government become the most concerned factor. The last ranking criterion in the study is workforce with the weight being 0.169 and English ability is dominant sub-criterion.

So, based on the experts' evaluations over 4 criteria and 12 sub-criteria, there are big differences on the order of these main and sub-criteria. Overall, cost structure is a leading consideration in the choice of 3PL service. In particular, the factors of freight costs, flexibility, punctuality, the support of infrastructure systems in the industry, policies to protect intellectual property rights of the government are key considerations of decision makers.

Table 5: The priority of SCs

Rank	SCs		P
1	SC1	**Freight costs**	0.164
2	SC9	**Flexibility**	0.104
3	SC8	**Timeliness**	0.099
4	SC3	**Transaction costs**	0.092
5	SC7	**Infrastructure**	0.085
6	SC11	IP protection	0.084
7	SC2	Labor costs	0.082

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8	SC6	English ability	0.079
9	SC10	Regulations	0.074
10	SC4	Workforce efficiency	0.058
11	SC12	Incentives	0.047
12	SC5	Technology Readiness	0.032

4. The priority of alternatives

With regard to the alternatives, the main criteria and sub-criteria were used as foundation for the experts to rank their priority over favored destinations. In the paper, 4 nations are selected as the alternatives in the pairwise comparison matrix. After normalizing, the four countries' priority weights were found as (0.29; 0.27; 0.19; 0.25). as illustrated in Table 6. In other words, Vietnam is considered the optimal destination with the highest weight being 0.29 (29%). However, this result is not much different from Thailand (27%) and The Philippines (25%) which are ranked number two and three. So, these findings reflect the fact that Vietnam, Thailand and Indonesia are three good destinations for 3PL services. These three countries not only can help to reduce cost, but provide very good conditions foreign partners. Indonesia with the weight being 0.19 (19%) is ranked low and much less important than the other three. So, Indonesia now is not so attractive for 3PL services.

Generally, the major goal of outsourcing logistics activities of foreign companies to the Southeast Asian region is to reduce costs structure, take advantage of preferential policies of host countries, and develop the global supply chain. To meet this goal, Vietnam is one of the emerging and attractive destinations, while Thailand and The Philippines are also proving their advantages.

Table 6: The priorities of alternatives

Alternatives	A1	A2	A3	A4	W	P
A1	1	1.16	1.49	1.51	0.29	1st
A2		1	1.27	1.03	0.27	2nd
A3			1	1.50	0.19	4th
A4				1	0.25	3rd

5. DISCUSSION AND CONCLUSION

Logistics has increasingly affirmed its important role in helping international companies build an effective global supply chain, thereby bringing products and services to customers quickly and economically (Mangan and Lalwani, 2016; Murphy, 2018). 3PL is becoming more popular for global supply chain as the growing number of companies' international logistics activities following with their international expansion strategies (Kumar and Singh, 2012) as well as the benefits in logistics costs reduction and international opportunity identification (Daim et al., 2012). In order to aid logistics decision makers in their assessments and options for 3PL outsourcing destinations, the authors have done this research with the comprehensive model

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which includes the most important criteria. In so doing, AHP theory is applied to analyse four main criteria including cost structure, workforce, supporting industry, and government policies. These four criteria are explained by 12 sub-criteria. Eventually, 11 experts in the given field are invited to give their views over the stated criteria and sub-criteria.

The final results are not surprising when cost structure becomes the most important criterion, which is similar to other previous studies' results (Kumar and Singh, 2012; Daim et al., 2012). The second is followed by supporting industries including infrastructure systems, technology application. In addition, preferential government policies to attract and protect assets of international companies are also one of the three important criteria.

With respect to these finding on the important level of criteria, there are the comparisons of experts on four typical nations including Vietnam, Thailand, the Philippines and Indonesia in the field of logistics services. As a result, Vietnam is the country that meets the all criteria, but it is not much different from Thailand and The Philippines. As a result, experts working in the given field will have a better perspective about the selection criteria to assess a destination for 3Pl services. Moreover, this study can be the first step to drill down into specific industries or partners in the selected destination. Therefore, the next research direction is to focus on criteria at industry or company level.

Finally, this study helps to enrich the theory in the logistics industry and once again confirm the important role of the stated criteria by providing an empirical research with in-depth opinions of experts for the emerging countries in the Southeast Asia.

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The Intellectual Capital, Firm Performance and the Moderating Role of Manager Skills

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Abstract

The purpose of this article was to explore the moderating role of the manager skills on the relationship between the intangible capitals and firm performance. Specific aims included (a) to synthesize the prior literatures and definitions related to human, organizational and social capital, firm performance and manager skills, (b) to refine conceptual definitions of the human and social capital with associated conceptual antecedent, organizational capital, and consequences, firm performances, (c) to propose a synthesized conceptual framework guiding the mediated moderation of the manager skills on the relationship between intangible capitals and firm performance. The analysis include data collected from a survey with the total of 370 information communication technology (ICT) firm's managers. The mediating and moderating techniques are used to analyze the indirect effects of organizational capital on firm performance via human and social capital and the moderating role of manager skills on the relationship between intangible capitals and firm performance. The results show that all intangible capital dimensions have direct impacts on firm performance. In addition, there is the existences of the mediating role of the human and social capital on the relationship between firm performance and organizational capital and moderating role of the manager skills on the relationship between intellectual capital dimensions and firm performance. This is the first paper to examine comprehensively the conceptual framework of the moderating role of manager skills on relationships between intangible capitals and firm performance in ICT sector in a developing country like Vietnam.

Keywords: human capital, social capital, organizational capital, manager skills, firm performances

1. Introduction

Vietnam information and communication technology (ICT) industry has the bright future as Vietnam has been emerging as production center for both IT hardware and software services. The expected growth rate of Vietnam's ICT market is eight percent in period of 2016-2020 (*Development Index country rankings*) (Vietnamnet, 2020). The Vietnamese government has identified ICT as one of key industries that may help Vietnam transforming manufacturing economy to knowledge-based economy. Hence, the government has devised a master plan for ICT sector which specifies targets for 2020 turning Vietnam into an advanced ICT country (*Development Index country rankings*) (Vietnamnet, 2020). However, to achieve those targets, there is one issue that policy maker should address is how to develop skillful human resource being able to fit to ICT job, especially, in which human resource in management level that have the important impact on the success or failure of a project or team. The high demand of workforce in the middle and high management level caused by the booming Vietnamese ICT sector has revealed the crisis in leadership style and management skill in the ICT managers (Vietnamnet, 2020). The managers have significant impact on team member's job satisfaction and commitment, so, they play key role to the success or failure of ICT project or team (Thuy et. al, 2015). In manufacturing organization, the work was primarily physical, it was easy to divide it up into separate jobs, each with its different job description (Gilbert et al, 2017). The jobs, in turn, were classified into separate departments, each with its clear and different mission (Gilbert et al, 2017). Therefore, it is said that the hierarchical-based management is appropriate for such firms in which the manager was viewed as powerful expert only focusing on command and control of team members (Gilbert et al, 2017). Meanwhile, ICT job is knowledge-based work that makes job dysfunctional and harder to manage in traditional manner. In knowledge-based organizations, knowledge and innovation are the most valuable asset and they must be acquired, synthesized and applied in the production of the organizational goals (Napier et al, 2009). Hence, management style in ICT firms have shift from hierarchical command to new one based on positive communication among manager and team members (Napier et al, 2009). Furthermore, ICT team members, by nature, come from many countries with different cultures and they come and go with each new need, so, managers have to make effort in interaction with team members effectively. Traditional researches of managerial effectiveness only focused on the role of human and organizational capital which are accumulation of knowledge, skills and experiences of employees that enable them to act in ways which are valuable to both them and their workplace (Napier et al, 2009). Moreover, there are little attentions paid in the literature to the importance of the influential relationships in the leadership and management of firm, researchers rarely incorporate or describe the importance of the formation of the influential relationships or social capital that managers must develop with intra-professional team in order to improve effectiveness of teamwork or indirectly achieve superior firm performance. Social capital is an emerging concept in leadership and management studies applied to explain the influential relationship-based aspect of leadership style and may be defined as "the groups, networks, norms, and trust that people are available to them for productive purpose" (Tong et al, 2015).

The ability of the ICT manager to establish and maintain productive relationships and influence resource deployment in an organization becomes an important complementary factor to their human capital.

The concepts of social, organizational and human capital have been researched largely as separate rather than complementary factors. ICT managers must access, synthesize and utilize their own human capital and human capital of team members through social capital. There is a few studies known about how we may combine them to produce outstanding outcome for organization through leadership and management skills of the manager. In this study, we would like to explore the concepts of human, organizational and social capital as they influence on firm out moderated by the Vietnamese ICT manager's skills. In sum, our specific purposes in this article include (a) summarizing the concepts of social, organizational and human capital in ICT management, (b) refining their relationship with associated antecedents as well as with consequences, (c) constructing integrative conceptual model for empirical study of social and human capital in ICT management, (d) conducting the empirical test of conceptual model and (e) discussing the theoretical and practical contributions of test outcomes.

2. Theoretical Backgrounds and Hypotheses Developments

2.1 Resource-Based View

Knowledge on how to effectively manage intangible capitals are vital, especially, in sectors that are innovation oriented and non-manufacturing (Peteraf, 1993). The ICT sector is a service sector possessing intangible capitals resulting from knowledge and skills of employees, processes, information systems and customer relationships. It is acknowledged that ICT firms with strong intangible resources can achieve sustainable competitive advantages and differentiate themselves from their competitors (Peteraf, 1993). For this reason, we use resource-based view (RBV) as theoretical

framework for this study. RBV is an economic tool used to determine the strategic resources available to a firm. The RBV looking inside the company for resources of superior outcome is valuable, rare, not available to other competitors, imperfectly imitable, not easily implemented by others and non-substitutable and not able to be replaced by some other non-rare resource (Peteraf, 1993). Therefore, it is argued that the management and development of intangible capitals are vital means of ICT firm's strategic management and outcome (Peteraf, 1993).

2.2 Firm Performance

One of the consequences of intangible capitals was defined as firm performance. Firm performance has been examined by academia for considerable time in measuring the health of firm. Initially, relying on a purely financial perspective, the firm performance measurements have been gradually extended to multiple dimensions. Financial outcome is measured by indicators such as sales growth, earning per share and profitability which is

reflected by return on investment, return on sales and return on equity (Youndt et al.,2004, Galli et al, 2012, Leitch et al, 2013 & Asiaei et al, 2004). Meanwhile, operational or non-financial outcome emphasizes on reputation, human and organizational learning domains (Galli et al, 2012, Leitch et al, 2013, Asiaei et al & Felício et al, 2014). The human outcome is measured by indicators of the rate of the employee commitment, engagement and turnover (Felício et al, 2013 & Ellinger et al, 2011). Reputation includes reputational power, goodwill and competitive advantage (Leitch et al, Felício et al, 2014 & Asiaei et al, 2014). Organizational learning occurs from the results of research and development activities, innovation and the ability to exploit new information (Felício et al, 2014, Ellinger et al, 2011 & Nahapiet et al, 1998). To ensure that firm performance is measured accurately, Dess and Robinson recommend firms employ both financial and operational outcome measurements. Rather than relying on a single indicator, utilizing multiple indicators enables firm to measure outcome via more complex and informative measures as well as assess the contribution of each indicator to the latent variable (Leitch et al, 2013).

2.3 Intellectual Capital

The first definition of intellectual capital was suggested by an economist, John Kenneth Galbraith in 1969, he believes that intellectual capital is not only an intangible capital but also an ideological process (Bontis, 2010, Edvinsson et. al,1996 & Huang et. al, 2010). Other scholars proposed that intellectual capital is the accumulation of all knowledge, information, intellectual property, experiences, social networks, capabilities and competencies that enhance organizational outcome not only held by individuals, but also embed in its business process (Felício, 2014, Nahapiet et al, 1998 & Bontis, 2000). Rastogi offers a comprehensive definition of the intellectual capital “as the holistic or meta-level capability of an company to coordinate, orchestrate and deploy its knowledge resources toward creating value in pursuit of its future vision” (Bontis, 2000, Bontis et.al, 2010 & Subramaniam et. al, 2004). Over past years, the concept of intellectual capital has been defined in multiple ways, resulting in a lack of consensus regarding its components (Choo et al, 2010). However, synthesizing the existing academic discussions, we find that the widely accepted definition for intellectual capital should have three components: human, organizational and social capital (Hsu, 2009, Sharabati et.al, 2010 & Aramburu et.al, 2011).

2.3.1 Human Capital

Embedded in employees, human capital may be defined as the summation of abilities, skills, attitude, commitment, experience and educational background of employees that enable them to act in ways which are economically valuable to both individual and firm (Shih. Human capital brings value to the company as a criterion of competency and creativity possessed by employees which allows them to identify business opportunities, create new knowledge and solve problems (Nonaka et.al, 2009). Firm does not have its own human capital but rather lease the acquired knowledge, skills and experience of employee. Quality of human capital of firm is influenced by hiring practices and training activities (Gilbert et. al, 2017). The economic value of human capital is dependent on how employer uses and develops.

Therefore, scholars confirmed that it is deemed as the most important intangible resource of firm's development, especially in innovative sectors like ICT (Cao et. al, 2015). Hence, the first hypothesis is proposed as the follow:

H1: Human capital has significant influence on firm performance

2.3.2 Social Capital

It is acknowledged in literature that the influence of social capital on firm performance has been increasing (Hsu et. al, 2011). However, the concept of social capital has been much debated in terms of definition, measurement and operationalization (Gilbert et. al, 2017). So far, there are three distinct theoretical perspectives of social capital proposed by scholars are the functional, network and multidimensional perspective (Coleman, 2009). The functional perspective developed by Coleman (1993) and Putnam (2011) defines social capital as a functional resource that enhances collaboration among individuals in an organization. The network perspective of social capital theory suggested by Bourdieu defines social capital as a resource embedded in social networks in which individuals or organizations are members. When member's network is expanded and trust is established, the members are more willing to share intellectual resources, in turn, motivating knowledge exchange activities. The last perspective, multidimensional perspective, is developed by synthesizing the functional and network perspective (Gilbert et. al, 2017). Therefore, this perspective conceptualizes social capital as a resource both inherent in a network and as a resource facilitating action among network member that it is available for productive purposes (Zack et al, 2009). In general, social capital encompasses the context, stock of relationships, interpersonal trust and norms that allow certain behaviors and sustainable relationships between individuals as well as ensure conditions for organizational development and knowledge exchanges (Grootaert, 2004). Hence, how social capital enabling accessing, processing, synthesizing and exchanging knowledge within and across organizations will influence on outcome of knowledge-based organization like ICT firm. The hypothesis is the following:

H2: Social capital may positively relate to firm performance

2.3.3 Organizational Capital

When examining the antecedents to human and social capital in the literature, many of antecedents to human and social capital can be conceptualized as inherent structures or processes in organization (Gilbert et. al, 2017). When the antecedents were interpreted, the organizational capital emerged as a major influence on development of human and social capital. Defined as the institutionalized knowledge and codified experiences preserved in organizational image, culture, routines, procedures, information systems and patents (Gilbert et. al, 2017 & Nahapiet, 1998). organizational capital is a strategic intangible asset. The purpose of organizational capital is to coordinate communication and action among individuals in an team or organization (Gilbert et. al, 2017). In literature reviews, scholars suggested three distinct dimensions of organizational capital as the following: the structural, cultural and knowledge dimension (Nahapiet, 1998). The first dimension, structural

dimension, refers to the formal procedures and processes of the organization providing the decision making guideline. This includes human resource policies and guidelines of the labor management practices such as hiring, tasking, staffing and disciplinary action (Youndt et. al, 2004, Ellinger et. al, 2011). The cultural dimension accounts for processes serving for the long-term strategy of firm. This includes formal objectives, strategic plan, mission, values, vision (Djuric et. al, 2015), the organizational culture, tradition (Ferreira-Lopes, 2016) and corporate social responsibility (Ferreira-Lopes, 2016). The knowledge dimension accounts for processes through which knowledge and information is created, utilized, exchanged and preserved. This includes investment in research and development (Galli et. al, 2012), copyrights and patents (Ellinger, et al, 2011).

Investment in research and development (R&D), a type of investment in organizational capital, is fundamental to create new knowledges, products and services. R&D investment activities increase the opportunities and avenues for organizational members to identify and apply technology in product and service (Ferreira-Lopes, et al, 2012). This also improves the members' own understanding and learning about new knowledges and technologies (Youndt et al, 2004). Accordingly, the more firm invests in R&D, the more it supports its individuals to enhance their expertise, knowledge, thus, builds up human capital. The other investment in organizational capital is regular training provision to employee. It is typically argued that firms can increase their human capital by providing comprehensive training activities to their current employees. The training activities focusing on developing personal knowledge and skills may not only increase employee's human capital, but also help employees increase social capital by building relationships with their colleagues and share knowledge among them (Zack et al, 2007). Likewise, as individuals learn and increase their human capital, they may create knowledge that potentially forms the foundation for organizational learning and knowledge accumulation (Zack et al, 2009). The investment in information system (IS) is also important for human and social capital. There is the consensus that information system is the infrastructure of many organizations (Youndt et. al, 2004). At primary level, information system creates repositories where knowledge can be codified and institutionalized. In addition, investment in IS also enables the creation and diffusion of knowledge from and across dispersed and globalized sources (Youndt et. al, 2004). Nowadays, computer network, a type of information system, removes physical and temporal limitations to communication and connection among people to create online social networks (Youndt et. al, 2004). These online connections enhance cooperation, sharing of knowledge not only among employees within firm, but also across firms (Zack et al, 2007). The last investment in organizational capital is the investment in organizational culture. Numerous literature regards organizational culture as an important impact on the development of intellectual capital's components, especially on human and social capital (Zack et al, 2007 & Galli et. al, 2012). Mouritsen argued that organizational culture is pivotal to the value of intellectual capital (Mouritsen et al, 2011). Petty and Guthrie (2004) advocates that corporate culture is crucial toward firm's successfulness, and is capable of increasing intellectual capital within that firm. Different kinds of organizational culture would have different influences on intellectual capital.

However, developing types of culture that refer to flexibility, openness, quick adaptability and responsiveness is appropriate for knowledge-based organization like ICT firm and is important driver to support the development of the intellectual capital's components, especially human and social capital (Gilbert et al, 2017). Synthesizing above arguments, we propose the following hypothesizes:

H3: The increase in organizational capital positively increase in human capital

H4: The increase in organizational capital positively increase in social capital

H5: The organizational capital indirectly influences on firm performance through human capital

H6: The organizational capital indirectly influences on the firm performance through social capital

Comparing with human and social capital, it is least flexible (Gilbert et al., 2017). Major Vietnamese ICT firms are small and medium size, thus, developing organizational capital that are less hierarchical in nature and allows for autonomy and independence in decision making allowing in increased innovation and absorption of new knowledge (Cao et al., 2015). As the result, the firm performance is improved. Based on these arguments, we hypothesize the following:

H7: Organizational capital may positively relate to firm performance

2.4 The Moderating Role of the Manager Skills

The managers may be defined as key agent of firm who is responsible for firm performance through work of other individuals. Due to frequent interactions with employees, the manager has the closest relationship to them and has most moderating impacts on their relationship with firm (Gilbert et al., 2017). According to Keil, Lee and Deng (2013), there are top five skills critical to an ICT manager including leadership, verbal communication, scope management, listening and project management skill. Firstly, manager must have leadership skill to translate firm's vision to his/her team members as well as to motivate them to work together effectively toward common goal (Keil et al, 2013). Next, verbal communication, the second most important skill are proposed by researchers (Keil et al, 2013). Keil, Lee and Deng (2013) argued:" We ranked verbal communication skill at the top because other skills can be rendered ineffective if the project or team manager is unable to accurately and clearly communicate with team's internal and external stakeholders. Most issue resolution, scope management and risk management activities require this skill to address them successfully" (Keil et al, 2013). The third most important skill identified is scope management. The major reason that this skill chosen is its significant impact on the success or failure of the ICT project (Keil et al, 2013). Some scholars proposed that scope management is one of the most important skills for the project manager working on complex projects and it is also critical for project management to control stakeholder expectations and project deliverables throughout the entire project lifecycle (Keil et al, 2013). The fourth skill mentioned is listening skill, some experienced managers argued that this skill is important because it is related to

identifying and understanding the status, problems, risks of the project or task, team member's and customer's need. Keil, Lee and Deng suggested:" Listening to some of my really good technical people and taking the time to listen to the issues they are experiencing is very critical. By not listening, you might have just missed one of the fatal flaws in the architecture of the project. Unfortunately, it might cause the project to fail" (Keil et al, 2013). The last important skill suggested in this article is the planning skill. Both academic researchers and experienced managers acknowledged that project managers are skillful at planning if they need to know where they are at in terms of the project schedule and when they are going to deliver project (Keil et al, 2013).

Much supports can be found in the literature mentioning to the contribution of the role of manager skills on human capital development through staff selection, training, accountability and project planning (Keil et al, 2013). Although not much attention in literature have been paid to the influences of the manager skills on social capital, this is arguably the primary source of value for the manager in a knowledge-based organization like ICT firm (Keil et al, 2013). The manager has strong leadership and verbal communication skills may facilitate positively influential relationships with team members leading to better firm performance. These relationships may be less effective when they are based on command and control or coercive managerial practices than based on relational managerial styles that focus on mutual trust and respect between manager and team members (Gilbert et. al, 2013). In sum, characteristics of human and social capital are associated with strong manager skills. Therefore, we argued that the skills of ICT managers are important to the success of ICT projects and highly correlated with firm performances. We propose the following hypothesizes:

H9: The manager skills moderate the relationship between human capital and firm performance

H10: The manager skills moderate the relationship between social capital and firm performance

In addition, we assume that the manager skills may conditionally have impacts on the strength of indirect relationships between the organizational capital and firm performance. In other words, the mediating effects of the organizational capital on firm performance may be moderated by the manager skills, thereby demonstrating a moderated mediation effect. We propose that a strong indirect influence of the organizational capital on firm performance when the moderating degree of the manager skills are high. Therefore, the hypotheses are proposed as the followings:

H11: The manager skills moderate positively the mediating effects of the organizational capital on firm performance via human capital.

H12: The manager skills moderate positively the mediating effects of the organizational capital on firm performance via social capital.

3. Conceptual Frameworks

Based on the above theoretical backgrounds and hypotheses, we propose an integrated model as the following:

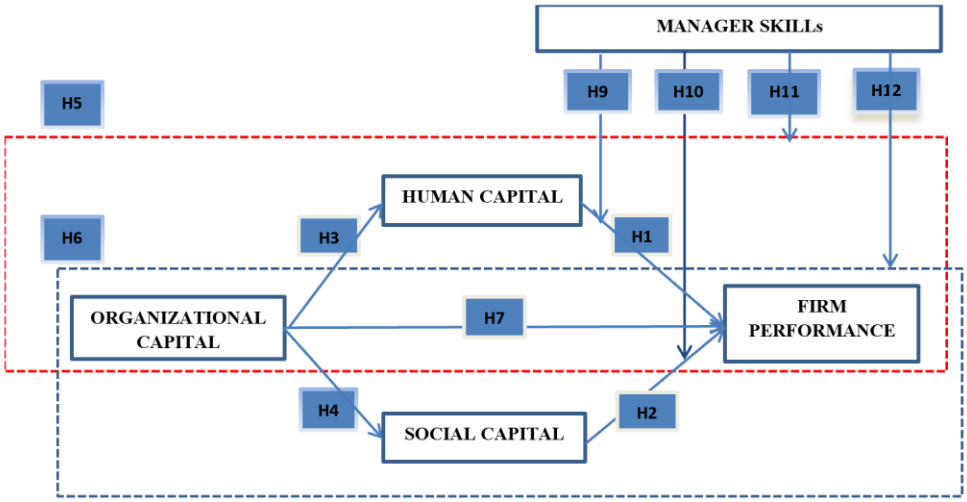


Figure 1. Research Model

4. Methodologies

4.1 Data Collection and Respondent Characteristics

We conduct a survey of the Vietnamese ICT firms and entrepreneurs, the majority of them are five-year old or smaller. The targeted respondents are directors, project managers and senior managers who represent the best source of information for our study. Eventually, 370 responses were directly collected from 450 questionnaires were distributed. After excluding missing data and outliers based on boxplot analyses 351 responses were analyzed. The table 1 presents the demographic information of the research sample.

Table 1. The demographic information of the research sample

Variable	Category	N	Percentage (%)
Age	20s	10	3
	30s	255	73
	40s	81	23
	≥ 50	5	1
Education	Vocational school	13	4
	Bachelor's degree	267	76
	Master's degree	71	20
ICT category	Software Services	200	57
	Hardware Services	31	9
	Hardware manufacturing	10	3
	Digital Media	80	23
	Telecommunication	30	9

4.2 Measurements

The questionnaire was developed from validated scales. This has been seen as a step to ensure content validity of measurements. However, the survey was conducted in Vietnamese due to the pre-dominantly Vietnamese setting. Two academic domain experts with fluent Vietnamese and English proficiency were invited for translation process. The questionnaire was pretested in meetings with 10 academic domain experts and 10 senior managers from Vietnamese ICT firms. The purpose of the pretest is to evaluate the content validity of the measures, and whether the respondent understood the instructions, items and scales.

Five-point Likert-scale items ranging from "1" (strongly disagree or strongly dissatisfaction) to"5"(strongly agree or strongly satisfaction) were used to measure the intellectual capital dimensions, firm performance and manager skills. All items in detail are reported in Appendix A. The measurement items of the three dimensions of capital, human, organizational and social capital, were mainly derived from measurement scales developed by Subramanian and Youndt [48]. Firm performance measurement was adapted from using scales developed and validated by Wkilund and Shepherd (2003), Call et al (2015), Ellinger et al (2011), and Hofmeyer (2013). The measurement scales of the project manager skills are developed based on the basis of studies developed by Keil, Lee and Deng (2013).

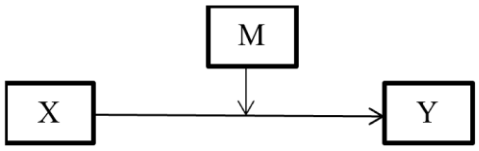
4.3 Mediation or Indirect Influence Analysis

In prior researches, when researchers test the structural model, they often focus only on direct relationship measurement among constructs, thus, to strengthen the causal effect relationship measurement among constructs, we performed indirect effect test. Indirect effect measurement involves in testing how an independent variable (X) affects a dependent variable (Y) through one or more potential intervening variables or mediators (M(s)) (Hayes, 2013). Hayes defined a method to test indirect effect, called Bootstrapping method, as the followings:" *Bootstrapping is computation-ally intensive method that involves repeatedly sampling from data set and estimating the indirect effect in each resampled data set. By repeating this process thousands of times, an empirical approximation of the sampling distribution of* ***product of a and b*** *(a and b values are standardized coefficient value of X -> M, M-> Y, respectively)* is *built and used to construct confident intervals for indirect effect. If zero is contained in the interval, there is no indirect effect of X to Y through M."* (Hayes,2013).

4.4 Moderation Analysis

In our article, we use moderation analysis to analyze the moderating relationships. The impacts of variable(s) X on dependent variable Y is moderated by moderator(s) M, if its

size, sign or strength depends on or can be predicted by M. In that case, M is said to be moderator of X's effect on Y or that M and X interact in their influence on Y (Hayes,2013).



5. Results

5.1 The Result of the Construct Reliability and Validity Evaluation

At first, we use Cronbach alpha (**α**) for reliability analysis to measure the internal consistency of the measurement scales (Hair, 1998). The proposed value of **α** should be above 0.6 (Hair et. al, 2013). The **α** of human, social and organizational capital are 0.8,0.82 and 0.65 representing reasonable scale reliability. Firm performance and manager skills with **α** of 0.621 and 0.7 also represent good scale reliability. Next, Exploratory factor analysis (EFA) technique used to conduct dimensionality analysis, and the result of this analysis is indicated by factor loading score. The general purpose of factor analytic technique is to condense the information contained in original construct into smaller set of new composite dimensions or factors (Hair et. al, 2013). All factor loading scores with suggested level of 0.5 (Hair et. al, 2013). result in the satisfaction of the condition of uni-dimensionality confirmation (Hair et. al, 2013). In our study, with original set of 40 measurement items, there were only 23 items which qualified the factor loading score threshold of 0.5 with minimum score of 0.675.

5.2 The Result of Convergent and Discriminant Validity Evaluation

Before verifying the hypotheses, confirmatory factor analysis (CFA) was conducted to assess how the conceptual model fit data with the help of AMOS software. Regarding overall model fitness, to make sure data fit to model well, root mean square error of approximation (RMSEA) should be smaller than or equal to 0.083 (Hair et. al, 2013), Goodness-of-fit index (GFI), and Comparative fit index (CFI) should satisfy thresholds of 0.91 (Hair et. al, 2013). Our test resulted acceptable fit for data set (GFI =0.91, CFI = 0.93 and RMSEA = 0.08). Furtherly, we use CFA technique to test convergent and discriminant validity. We checked all average variance extracted (AVEs) and composite reliabilities (CRs). All AVEs are higher the suggested level of 0.5 (Hair et. al, 2013) and CRs are also above the proposed level of 0.7 (Hair et. al, 2013). Therefore, convergent validity is satisfied. For the test of the discriminant validity ,Cheung, Chiu and Lee suggested that if the AVE of each construct is larger than the squared correlation coefficient of that construct compared with any other construct in the model, constructs indeed are different from one another (Cheung et al, 2010). The test result in table 2 demonstrates that all constructs carry sufficient discriminant validity.

Table 2. The test result of all constructs carry sufficient discriminant validity

	Human capital	Organizational capital	Social capital	Firm outcome	Manager skills
Human capital	**0.593***	0.207	0.263	0.504	0.352
Organizational capital	0.207	**0.664***	0.263	0.405	0.137
Social capital	0.260	0.301	**0.598***	0.396	0.319
Firm performance	0.504	0.392	0.397	**0.646***	0.362
Manager skills	0.352	0.137	0.319	0.362	**0.657***

*: Diagonal entries are AVE values

5.3 Hypotheses Verification

In hypothesis verification step, we test all hypotheses using process software. Collectively, H1, H2, H3, H4 and H7 represent direct individual effects, H5 and H6 represent indirect effects whereby the association between organizational capital and firm performance is mediated by human and social capital, respectively. Such mediated effects was tested using bootstrapping analysis, a powerful method in determining the statistical significance of mediation, to confirm a significant indirect effect proposed by Preacher and Hayes (2013). In H9 and H10, we assumed the moderating effect of the manager skills on the relationship between human, social and firm performance. In H11 and H12, we assumed as the moderating effect of the manager skills on indirect effect of organizational capital on firm performance via human and social capital. Such moderated and moderated mediation effects are tested by hierarchical regression analysis.

5.3.1 The Tests of the Direct and Indirect Effects

We adopted Hayes's suggestion to test direct and indirect effects (H1,H2,H3,H4 and H7) (Preacher, 2008). Firstly, human, organizational and social capital should be regressed directly on firm performance. The test result of model 1 in table 3 showed that human (β= 0.6809, $p<0.001$), organizational (β= 0.3006, $p<0.001$), and social capital (β= 0.1683, $p<0.05$) are positively related to firm performance, thus, H1, H2 and H7 are statistically supported. In the test outcome of the model 2 and 3 proved that the organizational capital is positively related to human capital (β= 0.2630, $p<0.01$) and social capital (β=0.404, $p<0.001$), respectively, so, H3 and H4 are supported. Based on test outcomes in above, we confirm that there are no full mediation effects in this model. The full mediation effects occur, if organizational capital has no direct influence on firm performance (Hayes, 1999). Therefore, there may be only partial mediation effects of human and social capital on the relationship between organizational capital and firm performance. The test results of model 4 showed that the partial mediation effects of human and social capital are confirmed (β= 0.0755, $p<0.001$) and (β= 0.0680, $p<0.001$), so, H5 and H6 are supported.

Table 3. The test results of different models

Model 1					
	β	se	p	LLCI	ULCI
Constant	.3985	.1931	.0015	3.562	1.1159
Human capital => Firm performance (H1)	.6809	.0369	.0000	.2219	.3672
Organizational capital => Firm performance (H7)	.3006	.0519	.0000	.2064	.4106
Social capital => Firm performance (H2)	.1683	.0335	.0000	.1024	.2341
Model 2					
	β	se	p	LLCI	ULCI
Constant	2.7772	.2293	.0000	2.3263	3.2281
Organizational capital => Human capital (H3)	.2630	.00735	.0004	.1185	. 4075
Model 3					
	β	se	p	LLCI	ULCI
Constant	3.3659	.2531	.0000	1.7802	2.7756
Organizational capital => Social capital (H4)	.4040	.0811	.0000	.2445	.5636
Model 4					
	β	Boot-se	p	BootLLCI	BootULCI
Organizational capital =>Human capital=> Firm performance (H5)	.0775	.0226	.0000	.0340	.1238
Organizational capital => Social capital=> Firm outcome (H6)	.0680	.0193	.0000	.0340	.1070

5.3.2 Moderation and Moderated Mediation Effect of the Manager Skills

In model 5, H9 and H10 postulates that the influence of human and social capital would be positive for firm performance with high moderating degree of the manager skills. To test H9 and H10, we include the interactions of (human capital x manager skills) and (social capital x manager skills) in regression analysis. The results in table 4 indicate that manager skills only moderate the influence of social capital on firm performance, (H10 (β= -.1788, p>0.01) is supported, H9 (β= -.0371, p>0.05) are not supported). However, the outcome of slope test indicates that the social capital has strong impact on firm performance when the degree of manager skills is low. Therefore, H10 is not fully supported.

Table 4. Regression analysis of moderating effects

Model 5					
	β	se	P	LLCI	ULCI
Constant	-2.0761	.7161	.0004	-3.2960	-.6676
Human capital => Firm performance	.3985	.1645	.0000	.0749	.7220
Social capital => Firm performance	.6809	.1318	.0044	.4216	.9401
Organizational capital => Firm performance	.3006	.0501	.0000	.2021	.3990
Manager skills => Firm performance	.9791	.2231	.0000	.5402	1.4180
Interaction-1=> Firm performance (H9)	-.0371	.0507	.6216	-.1368	.0625
Interaction-2=> Firm performance (H10)	-.1788	.0430	.0000	-.2635	-.0942

Interation-1 : Human capital x Manager skills , Interation-2 : Social capital x Manager skills

After having confirmed that H10 is partially significant, we furtherly analyze the moderated mediation impacts (H11 and H12). The output of moderated mediation analysis provides detailed results of the indirect effects by presenting their statistical significant at the degree of the manager skills. This allows us to verify the values of the manager skills for which conditional indirect effects of the organizational capital on firm performance via human and social capital are significant at $\alpha = 0.05$. The results in table 5 demonstrates that both moderated mediation effects are significant when the level of is low but not when is high. Therefore, H11 and H12 are not fully supported.

Table 5. The results of both moderated mediation effects

INDEX OF MODERATED MEDIATION OF THE MANAGER SKILLS				
Mediator	Index	SE(Boot)	BootLLCI	BootULCI
Human capital	-.0098	.0137	-.0421	.0107
Social capital	-.0723	.0219	-.1272	-.0365

6. Discussion

The main contributions of this study is to interpret the mediating effect of human and social capital between organizational capital and Vietnamese ICT firm performance and moderating effect of the manager skills. Firstly, this article reveals that intangible capitals, human, organizational and social capital, have significant influences on firm performance in which findings confirm that human capital has the most important contributions in forming these influences. Therefore, any innovative or creative activities must focus on human resource development. Secondly, this article has drawn the conceptual framework based on resource based view and intellectual capital theory to complement the limitations of both. Prior researches are based on the resource based view (RBV) and intellectual capital for explaining better business performance in well-developed countries and traditional industries. By developing the intellectual capital dimensions deployment as an aspect of RBV, the current study provides an answer to why with similar amount of the intellectual capital, the ICT western firms use them more successfully while Vietnamese ICT companies do not. The key

point of this answer is the moderating role of the manager skills in Vietnam on the relationship between human and social capitals and firm performance. Based on the test outcomes, it is concluded that the management skills of local ICT firms not strong enough to moderate positively impacts of human and social capital on firm performance. For this reason, we propose some following explanations. There were general acknowledgements among managers that we interviewed that major technical managers are weak at interpersonal skills, leadership and communication skill, in which flexibility is a factor allowing them to adapt their behavior to different situations to elicit the desired responses from team members or other stakeholders of project or team. The lack of smooth communication between main project participants is seen as one of the key causes of conflicts or task and project delays. However, major local ICT companies are micro, small and medium sized firms, their budget are not strong enough to fund for training opportunities that target to areas where soft-skill developments are needed to their managers. Therefore, they do not have much contributions in the development of the human and social capital in firm. In addition to interpersonal skills, visioning is another factor that affects team or project performance. A project manager having vision may see a project from a big picture perspective. It encourage managers not to lose track and remain focused on meeting the required quality in all project aspects. If team performs poorly in one aspect, it may have significant consequences towards overall project performance. Hence, a manager who lacks vision may not know how to organize available resources and coordinate team members to take corrective actions, consequently, these lead to the failure of project. Lastly, the mediating role of human and social capital could be considered a key sensor to explain how organizational capital positively improve firm performance. ICT staffs are high-education and creative experts who prefer working as non-managerial staffs to as employees under time management pressure, so, firm's organizational culture, environment and structure will influence on their performance as well as firm performance. Because of this special feature of ICT job, staffs must actively build their own social network to support them work independently. Unlike traditional industry, their major communication, and information exchanges are online and carried out in multi-culture environments, when mutual trusts in social network are established, they are willing to share intellectual resources, in turn, motivating innovation activities and consequently building positive corporate culture as well as firm performance improvement. In addition, ICT advance applied in organizational changes are considered to play a central role in enhancing working environment and staff's productivity. The discussion on the impact of ICT advance on growth and productivity was stimulated by the famous sentence of Robert Solow: "You can see the computer age everywhere but in the productivity statistics" [65]. Therefore, effective accumulation of the organizational capital can help employee creating and acquiring knowledge derived from a range of intangible assets that comprise an firm's competitive advantages. Concretely, organizational capital should not be the sole factor influencing on firm performance, the integration of the interrelationships among social, organization and human capital in explaining firm performance in specific context will provide us clear picture of how these intangible capitals are crucial to the existence and development of ICT firm.

7. Implications

The findings of this paper provide meaningful theoretical and practical contributions to the intellectual capital literature by extending prior findings. The first theoretical contribution is pertaining to the dimensions of the intellectual capital at theoretical approach in the Vietnamese-like emerging economies. Because of inadequate market and legal support, dysfunctional competitor behavior of firms is widespread, the evaluation of intellectual capital should not be the same as Western countries. Second, despite extensive discussions regarding the influence of organizational capital on firm performance, there are very few researches on its impacts on firm performance via the mediating role of human and social capital within the contexts of ICT sector. The findings also show that to create values of corporate cultures forming the foundation of the valuable, rare, inimitable, and non-substitutable (VRIN) assets, there are needs for building mutual trusts in social network extensions or social capital. In addition, the findings also provide practical implications for ICT management. Firstly, by improving all manager skills, especially interpersonal skills, managers are able to be flexible and to adapt themselves according to situations in persuading others to complete project activities within the mutually agreed timeframe and, as such, reduce conflicts among project participants. Secondly, similar as time performance, cost performance may also be affected by many factors, such as geographical locations, types of contract, design changes, completeness of design documents, cost control mechanisms, project management and external factors. The influences of these factors may cause project budget to be revised over time, thus regular and effective listening and communication and are required to meet the expectations of all stakeholders affected. This demonstrates the important of emotional intelligence and interpersonal skills for manager to improve team or project's cost performance. Lastly, the managers should improve leadership skills, because to meet customer's demand, they must provide strong aura of vision and contagious enthusiasm that substantially raises the confidence, aspirations, commitments of people to meet high quality performance demand. In sum, facing global trends and unpredictable environment, ICT managers must continuously improve their skills to develop human and social capital not only for themselves but also for their firm in order to meet customer's demand as well as build up strong network ties with employees, customers, suppliers and competitors to adapt environmental changes effectively and flexibly.

8. Conclusion and Limitations

Vietnam is on the road to a knowledge-based economy in which ICT is considered as one of the key sectors. This study gives brief insights into Vietnamese ICT sector in term of the interrelationship among social, human, organizational capital, manager skills and firm performance. By refining objectives in business operation, ICT firms must understand their own capabilities, especially their human resources to face to unpredictable changes of the environment. Social, organizational and human capital are recognized as the key intangible resources for firm's long-term performance. Accordingly, this study extends previous studies by empirical investigations on the moderating role of the manager skills as the one of the key

factors for the sustainable development of the ICT firms in future when firms become larger and more structured. Hence, we hope that the findings will be helpful managers and policy makers in Vietnam to find a good solution to enhance the performance of ICT firms in long-term.

This article also contains some limitations. First, the data, static data, collected through questionnaire survey was self-assessed, thus, it has inevitable drawbacks in reflecting the long-term impacts of intellectual capital's dimensions on firm performance. Second, the results are based on the perceptions of managers who are in charge of projects in software development and Therefore, the results may not represent other type projects such as system integration, information technology procurement, maintenance, infrastructure, network and securities. In spite of aforementioned limitations, we believe that the study not only contributes to both research and practice but also provide good foundation for further studies. One avenue for future research would be to examine how current environment in which ICT teams are conducted is changing manager skill requirements of managers. Another interesting extension of this article should be to consider cross-cultural differences. It may also be that the relative importance of ICT manager skills may vary between different cultures. Finally, this paper only addresses the moderating role of manager skills on the influences of intellectual capital dimensions on firm performance. However, there are other stakeholders such as team members, customers, environmental changes involved in the relationship between intangible capital and performance. Further studies should take into account the perspectives of different stakeholders.

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THE IMPACT OF INTELLECTUAL CAPITAL DIMENSIONS ON VIETNAMESE INFORMATION COMMUNICATION TECHNOLOGY FIRM PERFORMANCE: A MEDIATION ANALYSIS OF HUMAN AND SOCIAL CAPITAL

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ABSTRACT

Purpose: *The purpose of this article is to explore the impacts of the intellectual capital dimensions, human, the organizational and social capital on firm performance as well as the mediating role of human and social capital on the relationship between organizational capital and Information Communication Technology (ICT) firm's performance in Vietnam. Specific aims included the synthesizing the prior literatures and definitions related to intellectual capital dimensions and firm performance, refining conceptual definitions of the interrelationship among intellectual capital dimensions, of their relationship with firm's outcome and of the mediation role of human and social capital on the impacts of organizational capital on firm outcome and proposing a synthesized conceptual model to test relationships mentioned in above in Vietnam-like unstable environment.*

Methodologies: *Exploratory factor analysis, confirmatory factor analysis and moderating analysis were employed to test how a sample of Vietnamese ICT firms with the total of 319 responses collected fit to research model.*

Findings: *Results indicate that dimensions have direct impacts on firm performance. In addition, there is the existence of the mediating role of the human and social capital on the relationship between firm performance and organizational capital.*

Research Limitations: *This study employs static data, which has inevitable drawbacks in reflecting the long-term impacts of IC's dimensions and performance. The use of panel data may be the future direction of following-up studies.*

Keywords: Intellectual Capital, Human Capital, Organizational Capital, Social Capital, Information Communication Technology (ICT).

INTRODUCTION

Vietnam ICT industry has the bright future as Vietnam has been emerging as a production center for both IT hardware and software services (ITU, 2015). The expected growth rate of Vietnam's ICT market is eight percent in the period of 2016-2020 (ITU, 2015). Hence, the government has devised a master plan for ICT sector which specifies targets for 2020 turning Vietnam into an advanced ICT country (ITU, 2015; Taking-off strategy: Does it stepping up the development of the ICT industry in Vietnam, 2013). However, unlike other well-developed

industries in term of inputs, firm size, management knowledge, ICT with short product life cycle, high customer demand and very unpredictable technological changes, attaining and managing Valuable, Rare, Inimitable and Non-Substitutable (VRIN) sources like intellectual capital is very important to superior performance. However, the intellectual capital of Vietnamese ICT firms is a shortage (Taking-off strategy: Does it stepping up the development of the ICT industry in Vietnam, 2013). Therefore, to survive and grow in a highly competitive and uncertain institutional environment, they must increase their efforts in intellectual capital development. Intellectual capital often referred to as the value is created by three types of intangible resources, that is, human capital such as individual's knowledge, skill and education, organizational capital including all non-human knowledge containers involving information and communication systems, databases, process manuals, strategies, routines and social capital regarding to social relationships of an organization or individual with customers, investors, competitors or suppliers (Taking-off strategy: Does it stepping up the development of the ICT industry in Vietnam, 2013). Although the popularities of western studies on intellectual capital have built on the assertion that it is the key source of superior performance, there are very few studies in developing countries validating, operationalizing above propositions where the business environment is very unstable like Vietnam. In this article, several contributions can be made to management literature as the following. Firstly, we extend previous literature by offering insights into the relevance of the social, human and organizational capital, for achieving ICT firm's outstanding performance in the face of environmental uncertainties. Secondly, we advance existing research in this field by explicitly discussing how organizational, social and human capital development leading to the achievement of the outstanding performance. Lastly, we measure the mediating role of the social capital in the model by evaluating the extent to which its effects on performance through organizational and human capital is contingent on environmental uncertainties. In sum, to fill above gaps, we build and validate the conceptual model of the interrelationships among intellectual capital dimensions and firm performance and then suggest how to use the outcome of model test effectively.

THEORETICAL BACKGROUNDS AND HYPOTHESIS DEVELOPMENTS

Resource-Based View

The ICT sector is a service sector, thus, strategic intangible resources such as intellectual capital, resulting from knowledge and skills of employees, processes and information systems and customer relationships are very important. It is claimed that ICT firm with strong intellectual capital can achieve sustainable competitive advantages and differentiate themselves from their competitors (Zeglat & Zigan, 2013; Wernerfelt, 1984). For this reason, we use Resource-Based View (RBV) as a theoretical framework for this study. RBV is an economic tool used to determine the strategic resources available to a firm (Wernerfelt, 1984). Therefore, it is argued that the management and development of intellectual capital are vital means of ICT firm's strategic management and performance (Wernerfelt, 1984). The RBV looking inside the company for resources of superior performance is valuable, enabling firm strategies that improve its efficiency and effectiveness, rare, not available to other competitors, imperfectly imitable, not easily implemented by others and non-substitutable, not able to be replaced by some other non-rare resource (Cao & Wang, 2015).

Firm Performance

The firm has been examined by academia for a considerable time in measuring the health of the firm. The reliable and valid measurement of performance is critical for research. Initially, relying on a purely financial perspective, the firm performance measurement has been gradually extended to multiple dimensions. Several classification criteria have been suggested. Venkatraman & Ramanujam proposed that firm performance should be measured in terms of financial and operational aspects (Venkatraman & Ramanujam, 1986). Financial performance is measured by indicators such as sales growth, earning per share and profitability which is reflected by return on investment, return on sales and return on equity. However, operational or non-financial performance emphasizes factors such as product quality and productivity, market share and marketing effectiveness (Demirbag, Tatoglu, Tekinkus & Zaim, 2006). To ensure that firm performance is measured accurately, Dess & Robinson recommended that firm should employ both financial and non-financial performance measurement. Rather than relying on a single indicator, utilizing multiple indicators enables firms to measure performance via more complex and informative measures as well as assess the contribution of each indicator to the latent variable (Dess & Robinson, 1984).

Intellectual Capital

The Impact of Human, Organizational and Social Capital on Firm Performance

The first definition of intellectual capital was suggested by an economist, John Kenneth Galbraith in 1969, he believes that intellectual capital is not only an intangible asset but also an ideological process (Bontis, 1998; Edvinsson & Sullivan, 1996; Huang & Jim, 2010). Other scholars suggest that intellectual capital is the accumulation of all knowledge, information, intellectual property, experiences, social networks, capabilities and competencies that enhance organizational performance not only held by individuals but also embed in its business process (Bontis, Chua & Richardson, 2000; Subramaniam & Youndt, 2005; Rastogi, 2003). Rastogi offers a comprehensive definition describing intellectual capital "as the holistic or meta-level capability of a company to coordinate, orchestrate and deploy its knowledge resources toward creating value in pursuit of its future vision" (Choo, Tayles & Luther, 2010). Over past years, the concept of intellectual capital has been defined in multiple ways, resulting in a lack of consensus regarding its components (Intellectual Capital Information). However, synthesizing the existing academic discussions, we find that the widely accepted definition for intellectual capital should have three components: human, organizational and social capital (Bontis, 1998; Phusavat, Comepa, Sitko-Lutek & Ooi, 2011; Hsu & Fang, 2009; Sharabati, Jawad & Bontis, 2010; Aramburu & Saenz, 2011).

Embedded in employees, human capital may be defined as the summation of abilities, skills, attitude, commitment, experience and educational background of employees that enable them to act in ways which are economically valuable to both individual and to the firm (Shih, Chang & Lin, 2010). Human capital brings value to the company as a criterion of competency and creativity possessed by employees which allows them to identify business opportunities, create new knowledge and solve problems (Nonaka & Von Krogh, 2009). The firm does not have its own human capital but rather lease the acquired knowledge, skills and experience of the employee. Quality of human capital in a firm is influenced by hiring practices and training activities (Gilbert, Von & Broome, 2017). The economic value of human capital is dependent on

how an employer uses and develops. Therefore, scholars confirmed that it is deemed as the most important intangible resource of firm's development, especially in innovative sectors like ICT (Cao & Wang, 2015). Hence, the first hypothesis is proposed as the following:

H_1: Human capital has a positive and significant influence on firm performance.

Defined as the institutionalized knowledge and codified experiences preserved in the organizational image, culture, routines, procedures, information systems and patents (Gilbert, Von & Broome, 2017; Nahapiet & Ghoshal, 1998) organizational capital is a strategic intangible asset. The purpose of organizational capital is to coordinate communication and action among individuals in an organization (Gilbert, Von & Broome, 2017). From the literature review, scholar suggests three distinct dimensions of organizational capital as the following: (a) the structural, (b) the cultural and (c) knowledge dimension (Gilbert, Von & Broome, 2017). The first dimension, structural dimension, refers to the formal procedures and processes of the organization providing the decision-making guideline. This includes human resource policies and guidelines of the labor-management practices such as hiring, tasking, staffing and disciplinary action (Nonaka & Von Krogh, 2009; Gilbert, Von & Broome, 2017, Nahapiet & Ghoshal, 1998). The cultural dimension accounts for processes serving for the long-term strategy of the firm. This include formal objectives, strategic plan, mission, values, vision (Akdere & Roberts, 2008; Djuric & Filipovic, 2015), the organizational culture and tradition (Baughn, Neupert, Anh & Hang, 2011; Kostopoulos, Bozionelos & Syrigos, 2015; Oldroyd & Morris, 2012) and corporate social responsibility (Ferreira, Roseta & Sequeira, 2012). The knowledge dimension accounts for processes through which knowledge and information are created, utilized, exchanged and preserved. This includes investment in research and development (Youndt, Subramaniam & Snell, 2004) copyrights and patents (Ellinger et al., 2011).

Comparing with human and social capital, it is least flexible (Gilbert, Von & Broome, 2017). Major ICT firms are small and medium size, thus, developing organizational capital that is less hierarchical in nature and allows for autonomy and independence in decision making allowing in increased innovation and absorption of new knowledge (Cao & Wang, 2015). As the result, the firm performance is improved. Based on these arguments, we hypothesize the following:

H_2: Organizational capital positively relates to firm performance.

It is acknowledged in the literature that the influence of social capital on firm performance has been increasing (Kianto, Andreeva & Pavlov, 2013). However, the concept of social capital has been much debated in terms of definition, measurement and operationalization (Hsu, Chang, Huan & Chiang, 2011). So far, there are three distinct theoretical perspectives of social capital proposed by scholars are the functional, network and multidimensional perspective (Gilbert, Von & Broome, 2017). The functional perspective developed by Coleman & Putnam defines social capital as a functional resource that enhances collaboration among individuals in an organization (Coleman, 1988; Putnam, 1993). The network perspective of the social capital theory suggested by Bourdieu defines social capital as a resource embedded in social networks in which individuals or organizations are members (Bourdieu, 2011). When member's network is expanded and trust is established, the members are more willing to share intellectual resources, in turn, motivating knowledge exchange activities. The last perspective, multidimensional perspective, is developed by synthesizing the functional and network perspective (Gilbert, Von

& Broome, 2017). Therefore, this perspective conceptualizes social capital as a resource both inherent in a network and as a resource facilitating action among network member that it is available for productive purposes (Grootaert, 2004). In general, social capital encompasses the context, stock of relationships, interpersonal trust and norms that allow certain behaviors and sustainable relationships between individuals as well as ensure conditions for organizational development and knowledge exchanges (Zack, McKeen & Singh, 2009). Hence, how social capital enabling accessing, processing, synthesizing and exchanging knowledge within and across organizations will influence the performance of knowledge-based organization like ICT firm. The hypothesis is the following:

H_3: Social capital may positively relate to firm performance.

The Impact of Organizational Capital on Human and Social Capital Development and Mediating Role of Organizational Capital

Investment in Research and Development (R&D), a type of investment in organizational capital, is fundamental to create new knowledge's, products and services. R&D investment activities increase the opportunities and avenues for organizational members to identify and apply technology in product and service (Zack, McKeen & Singh, 2009). This also improves the members' own understanding and learning about new knowledge's and technologies (Youndt, Subramaniam & Snell, 2004). Accordingly, the more investments in R&D, the more it supports its individuals to enhance their expertise, knowledge, thus, build up human capital.

The other investment in organizational capital is a regular training provision for the employees. It is typically argued that firms can increase their human capital by providing comprehensive training activities to their current employees. The training activities focusing on developing personal knowledge and skills may not only increase employee's human capital but also help employees increase social capital by building relationships with their colleagues and share knowledge among them (Youndt, Subramaniam & Snell, 2004; Tseng, Wang & Yen, 2014). Likewise, as individuals learn and increase their human capital, they may create knowledge that potentially forms the foundation for organizational learning and knowledge accumulation (Youndt, Subramaniam & Snell, 2004).

The investment in Information System (IS) is also important for human and social capital. There is a consensus that information system is the infrastructure of many organizations (Youndt, Subramaniam & Snell, 2004). At primary level, information system creates repositories where knowledge can be codified and institutionalized. In addition, IS investments also enable the creation and diffusion of knowledge from and across dispersed and globalized sources (Youndt, Subramaniam & Snell, 2004). Nowadays, computer network, a type of information system, removes physical and temporal limitations to communication and connects people to create online social networks (Youndt, Subramaniam & Snell, 2004). These online connections enhance cooperation, sharing of knowledge not only among employees within the firm, but also across firms (Youndt, Subramaniam & Snell, 2004).

The last investment in organizational capital is the investment in organizational culture. Numerous literature regards organizational culture as an important impact on the development of intellectual capital's components, especially on human and social capital (Youndt, Subramaniam & Snell, 2004; Kostopoulos, Bozionelos & Syrigos, 2015). Mouritsen argued that organizational culture is pivotal to the value of intellectual capital (Ellinger et al., 2002). Petty & Guthrie advocates that corporate culture is crucial toward firm's successfulness and is capable of

increasing intellectual capital within that firm (Mouritsen, Larsen & Bukh, 2001). Different kinds of organizational culture would have different influences on intellectual capital. However, developing types of culture that refer to flexibility, openness, quick adaptability and responsiveness is appropriate for a knowledge-based organization like ICT firm and is an important driver to support the development of the intellectual capital's components, especially human and social capital (Gilbert, Von & Broome, 2017). Synthesizing above arguments, we propose the following hypothesizes:

H_4: The increase in organizational capital positively increases in human capital.

H_5: The increase in organizational capital positively increases in social capital.

H_6: The organizational capital has an indirect influence on firm performance through social capital.

H_7: The organizational capital has an indirect influence on firm performance through human capital.

Conceptual Frameworks

Based on the above theoretical backgrounds and hypotheses, we propose an integrated model as the following:

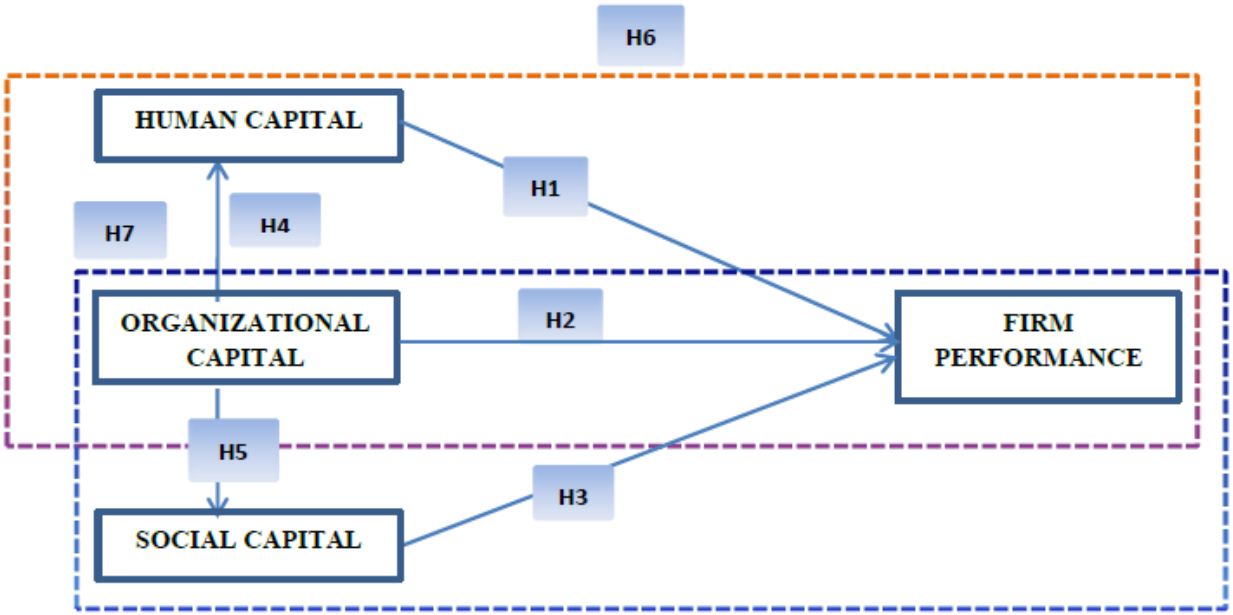

FIGURE 1
RESEARCH MODEL

METHODOLOGIES AND DATA ANALYSIS

Data Collection and Respondent Characteristics

We conduct a survey of the Vietnamese ICT firms, the majority of them are five-year-olds or smaller. The targeted respondents are directors, project managers and senior managers who represent the best source of information for our study. Eventually, 350 responses were

directly collected from 450 questionnaires were distributed. After excluding missing data and outliers based on boxplot analyses 319 responses were analyzed. Table 1 presents the demographic information of the research sample.

Table 1
DEMOGRAPHIC INFORMATION OF THE RESEARCH SAMPLE

Variable	Category	N	Percentage (%)
Age	20s	10	3
	30s	255	80
	40s	54	17
Education	Vocational school	13	4
	Bachelor's degree	267	84
	Master's degree	39	12
ICT category	Software Services	200	57
	Hardware Services	31	9
	Hardware manufacturing	10	3
	Digital Media	80	23
	Telecommunication	30	9

Measurements

The questionnaire was developed from validated scales. This has been seen as a step to ensure content validity of measurements. However, the survey was conducted in Vietnamese due to the pre-dominantly Vietnamese setting. Two academic domain experts with fluent Vietnamese and English proficiency were invited for the translation process. The questionnaire was pretested in meetings with 10 academic domain experts and 10 senior managers from Vietnamese ICT firms. The purpose of the pretest is to evaluate the content validity of the measures and whether the respondent understood the instructions, items and scales.

Five-point Likert-scale items ranging from "1" (strongly disagree or strongly dissatisfaction) to "5" (strongly agree or strongly satisfaction) were used to measure the intellectual capital dimensions, firm performance and environmental uncertainties. All items in detail are reported in Appendix A. The measurement of the three dimensions of capital, human, organizational and social capital, was mainly derived from measurement scales developed by Subramanian, Youndth & Snell (2004). Firm performance measurement was adapted from using scales developed and validated by Wkilund & Shepherd (2003). Environmental uncertainties measurement scales are developed based on the basis of studies by Atuahene-Gina & Murray (2004).

Construct Validity and Reliability Measurement

Firstly, we use Cronbach's alpha (α) for reliability analysis in order to measure the internal consistency of the measurement scales (Hair, Anderson, Tatham & Black, 1998). The acceptable value of α should be above 0.6 (Hair, Anderson, Tatham & Black, 1998). Secondly, we apply Exploratory Factor Analysis (EFA) techniques to condense the data contained in a group of original variables into a smaller set of new dimensions or factors with minimum loss of information (Hair, Anderson, Tatham & Black, 1998). Lastly, Confirmatory Factor Analysis (CFA) is used to provide an evaluation of how questionnaire items logically and systematically

represent constructs involved in the conceptual model. In other words, to assess the validity and reliability of the measurement model, we need to conduct tests of convergent and discriminant validity. To achieve adequate converge, factor loading score of every item of each factor should be 0.5 or higher, Construct Reliability (CR) of every construct should be above 0.6 and Average Variance Extracted (AVE) should exceed 0.5 (Hair, Anderson, Tatham & Black, 1998). To support discriminant validity, AVE for any two constructs must be greater than the squared correlation estimate between these two constructs (Hair, Anderson, Tatham & Black, 1998).

Mediation or Indirect Influence Analysis

In prior research, when researchers test the structural model, they often focus only on direct relationship measurement among constructs, thus, to strengthen the causal effect relationship measurement among constructs, we performed indirect effect test. Indirect effect measurement involves in testing how an independent variable (X) affects a dependent variable (Y) through one or more potential intervening variables or mediators (M(s)) (Hayes, 2013). Hayes defined a method to test the indirect effect, called Bootstrapping method, as the followings:" Bootstrapping is a computationally intensive method that involves repeatedly sampling from the dataset and estimating the indirect effect in each resampled data set. By repeating this process thousands of times, an empirical approximation of the sampling distribution of the product of a and b (a and b values are the standardized coefficient value of X => M, M => Y, respectively) is built and used to construct confident intervals for indirect effect. If zero is contained in the interval, there is no indirect effect of X to Y through M." (Hayes, 2013) (Figure 2).

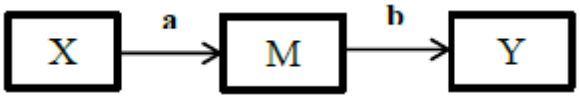

FIGURE 2
INDIRECT INFLUENCE ANALYSIS

RESULTS

The Result of the Construct Reliability and Validity Evaluation

At first, we use Cronbach's alpha (α) for reliability analysis in order to measure the internal consistency of the measurement scales (Hair, Anderson, Tatham & Black, 1998). The acceptable value of α should be above 0.6 (Hair, Anderson, Tatham & Black, 1998). The α of human, social and organizational capital are 0.89, 0.9 and 0.6 representing reasonable scale reliability. Firm performance and environmental uncertainties with α of 0.611 and 0.699 also represent good scale reliability. Next, we use EFA technique to conduct dimensionality analysis indicated by factor loading score. The general purpose of factor analytic techniques is to condense the information contained in original construct into a smaller set of new composite dimensions or factors (Hair, Anderson, Tatham & Black, 1998). In our study, all factor loading scores are higher than the suggested level of 0.5 (Hair, Anderson, Tatham & Black, 1998) which results in the satisfaction of the condition of uni-dimensionality confirmation (Hair, Anderson, Tatham & Black, 1998).

The Result of Convergent and Discriminant Validity Evaluation

Before verifying the hypotheses, CFA was conducted to assess how the conceptual model fit data with the help of AMOS software. Regarding overall model fitness, to make sure data fit to model well, Root Mean Square Error of Approximation (RMSEA) should be smaller than or equal to 0.08 (Hair, Anderson, Tatham & Black, 1998), Goodness of Fit Index (GFI) and Comparative Fit Index (CFI) should satisfy thresholds of 0.9 (Hair, Anderson, Tatham & Black, 1998). Our test resulted acceptable fit for dataset (GFI=0.9, CFI=0.91 and RMSEA=0.08). Further, we use CFA technique to test convergent and discriminant validity. We checked all Average Variance Extracted (AVEs) and Composite Reliabilities (CRs). All AVEs are higher the suggested level of 0.5 (Hair, Anderson, Tatham & Black, 1998) and CRs are also above the proposed level of 0.7 (Hair, Anderson, Tatham & Black, 1998). Therefore, convergent validity is satisfied. For the test of the discriminant validity, Cheung, Chiu & Lee suggested that if the AVE of each construct is larger than the squared correlation coefficient of that construct compared with any other construct in the model, constructs indeed are different from one another (Hair, Anderson, Tatham & Black, 1998). The test result in Table 2 demonstrates that all constructs carry sufficient discriminant validity.

Table 2
CONSTRUCTS CARRY SUFFICIENT DISCRIMINANT VALIDITY

	Human Capital	Organizational Capital	Social Capital	Firm Performance	Environmental Uncertainties
Human Capital	**0.593***	0.207	0.263	0.504	0.352
Organizational Capital	0.207	**0.664***	0.263	0.405	0.137
Social Capital	0.263	0.301	**0.598***	0.396	0.319
Firm Performance	0.504	0.405	0.396	**0.646***	0.362
Environmental Uncertainties	0.352	0.137	0.319	0.362	**0.657***

*: Diagonal entries are AVE values

Hypotheses Verification

In hypothesis verification step, we test all hypotheses using process software. Collectively, H_1, H_2, H_3, H_4 and H_5 represent direct individual effects; H_6 and H_7 represent indirect effects whereby the association between organizational capital and firm performance is mediated by human and social capital, respectively. Such mediated effects were tested using bootstrapping analysis, a powerful method for determining the statistical significance of mediation, to confirm a significant indirect effect proposed by Hayes (2009).

The Tests of the Direct and Indirect Effects

We adopted Hayes's suggestion to test direct and indirect effects (H_1, H_2, H_3, H_4, H_5, H_6 and H_7). The results in Table 3 showed that the organizational (β=0.308, $p<0.001$) and human capital (β=0.28, $p<0.001$) are positively related to firm performance, while social capital is less positively related to firm performance than two other dimensions (β=0.0983, $p<0.05$). Thus, H_1, H_2 and H_3 are statistically supported. The organizational capital is positively related to human and social capital ((β=0.2630, $p<0.01$) and (β=0.404, $p<0.001$)), respectively, so, H_4 and H_5 are

supported. In addition, because of the significance of H_2, we confirm that there are no full mediation effects in this model. The full mediation effects occur when organizational capital has no direct influence on firm performance (Hayes, 2009). Therefore, there may be only partial mediation effects of human and social capital on the relationship between organizational capital and firm performance. The test outcomes showed that the partial mediation effects of human and social capital are confirmed (β=0.0755, $p<0.001$) and (β=0.0680, $p<0.001$), so, H_6 and H_7 are supported.

Table 3
ORGANIZATIONAL AND HUMAN CAPITAL ARE POSITIVELY RELATED TO FIRM PERFORMANCE

Model 1	**β**	**se**	**p**	**LLCI**	**ULCI**
constant	0.7361	0.1931	0.0002	3.562	1.1159
Human capital => Firm performance (H_1)	0.2946	0.0369	0.0000	0.2219	0.3672
Organizational capital => Firm performance (H_2)	0.3085	0.0519	0.0000	0.2064	0.4106
Social capital => Firm performance (H_3)	0.1683	0.0335	0.0000	0.1024	0.2341
Model 2	**β**	**se**	**p**	**LLCI**	**ULCI**
constant	2.7772	0.2293	0.0000	2.3263	3.2281
Organizational capital => Human capital (H_4)	0.2630	0.00735	0.0004	0.1185	0.4075
Model 3	**β**	**se**	**p**	**LLCI**	**ULCI**
constant	3.3659	0.2531	0.0000	1.7802	2.7756
Organizational capital => Social capital (H_5)	0.4040	0.0811	0.0000	0.2445	0.5636
Model 4	**β**	**Boot-se**	**p**	**BootLLCI**	**BootULCI**
Organizational capital => Human capital => Firm performance (H_6)	0.0775	0.0226	0.0000	0.0340	0.1238
Organizational capital => Social capital => Firm performance (H_7)	0.0680	0.0193	0.0000	0.0340	0.1070

DISCUSSION

The main contributions of this study are to interpret the mediating effect of human and social capital on the relationship between organizational capital and Vietnamese ICT firm performance. Basing on the test result, this article reveals that intellectual capital dimensions have significant influences on firm performance in which findings confirm that human capital has the most important contributions in forming these influences. Therefore, any innovative or creative activity must focus on human resource development. Second, this article has drawn the conceptual framework based on RBV and intellectual capital theory to complement the limitations of both. Prior researches are based on RBV and intellectual capital for explaining better business performance in well-developed countries and traditional industries. By developing the intellectual capital dimensions deployment as an aspect of RBV, the current study provides an answer to why with a similar amount of the intellectual capital, the ICT western firms use them more successfully while Vietnamese ICT companies do not. It is explained that major local ICT firms are micro or small and medium firms, they are working in business environment in which they are facing a number of challenges in terms of regulatory framework and intellectual property protection, quality and availability of skillful persons, financial supporters which are barriers to the development of Vietnamese ICT sector. Therefore, they expect that they could gain long-term development if such environmental factors are improved. Third, the mediating roles of human and social capital could be considered key sensors to explain

how organizational capital positively improves firm performance. ICT staffs are high-education and creative experts who prefer working as non-managerial staffs to as employees under time management pressure, so, firm's organizational culture, environment and structure will influence on their performance as well as firm performance. Because of this special feature of ICT job, staffs must actively build their own social network to support them work independently. In addition, their major communication and information exchanges are online and carried out in multi-culture environments. When mutual trusts in a social network are established, they are willing to share intellectual resources, in turn, motivating innovation activities and consequently building a positive corporate culture as well as firm performance improvement. In addition, ICT advance applied in organizational changes or operation are considered to play a central role in enhancing working environment as well as determining staff's productivity. The discussion on the impact of ICT advance on growth and productivity was stimulated by the famous sentence of Robert Solow: "You can see the computer age everywhere but in the productivity statistics" (Solow, 1987). Therefore, effective accumulation of the organizational capital can help employee creating and acquiring knowledge derived from a range of intangible assets that comprise a firm's competitive advantages. Concretely, organizational capital should not be the sole factor influencing on firm performance, the integration of the interrelationships among social, organization and social capital in explaining firm performance in a specific context will provide us a clear picture of how intellectual capital is crucial to the existence and development of ICT firm.

IMPLICATIONS

The findings of this paper provide meaningful theoretical and practical contributions to the intellectual capital literature by extending prior findings. The first theoretical contribution is pertaining to the dimensions of the intellectual capital at theoretical approach in the Vietnamese-like emerging economies. Because of the inadequate market and legal support, dysfunctional competitor behavior of firms is widespread; the evaluation of intellectual capital should not be the same as Western countries. Second, despite extensive discussions regarding the influence of organizational capital on firm performance, there are very few researches on its impacts on firm performance via other intellectual capital dimensions within the contexts of ICT sector. The findings show that to values of corporate cultures form the foundation of the Valuable, Rare, Inimitable and Non-Substitutable (VRIN) assets, there are needs for building mutual trusts in social network extensions. In addition, the findings also provide practical implications for ICT management. Facing global trends and unpredictable environment, ICT managers must develop their own human organizational and social capital to meet customer's challenge demand and must maintain and build up strong network ties with employees, customers, suppliers and competitors to observe environmental changes rapidly and adjust their own business direction effectively and with flexibility.

CONCLUSION AND LIMITATIONS

Vietnam is on the road to a knowledge-based economy in which ICT is considered as one of the key sectors. This study gives brief insights into Vietnamese ICT sector in term of the interrelationship among social, human, organizational capital and firm performance. By refining objectives in business operation, ICT firms must understand their own capabilities, especially their internal strengths to face to unpredictable changes in the environment. Social,

organizational and human capital, dimensions of intellectual capital, is recognized as the key intangible resources for firm's long-term performance. Accordingly, this study extends previous studies by investigating the central role of organizational capital as the key factor for the sustainable development of the ICT firms in future when firms become larger and more structured. However, the initiative of Vietnamese ICT firms to motivate innovation activities and develop intellectual capital is still in infancy. Hence, we hope that the findings will be helpful to top managers and policy makers in Vietnam and in developing countries in their work to find a good solution to enhance the performance of ICT firms in long-term.

This research also contains some limitations. First, this study just explores the definition of the dimensions of intellectual capital and its impact on firm performance. This study employs static data, which has inevitable drawbacks in reflecting the long-term impacts of IC's dimensions and performance. The use of panel data may be the future direction of following-up studies. Second, there are some other dimensions of intellectual capital such as customer capital should be investigated in future. Lastly, there are other stakeholders such as employees and managers involved in the relationship between intangible capital and firm performance. Further studies should take into account the perspectives of these stakeholders.

APPENDIX

Appendix 1 **QUESTIONNAIRE ITEMS**
Firm performance
We demonstrated more profitability than other market competitors
We have greater capacity in developing new products or services than other competitors
We have higher quality of products or services than other competitors
We have greater capability in developing new products, service or programs
We have greater ability to attract and retain essential employees
We achieve greater satisfaction among customers or clients
We experienced a greater growth in sales than other market competitors
Social Capital
Our employees are skilled at collaborating with each other to diagnose and solve problems
Our employees share information and learn from one another
Our employees interact and exchange ideas with people from different areas of the organization
Human Capital
Our employees are active in upgrading employee's skills
Our employees are bright
Our employees are satisfied with working conditions
Our employees always come up with new ideas
Organizational capital
We have the know-how to improve the organizational capability
Our organizational culture includes a clear organization structure
Our organization invest abundant resources to acquire new knowledge and information system
Our organization always provide training for employees
Environmental Uncertainties
Marco policies is highly uncertain
Technological development is highly unpredictable
Product market is a very complex environment
Customer demand is hard to forecast
Customer tend to look for new products all the time

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