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Article

Talent management at science parks: Firm-university partnerships as a strategic resource for competitive advantage creation in the information technology sector in Vietnam

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MANAGEMENT | RESEARCH ARTICLE

Talent management at science parks: Firm-university partnerships as a strategic resource for competitive advantage creation in the information technology sector in Vietnam

Nga T.T. Le¹, Phuong V. Nguyen^{1*}, Hoa D. X. Trieu¹ and Long Nguyen Hai Lam^{2,3}

Abstract: Talent attraction has been confirmed to be one of the crucial human resource strategies during the Science Park development. Skilled workers with expertise, knowledge, and innovation are required for tenant firms to survive and gain competitive advantages in the increasingly intense information technology (IT) industry. This study aims to contribute to our knowledge of talent attraction management in Science Parks, emphasizing the interaction between universities and research institutes, which are confirmed to be the primary source providing talented individuals. The fundamental logic is that a Science Park's connection to universities may improve innovation capacity, eventually gaining competitive advantages. The data collection comes from 178 senior managers of various IT firms located at two Science Parks in Vietnam, Quang Trung Software City, and Saigon Hi-Tech Park. A partial least squares structural equation modeling approach was used to estimate the measurement and causal relationships. The findings revealed that IT firms should consider two critical elements when enhancing their competitiveness through talent acquisition: the network attractiveness dimension and university-based expertise. Additionally, information gained through firm-university partnerships significantly contributes to both innovation capacity and competitive advantages.

Subjects: Management of Technology; Innovation Management; Strategic Management; Management Education

Keywords: talent attraction; innovation capability; competitive advantages; information technology

1. Introduction

Talent management has been widely acknowledged as vital in establishing competitive advantages for firms operating in Science Park (Cadorin et al., 2017, 2021; Löfsten et al., 2020). In general, talents are identified to help firms cope with today's dynamic environment. Tenants in Science Parks are required to adopt talent management, which is a new strategic level that strives to discover the skills necessary for adopting human resource management procedures and using talent supply more effectively (Collings & Mellahi, 2009). It has been confirmed that the ability to discover and retain employees with relevant talents is one aspect that contributes to a company's



success. It is similar to the case of Science Park and its tenants (Cadorin et al., 2021; Osburg et al., 2020). Cadorin et al. (2017) define a talented person as someone with specific skills, experiences, and qualities that are significant for the growth and development of the science park. Löfsten et al. (2020) further add to the definition of talents as individuals who contribute to the company's performance using their unique, superior capability in expertise, knowledge, and leadership. These talented individuals can mostly be found in universities where students are equipped with the necessary skills and knowledge to meet companies' demands.

According to recent literature on Science Park development, gaining access to a talented labor force, specifically from universities, can enable companies to enhance innovation capacity and competitive advantages (Cadorin et al., 2017; Díez-Vial & Montoro-Sánchez, 2016). In a study investigating the link between the university and Madrid Science Park, Díez-Vial and Montoro-Sánchez (2016) confirm that universities' knowledge promotes the science park's innovation capacity. Previous studies show that connections to universities and access to a various academic expertise are among the most beneficial services that Science Parks offer to tenants (Cadorin et al., 2020). In a study exploiting primary data collected from 120 Science Parks in Brazil and Europe, Löfsten et al. (2020) find that strong cooperation and collaboration with academic institutes can enable park managers to identify and attract talents more efficiently. Additionally, in order to create an effective ecosystem that can enhance the member firms' competitive advantages, it is vital to have sufficient interactions among industries, universities, and government (Cadorin et al., 2017; Yoon et al., 2015).

A variety of previous studies have recognized the leading role of Science Park in supporting and boosting the development of their tenants as well as of surrounding regions. For instance, Hommen et al. (2006) state that Science Park is characterized as a magnet-like attraction for talented people who have the potential to drive the growth of an entire region. There is no unified definition to characterize a Science Park; as such, it can be referred to as Research Park, Technology Park, Business Park, and Innovation Centre (Löfsten et al., 2020). This study adheres to the International Association of Science Parks and Areas of Innovation to define a Science Park as "an organization managed by specialized professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions" (International Association of Science Parks and Areas of Innovation, 2017). Researchers are increasingly focusing on Science Parks-related concerns in terms of establishing a broad and effective business network with other research institutes sharing knowledge, contracts, strategic partnerships, and talent recruitment and talent management (Roldan et al., 2018). The extant literature on talent recruiting activities is abundant. However, empirical studies on the talent management practices in Science Parks are scarce, giving the sense that not all Science Parks comprehensively understand the concept and how to apply such practices effectively. In our view, the scarcity of literature in a field that has grown in importance indicates a significant knowledge gap. The fundamental rationale is how to encourage university linkages and how Science Park management can help attract talents and promote tenant firms in Science Parks through effective relationships with colleges and students.

The Vietnamese information technology industry has developed tremendously due to prudent, timely government planning and applicable regulations in the early 2000s. Over the last five years (2015–2019), the IT business in Vietnam generated total revenue of \$110 billion (USD) and has continued to play a critical role in the economic growth, accounting for around 14% – 15% of GDP (Nhat et al., 2020). Due to globalization and integration, IT businesses are compelled to be constantly creative and inventive to survive in an intensely competitive sector. Regardless, acquiring and nurturing the talents needed to meet the rising demand for Science Parks development in Vietnam has hit some roadblocks in recent years. Furthermore, the growing internalization and globalization intensify rivalry in talent attraction, especially for those who can make precise assessments and decisions (Cadorin et al., 2017; Löfsten et al., 2020). The reason for this is that the concept of talent remains controversial (Cadorin et al., 2017; Lewis & Heckman, 2006),

especially talent in the high-tech industry in emerging markets such as Vietnam. Thus, how Science Parks identify talents and create an appropriate environment to support talent growth is a rising problem.

Additionally, most existing studies on Science Parks are predominant in developed nations (Cadorin et al., 2017; Löfsten et al., 2020), whereas Science Parks in developing countries remain limited. Vietnam is one of the under-researched economies concerning Science Park management to establish university-firm partnerships in attracting talent and enhancing competitive advantages. The lack of attention to studies that give an in-depth understanding of talent management attraction activities as the source of innovation capability is the basis for judging the research status and originality to fill the gaps left by prior studies. As a result, this study will examine the elements that drive the Science Parks' talent acquisition activities and give important insights and recommendations for how Science Parks may establish effective HRM strategies that can provide tenant firms with competitive advantages. We believe that external sources of information obtained via contact and collaboration with universities may help enhance talent attraction management in tenant enterprises in SPs, hence stimulating innovation capabilities and competitive advantages. Vietnam provides an exciting study context to seek insightful explanations of the causal relationships between knowledge acquisition from universities with innovation capacity and competitive advantages of firms located at Science Parks.

This study aims to gain deeper insights into talent management in innovation capacity, knowledge transfers from research institutes, and knowledge acquisition of firms located at Science Parks. Given the importance of talent management, the question of whether Vietnam IT tenant firms located at Science Parks can fully benefit from the causal relationships with universities has not yet been resolved. We address this problem by analyzing two of Vietnam's most renowned Science Parks, namely Quang Trung Software City (QTSC) and Saigon Hi-Tech Park (SHTP), where we gathered 178 representative samples. The research adds to the growing body of literature about talent attraction and knowledge acquisition from academic institutes to firms in Science Parks throughout the partnerships. The findings enable us to suggest practical implications that can assist Science Parks managers in developing high-quality workforce and management strategies.

2. Literature review

2.1. Network attraction dimension, talent attraction activities and partnership with talents

Every successful firm hinge on its ability to recruit and retain skilled workers. Firms must regularly analyze their attraction to top talents due to the severe competition for recruiting. Competitive compensation, family-friendly working conditions, and development benefits are all tried and true methods for attracting top talents (Osburg et al., 2020). Effective HR management facilitates the implementation of an organization's operational plan and fosters competitive advantage (Asriati et al., 2022). Talent management is a recently developed strategic level in human resource management that focuses on identifying a specific group of individuals who can bring about differentiating values to the organization (Saddozai et al., 2017). Talent management activities are expected to help tenants effectively compete for quality labor force available in Science Parks (Florida, 2004).

In general, it is widely accepted that talent management is a more competitive approach compared to traditional human resource management (Cappelli, 2008; Löfsten et al., 2020). Specifically, talent management focuses more on attracting and retaining a high-quality workforce. In contrast, traditional human resource management focuses on developing the capacity of the entire employees within the organization (Löfsten et al., 2020). Collings and Mellahi () propose a theoretical model that defines talent management as a series of complex activities and systematic processes of identifying talented individuals whose skills and capacities fit the key positions contributing to the organization's sustainable competitive advantage. Löfsten et al. (2020) expand on the initial concept, stating that firms located in Science Parks should perform talent

recruitment in line with their maturity stage in order to acquire new talented workers efficiently. The majority of tenants in Science Parks are technology-based and highly skilled. Recent studies have discovered factors that affect Science Parks' capacity to recruit and provide tailored talent solutions for their tenants (Osburg et al., 2020; Roldan et al., 2018).

Han and Han (2009) indicated that network-based recruiting practices allow firms to conduct the recruitment process more efficiently, as well as increase the chance of attracting highly prospective and competent applicants. Similarly, the network attraction dimensions developed by Löfsten et al. (2020) emphasize that the original source of talent comes from alum networks and university graduate students. As Science Parks have a wide connection with universities and research institutions, they can provide a stable flow of potential talents that tenant firms can access (Feldman & Desrochers, 2003). By providing pleasant and affordable housing, good school options, working conditions, and opportunities for relationships with other fellow workers, Science Parks can attract and retain talents more efficiently (Löfsten et al., 2020). Thus, the following hypothesis is proposed:

H1. *Network attraction dimension has a positive impact on talent attraction activities.*

In research on Science Parks talent management, Löfsten et al. (2020) also note that collaboration with other stakeholders, especially networking with educational and research entities, enables tenant firms to discover and recruit talent more efficiently. Science Parks are important actors in entrepreneurial ecosystems because they establish a mixture of stakeholder relationships among universities, firms, governmental agencies, incubators, and other parks (Lindelöf & Löfsten, 2002). As Science Parks generally have a wide range of networks and close relationships with universities and research institutions, the ecosystem in Science Parks can enable tenant firms to gain better access to the aforementioned source of talent. Thus, in order to attract these talents, the tenant firms need to develop suitable attraction strategies, which eventually leads to an increase in the effectiveness of talent attraction activities (Beugelsdijk, 2008; Ceylan, 2013; Jiang et al., 2012; Lau & Ngo, 2004). In return, efficient talent attraction activities can enhance the Partnership with talents.

Collaboration among universities, academic research institutes, and firms is a significant factor that requires high consideration when developing a successful Science Park model (Cadorin et al., 2017). These entities have been widely acknowledged as primary providers of talent and contribute significantly to the talent attraction processes of tenant firms in the Science Parks (Soetanto & Van Geenhuizen, 2015). As mentioned above, one of the most valuable services Science Parks offers for tenant firms is providing a collaborative network with external entities, including universities and research institutions (Cadorin et al., 2019, 2020). The significant advantage of Science Parks is that it offers a comprehensive business network with various types of stakeholders, including universities and surrounding tenant firms. Such a solid network base is expected to assist firms in exchanging knowledge; creating strategic alliances; attracting talent, and discovering profitable partnerships. In general, Science Parks provide an ecosystem where the relationship between firms and academic institutes is strongly nurtured; tenant firms are more likely to gain access to qualified potential workers (Cadorin et al., 2021).

Similarly, Löfsten et al. (2020), exploiting empirical data from Science Parks in Europe, find that network attraction and talent management activities contribute favorably to university and firm partnerships. The Science Parks ecosystem offers career and individual development opportunities that can positively contribute to companies' talent attraction processes (Ferguson & Olofsson, 2004). Thus, Science Parks can be considered a facilitator of knowledge spillovers between universities and firms, allowing new ideas creation and technical expertise exchange to occur more easily among them (Diez-Vial & Montoro-Sanchez, 2017).

In this study, we concentrate on the features of the relationships among business networks, talents, and university and firm partnerships to explain how the management of Science Parks may improve partnership performance through talent recruitment efforts. This implies that the study focuses on Science Park's talent attraction initiatives. Science Park's talent attraction activities are supposed to be one of the critical factors in our research model. First, we concentrate on Science Park talent attraction activities, arguing that networking and talent attraction will enhance collaborations with talents in the Science Park. Second, we argue that Science Park talent recruitment encourages cooperative linkage between students, universities, and businesses. Based on the literature review and our arguments, the following hypotheses are formulated:

H2. *Talent attraction activities have a positive impact on partnerships with talents.*

H3. *Network attraction dimension has a positive impact on partnerships with talents.*

2.2. Knowledge from universities, partnership with talents and innovation capacity

According to Tidd and Trewhella (1997), innovation capacity refers to a firm's ability to turn opportunities into practical applications that can contribute to the firm's productivity. These include introducing novel processes, products, or ideas in the companies (Koc & Ceylan, 2007). Furthermore, this capacity to innovate is considered one of the most critical factors impacting organizational performance, especially for firms operating in high-tech industries.

Universities are vital in generating new ideas and knowledge for entrepreneurs (Westhead & Batstone, 1998). The extant literature has shown that, besides fostering and developing the internal workforce, firms should exploit the labor market from external sources, such as universities and research institutions. Díez-Vial and Montoro-Sánchez (2016) also confirm that universities and other higher education institutions are among the critical facilitators of knowledge that can promote firms' innovation. Similarly, Tian et al. (2022) contend that universities are one of the paths via which enterprises may receive external information through academic research, significantly contributing to firms' innovative capacity. Valuable knowledge and research expertise from academics and researchers are essential assistance for firms to develop new products, services, or processes, which greatly enhance firms' innovation capability. Thus, tenant firms in Science Parks can improve their innovation capacity by combining their existing knowledge and technology with knowledge provided by universities. As a result, many innovative businesses are developed through university resources such as cutting-edge technological expertise and other forms of training (Roldan et al., 2018). Díez-Vial and Montoro-Sánchez (2016) conducted an in-depth interview with 76 managers of firms located in a Science Park and concluded that knowledge gained from universities via formal contracts and informal interactions greatly enhances firms' innovation capacity. Taking into account mentioned arguments allows us to formulate the following hypothesis:

H4. *Knowledge from universities has a positive impact on innovation capacity.*

Several studies have also confirmed that by establishing a solid formal and informal relationship with universities, tenant firms are more likely to attract talents, such as graduates equipped with creative ideas and sufficient technical expertise (Löfsten et al., 2020). These talents' knowledge and skills can contribute greatly to the firm's innovation capability. Additionally, it is widely accepted that universities and other higher education institutions provide valuable knowledge to tenant firms and boost their innovation (Lambooy, 2004; Lindelöf & Löfsten, 2002; Mian, 1996; Ritala et al., 2015). Thus, a close relationship with these entities, who possess a rich social network, enables firms to benefit from gaining access to an even more comprehensive network. Drawing from the knowledge-based perspective, knowledge acquired via interactions with external

organizations can enhance the capabilities of firms to differentiate and improve product development (Eisenhardt & Santos, 2012; Grant, 1996). Accordingly, knowledge flow from universities or research centers is considerably encouraged, accounted by the nature of Science Parks as loose structures facilitating knowledge spillovers, thus, favoring the establishment and exchange of technical knowledge among them (McAdam & McAdam, 2008; Mian, 1997; Montoro-Sánchez et al., 2011). Mentioned rationales allow us to formulate the following hypotheses:

H5. *Firm's partnerships with talents have a positive impact on innovation capacity.*

2.3. Partnership with talents, knowledge acquisition and innovation capacity

As confirmed by H. Liao et al. (2012), the key to the success of an organization is knowledge acquired from professionals in various sources. This intangible asset can enable firms to enhance their competitive advantage. Knowledge is a crucial asset required by all businesses to facilitate efficient operations and increase innovation (Asiedu et al., 2022). Knowledge acquisition is one of the procedures necessary for ensuring the continuity and efficacy of an organization's administration and developing competitive advantages. Particularly for businesses in the IT sector, which rely heavily on innovative ideas to deliver competitive advantages in terms of product designs, performance enhancement, and supply chain productivity (Asiedu et al., 2022). Knowledge acquisition is the initial step in combining knowledge from external sources and transforming it into a form that can be used efficiently within an organization (Yang et al., 2006). As a result, organizations' capacity for acquiring, assimilating, and applying information novel commercial goods and services aligns with this ability, which is a crucial component for both knowledge-based perspectives (Grant, 1996; Kogut & Zander, 1996; Spender, 1996).

According to Martinez-Canas and Ruiz-Palomino (2011), tenant firms can enjoy the benefits of acquiring new knowledge by forming a solid relationship with their surrounding partners and universities and research institutes. Specifically, firms located inside Science Parks can collaborate with universities through both formal activities, such as R&D contracts, and informal activities, such as personal interactions with university staff or attendance at seminars and conferences, which also encourage knowledge exchange (Lindelöf & Löfsten, 2002; Löfsten & Lindelöf, 2005). These interactive activities allow firms to foster the propensity to explore new and related knowledge, as well as approach and recruit talents from universities. Frequent interaction activities among tenant firms and academic institutes can also encourage exchanging knowledge from universities to high-tech entrepreneurs through organizing conferences and presentations (Cadorin et al., 2021; Löfsten et al., 2020). Therefore, we argue that to effectuate this acquirement of knowledge, firms should consider promoting partnerships with talents. Thus, the following hypothesis is proposed:

H6. *Firm's partnerships with talents have a positive impact on knowledge acquisition.*

A company's innovation capability is its capacity to shape and manage numerous capabilities (Kobarg et al., 2018). Various research within the knowledge-based view explores that a firm's access to external knowledge can be essential to innovative development (Caloghirou et al., 2004). From the knowledge-based perspective, knowledge is the foundation of organizational learning, and knowledge acquisition is one of the components of this process. Knowledge acquisition comprises accumulating experiences, guided learning by doing, knowledge transfer, and searching (H. Liao et al., 2012). By gaining new knowledge, firms can identify and incorporate relevant knowledge from beyond their boundaries, hence constituting innovative capacity advancement (Eisenhardt & Santos, 2002). Especially for firms in the IT industry, where the environment is constantly changing, knowledge acquired from external relationships is critical for firms to develop and improve new technology that is distinct from their competitors and meet customers'

demands. H. Liao et al. (2012), exploiting data from 449 firms in Taiwan, show evidence of the positive relationship between knowledge acquisition and firms' innovation capacity. Several studies on emerging economies have confirmed the role of knowledge acquisition in enhancing firms' innovation capacity. For example, Migdadi (2022) conducted research on Jordanian firm managers and found that effective knowledge management strongly encourages firms' innovation capability. Therefore, we propose the following hypotheses:

H7. *Knowledge acquisition has a positive impact on innovation capacity.*

2.4. Innovation capacity, knowledge acquisition and competitive advantages

In today's world, market trends and business environments are changing at an unprecedented pace, resulting in increased competitive pressures. Accordingly, firms are often deficient in time and available resources to internally improve essential knowledge to accomplish competitive success through product and process innovations (Lambe & Spekman, 1997; Swan & Allred, 2003). In order to cope with constantly changing markets, firms are required to innovate and develop potential resources and capabilities (Silwal, 2022). Innovation is widely acknowledged as an essential source of efficiency and long-term competitive advantages for technology firms (Huang, 2011). Innovation capabilities are described as a company's potential to nurture creative and innovative ideas. These ideas are applicable to the design, product development, remodeling, and development of new procedures that aim to improve firms' performance and productivity (Ávila, 2022). In other words, innovation capacity is a significant source for technology companies to enhance their efficiency and to constitute long-term competitive advantages.

Competitive advantages are generally defined as an organization's strategic resource over its competitors within a competitive industry (Barney, 1991; Caiazza et al., 2015). Under the aspect of the resource-based view, several scholars suppose that the origin of competitive advantage is firms' valuable specific resources and capacities that are rare and difficult to duplicate (Barney, 1991; Dierickx & Cool, 1989). This perspective suggests that resources and abilities are included in a single firm; therefore, the source of competitive advantage is the internal factors within the firm itself. On the other hand, following the theoretical relational view, firms can exploit external connections with other organizations to generate competitive advantages (Dyer & Singh, 1998). Tohidi and Jabbari (2012) found that organizational innovation capacity can encourage a firm to acquire sustainable competitive advantages. Therefore, innovation capacity is expected to positively impact companies' competitive advantages in Science Parks. The following hypotheses are proposed:

H8. *Innovation capacity has a positive impact on competitive advantages.*

In order to survive the intense global rivalry of the Industry 4.0 era, businesses must adopt new information and convert it into important knowledge. Various research within the knowledge-based view explores that a firm's access to externally generated knowledge that can be essential to developing its innovative activity is favored by acquiring external knowledge (Caloghirou et al., 2004; Fey & Birkinshaw, 2005). Knowledge acquisition from external source partners is, according to Aldulaimi (2015), a key component in achieving sustained success in a competitive marketplace. According to Eisenhardt and Santos (2012), by gaining knowledge, firms can identify and incorporate relevant knowledge from beyond their boundaries, constituting the advancement of innovative capacity. In today's business environment, firm managers, especially those in heavy knowledge and technology-based industries, are shifting strategies to focus on intangible assets to sustain competitive advantage. Past research has shown that new information is crucial to a company's survival (Ávila, 2022). Knowledge acquisition is an essential activity that enables businesses to grow their knowledge base (Ngoc Thang et al., 2020). Collaborative activities with

other stakeholders are crucial external knowledge sources (Asiedu et al., 2022). According to Rehman et al. (2022), the acquisition of new information from a variety of external and diverse sources enables businesses to build stable innovations and achieve competitive advantages. In their study of 387 manufacturing companies in Pakistan, knowledge management methods, such as knowledge acquisition, were found to be a significant predictor of businesses' innovativeness. In the specific case of the technology industry, knowledge acquisition is the decisive factor of knowledge integration and the fundamental of competitiveness. The data analysis of 133 North American companies finds that effective knowledge acquisition can positively influence firms' competitive advantages (Chin-Loy & Mujtaba, 2011). As such, the following hypothesis is proposed:

H9. Knowledge acquisition has a positive impact on competitive advantages.

The research model with nine proposed hypotheses is presented in Figure 1. This model is integrated with a knowledge network approach to analyze the firm-university partnerships in attracting talent. This model also aims to test the relationships between knowledge acquisition and knowledge from universities with innovation capacity and competitive advantages. Precisely, we expect to find key determinants affecting innovation capacity and competitive advantages of companies in Science Parks.

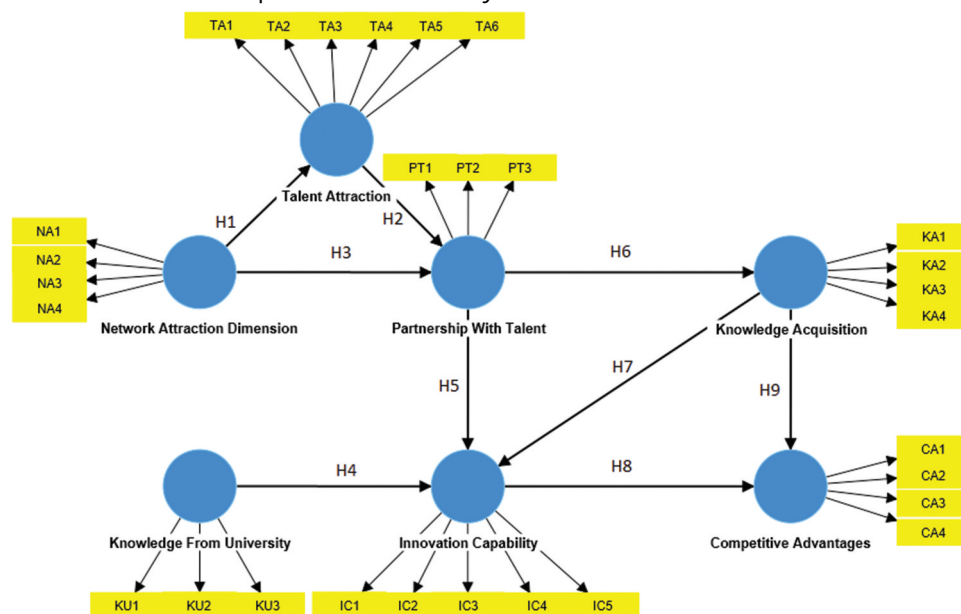
3. Methodology

3.1. Research design

The research design applied a quantitative approach to investigate the hypothesized relationships. A survey was conducted to collect primary data from managers and leaders at IT firms. The data obtained were then processed and analyzed using the partial least squares structural equation modeling (PLS-SEM) method. In recent years, the PLS-SEM approach has been gaining popularity in business management science for its high appropriateness in assessing a complicated research model with multiple simultaneous relationships (R. Hair et al., 2011). In addition, scholars recommend PLS-SEM as it guarantees the robustness of the result when testing a research model with a small sample size, which is an advantageous feature for our study.

This study adopts the sample size determination criteria from R. Hair et al. (2011). Accordingly, the recommended sample size for SEM analysis should be ten times the number of examined

Figure 1. The research model.



items. However, the acceptable sample size can be five times the number of items. Our study includes a total of 29 items. Hence the optimal sample size for this investigation is 290 individuals. Nevertheless, a minimum sample size of 145 is also sufficient.

3.2. Data collection

We contacted the public relations department of QTSC to access a selected list of IT firms. This study used a combination of convenience and referral sampling methods to collect data based on this list. The online survey was sent to IT firms with a referral from QTSC. The respondents are professionals in management positions, such as team leader, manager, or CEO, since they have the necessary technical expertise and knowledge to answer the topic accurately under investigation. Before distributing the questionnaire, it was translated into Vietnamese and reviewed many times with QTSC partners to remove any remaining ambiguities or misleading claims. After finishing the final steps of adjustments, the questionnaire was designed under Google form and emailed to IT firms located at QTSC and SHTP.

The data collection period of this study took place in two and a half months, starting in mid-August 2020 and finishing at the end of October 2020. Specifically, we conducted three group discussions with the management board of QTSC to clarify our research purpose and ask them to provide valuable evidence, which enabled us to explain the findings during the study period. Eventually, 178 valid responses were returned for implementing the data analysis. Since the targeted participants of this study were managers at various levels of IT companies in Science Parks, and due to time restrictions, it is impossible for the authors to reach the necessary sample size of 290 as anticipated. Despite this, the sample size of 178 is considered sufficient for SEM analysis.

3.3. Measurement

In order to measure the constructs proposed in the research model, questionnaire items were adopted from previous studies, and each is measured using Five-point Likert scale (1 = *strongly disagree* to 5 = *strongly agree*). Various studies have thoroughly examined the items used to measure the constructs and confirmed them as valid and reliable. Constructs underlying Partnership with talents (three items), Talent attraction activities (six items) and Networking and attracting dimension (four items) were adopted from (Löfsten et al., 2020). To explore Knowledge from Universities and Innovation capability, we adopted and refined three items from (Diez-Vial & Montoro-Sanchez, 2017), and five items from (Soetanto & Van Geenhuizen, 2015), respectively. Finally, four items measuring competitive advantage and four items measuring Knowledge acquisition were adopted from (Wu & Chen, 2012).

4. Results

4.1. Demographic characteristics

Table 1 depicts the sample respondents' demographic characteristics, including business types and sizes, job titles, and operation years. The data reveals that limited liability companies and joint-stock companies represent the majority business type, accounting for 71% of the total. Team leaders and managers dominate the job title group enclosed in this study, accounting for 52 percent and 36 percent, respectively. Notably, most IT firms located at QTSC and SHTP are large-size firms with 100 to more than 200 employees (accounting for 43%) and have been doing business for 11 to 20 years (accounting for 38%).

4.2. Measurement model evaluation

The measurement model was evaluated using standard criteria from previous research to test for construct reliability and validity. Firstly, we examined the Cronbach's alpha and composite reliability (CR) estimates to confirm the constructs' reliability. Table 2 shows that the values for these criteria are above the minimum threshold limit of 0.6 and 0.7, respectively. The outer loading estimates also exceed the benchmark of 0.7 or higher (Hair et al., 2011a), indicating that all the

Table 1. Demographic characteristics

Characteristics (N=178)		Percentage (%)
Type of business	Limited liability company	48%
	Join stock company	23%
	Partnership	2%
	Private enterprise	3%
	State-owned companies	8%
	Companies with foreign capital	15%
	Others	1%
Job title	Administrative council	5%
	Board of directors	7%
	Manager	36%
	Team leader	52%
Number of employees	Less than 20	17%
	20-50	32%
	51-99	8%
	100 – more than 200	43%
Years of operation	Less than 3	13%
	3-5	20%
	6-10	13%
	11-20	38%
	More than 20	16%

items are significantly loading to measure their respective construct. Thus, little concern for reliability is reflected in the results. Secondly, the validity of constructs was tested in terms of convergent and discriminant validity. Our test showed that none of the items had the minimum AVE below the threshold of 0.5 (Henseler et al., 2012), signifying that no issue of convergent validity is present in this study.

4.3. Common method bias

The scholars agree that common method bias (CMB), particularly with single informant surveys, poses a severe threat to bias in behavioral research. There were various steps before data collection to overcome CMB, including assuring participants that there were no right or wrong answers and that their responses would be kept confidential (Podsakoff et al., 2003). Additionally, this study was created to lessen the impact of data collection bias. The authors calculated the values of the complete collinearity variance inflation factor (FCVIF) among all variables in our study model following Kock's (2015) assessment approach to establish whether the acquired data falls within CMB. The test results for CMB are shown in Table 2. The maximum FCVIF was less than 3.3, indicating that the measurement model was not subject to CMB.

According to Fornell and Larcker (1981), the constructs can be considered discriminant valid if each latent variable has a higher variance than its measurement variables or other constructs. As can be observed in Table 3, the square root values of AVE were higher than the correlation values of the constructs, satisfying the discriminant validity requirements.

Table 2. Construct reliability and validity

Constructs	Standard loading	VIF
Partnership with talent and firms/universities (PT) ($\alpha = 0.902$; CR = 0.938; AVE = 0.836)		
PT1 - Science Park manager cooperates with universities to organize activities to enhance relationships between students and tenant firms.	0.913	2.930
PT2 - Science Park manager cooperates with universities to organize activities to enhance relationships between faculty and tenant firms.	0.902	2.621
PT3 - Science Park manager creates favorable conditions to promote cooperation in implementing research projects and technology transfer between universities/research institutes and tenant firms.	0.927	3.059
Talent attraction activities (TA) ($\alpha = 0.897$; CR = 0.921; AVE = 0.661)		
TA1 - Science Park manager develops customized strategies to assist tenant companies in recruiting talent.	0.784	2.021
TA2 - Science Park manager supports the relevant legal procedures when there are new experts working or new companies move into operation in the Science Park.	0.833	2.307
TA3 - Drawing reputable companies to the Science Park is a successful strategy for attracting talent.	0.757	1.853
TA4 - Science Park manager cooperates with organizations, universities and research institutes to receive new ideas from them and disseminate information about the Science Park to the community.	0.839	2.425
TA5 - Science Park manager creates initiatives to encourage and assist student and researcher entrepreneurship.	0.849	2.591
TA6 - Science Park manager creates initiatives to attract attract veteran experts to the tenant firms.	0.810	2.243
Network Attraction Dimension (NA) ($\alpha = 0.839$; CR = 0.892; AVE = 0.674)		
NA1 - Tenant firms in Science Park develop initiatives to connect and attract former university students.	0.833	1.981

(Continued)

Table 2. (Continued)

Constructs	Standard loading	VIF
NA2 - Convincing students to continue working in the tenant firms after graduation is an effective strategy of attracting talent.	0.800	1.827
NA3 - Tenant firms in Science Park provide favorable conditions and facilities to foster of student entrepreneurship.	0.805	1.771
NA4 - Science Park provides recruitment opportunities at reputable firms in the Science Park.	0.847	1.878
Knowledge from Universities (KU) ($\alpha = 0.869$; CR = 0.919; AVE = 0.792)		
KU1 - Enterprises in Science Park receive intense and frequent knowledge exchange from universities.	0.876	2.136
KU2 - Enterprises in Science Park invite researchers from universities/institutes to organize seminars sharing essential knowledge for staff.	0.895	2.350
KU3 - Universities and research institutes are an essential source of knowledge for firm innovation.	0.899	2.390
Innovation capability (IC) ($\alpha = 0.912$; CR = 0.934 AVE = 0.740)		
IC1 - Enterprises in Science Park regularly improve technology and innovate for existing products and services.	0.885	2.952
IC2 - Enterprises in Science Park often improve the quality of existing products or services.	0.822	2.206
IC3 - Enterprises in Science Park invent new products or services.	0.849	2.607
IC4 - Enterprises in Science Park experiment with new products or services.	0.881	2.870
IC5 - Enterprises in Science Park invest in developing new technologies.	0.864	2.664
Competitive advantage (CA) ($\alpha = 0.904$; CR = 0.933; AVE = 0.776)		
CA1 - Enterprises in Science Park offer products that have unique benefits over competitors.	0.877	2.593
CA2 - Enterprises in Science Park offer products that have superior quality than competitors.	0.889	2.831

(Continued)

Constructs	Standard loading	VIF
CA3 - Enterprises in Science Park offer products that are more advanced than those in the same market.	0.880	2.716
CA4 - Many leading companies in the IT sectors choose to locate Science Park.	0.876	2.593
Knowledge acquisition (KA) ($\alpha = 0.913$; CR = 0.939; AVE = 0.794)		
KA1 - Enterprises in Science Park often update information about new technologies through communication with customers or partners	0.892	2.972
KA2 - Enterprises in Science Park closely observe competitors get technical information.	0.904	3.259
KA3 - Enterprises in Science Park regularly collect technical information from newspapers and research.	0.872	2.644
KA4 - Enterprises in Science Park often communicate with suppliers to collect new technical information.	0.895	2.962

Note: CR (composite reliability), AVE (average variance extracted), α (Cronbach's alpha)

Heterotrait-Monotrait Ratio was also calculated to evaluate discriminant validity; accordingly, the mean value of all items across constructs was divided by the correlation across items. The threshold for this ratio must not exceed 0.85 (Clark & Watson, 1995; Kline, 1998). Results from Table 4 confirm all the items are below 0.85. Thus, the measurement model evaluation indicates a high degree of reliability and validity.

4.4. Structural model evaluation

Once the outer model has been confirmed to be valid and reliable, the following steps are to assess the structural model. First, we evaluated path coefficients to quantify the impact of the direct relationships hypothesized in this study. A PLS bootstrapping procedure with 5000 subsamples was conducted to calculate significance values for all paths. According to the results in Table 5 and Figure 2, all hypotheses, except for H3 and H5, were supported with significant p-values less than 0.001.

The findings confirm that the network attraction dimension has a direct relationship with talent attraction activities, and talent attraction activities were found to positively impact partnerships with talents. Thus, H1 ($\beta = 0.782, p < 0.001$) and H2 ($\beta = 0.731, p < 0.005$) were accepted. However, the networking attraction dimension was observed to have no substantial impact on firms' partnerships with talents. Thus, H3 ($\beta = 0.069, p > 0.1$) was rejected. Knowledge from universities and knowledge acquisition was confirmed to enhance innovation capacity significantly, confirming H4 ($\beta = 0.212, p < 0.05$) and H7 ($\beta = 0.612, p < 0.001$). Regardless, there was no evidence for the direct relationship between firms' partnerships with talents and innovation capacity; as such, H5 ($\beta = 0.057, p > 0.1$) was rejected. The results also provided evidence for the positive and significant correlation between firms' partnerships with talents and knowledge acquisition. Thus, H6 ($\beta = 0.570, p < 0.001$) was accepted. Innovation capacity and knowledge acquisition were confirmed to

Table 3. Fornell-Larcker criterion

	CA	IC	KA	KU	NA	PT	TA
Competitive Advantages (CA)	0.881						
Innovation Cabability (IC)	0.740	0.861					
Knowlde Acquisition (KA)	0.778	0.786	0.891				
Knowledge From University (KU)	0.592	0.656	0.669	0.890			
Network Attraction Dimension (NA)	0.670	0.708	0.704	0.687	0.821		
Partnership with Talent (PT)	0.475	0.532	0.570	0.596	0.641	0.914	
Talent Attraction (TA)	0.550	0.620	0.643	0.633	0.782	0.785	0.813

Note: The square root values of AVE were in bold.

Table 4. Heterotrait-Monotrait ratio (HTMT)

	CA	IC	KA	KU	NA	PT	TA
Competitive Advantages (CA)							
Innovation Cabability (IC)	0.812						
Knowlde Acquisition (KA)	0.854	0.858					
Knowledge From University (KU)	0.667	0.735	0.751				
Network Attraction Dimension (NA)	0.766	0.800	0.801	0.798			
Partnership with Talent (PT)	0.524	0.583	0.625	0.672	0.731		
Talent Attraction (TA)	0.609	0.685	0.711	0.719	0.893	0.871	

Table 5. PLS-SEM path analysis results

	Estimates	P Values	T Statistics	Results
H1 (NA → TA)	0.782	0.000	14.968	Accepted
H2 (TA → PT)	0.731	0.000	8.804	Accepted
H3 (NA → PT)	0.069	0.403	0.836	Rejected
H4 (KU → IC)	0.212	0.019	2.351	Accepted
H5 (PT → IC)	0.057	0.471	0.872	Rejected
H6 (PT → KA)	0.570	0.000	6.802	Accepted
H7 (KA → IC)	0.612	0.000	7.884	Accepted
H8 (IC → CA)	0.336	0.000	3.736	Accepted
H9 (KA → CA)	0.514	0.000	5.972	Accepted

have a positive direct relationship with tenant firms' competitive advantage. This result support H8 ($\beta = 0.336, p < 0.001$) and H9 ($\beta = 0.514, p < 0.001$).

Second, R^2 was calculated to assess the structural model's predictive strength. The variance explained (R^2) represents the exogenous variable's combined effect on the endogenous variables. The R^2 values of 0.75, 0.50, or 0.25 for endogenous latent variables in the structural model can be described as substantial, moderate, or weak, respectively (Cohen, 1988). The results from Table 6 indicate that the R^2 values of the endogenous constructs are within the specified tolerance. As a result, these values demonstrate that the model has a relatively high prediction accuracy in general.

Figure 2. SEM results.

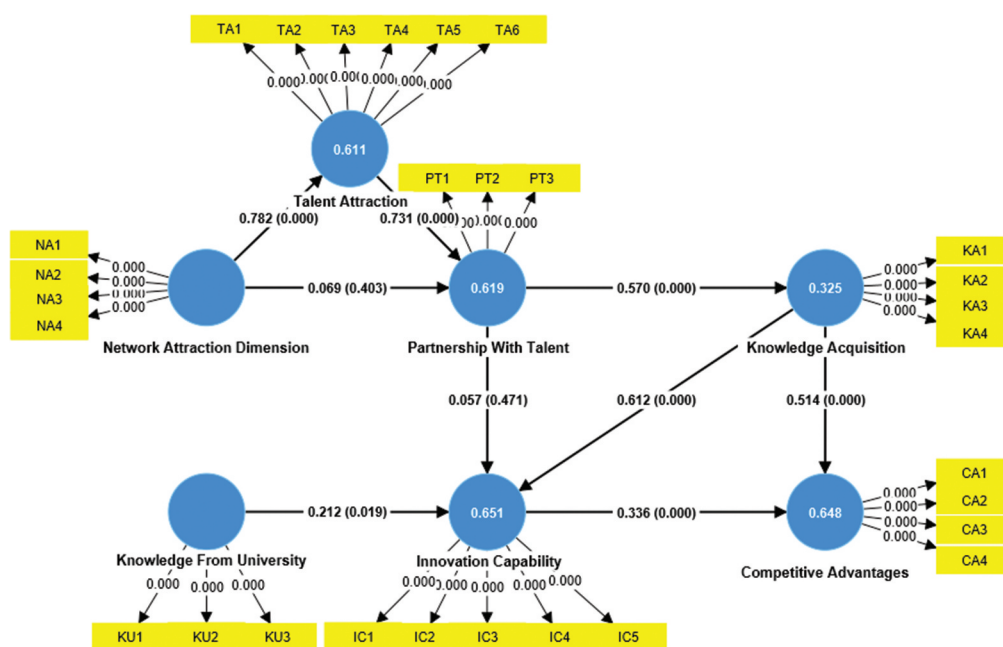


Table 6. The variance explained (R^2), effect size (f^2), predictive relevance value (Q^2)

R^2	F^2	Competitive Advantages	Innovation Capability	Knowledge Acquisition	Knowledge from Universities	Network Attraction Dimension	Partnership with Talent	Q^2
0.648		Competitive Advantages						0.339
0.651		Innovation Capability	0.122					0.440
0.325		Knowledge Acquisition	0.286	0.544				0.373
0.619		Knowledge from Universities	0.062					0.402
0.611		Network Attraction Dimension					0.005	0.602
0.648		Partnership with Talent	0.006	0.481				0.339
0.651		Talent Attraction					0.544	0.440

After assessing the significance of the proposed hypotheses, the next step is to test whether the sizes of the structural coefficients are meaningful. According to Cohen (1988), an f^2 value of 0.02, 0.15, and 0.35 is regarded to be weak, moderate, and strong, respectively. As shown in Table 6, the size effect values of the tested relationships fall within the moderate and strong range. However, as expected, the size effects of partnerships with talent and innovation capacity; and network attraction dimension and partnerships with talent are weak since it was found in the path coefficient results that the hypotheses for these relationships were insignificant.

The final criterion for testing the structural model is the predictive relevance value (Q^2). The Q^2 is a method for evaluating the predictive accuracy of the inner model (R. Hair et al., 2011). According to J. F. Hair et al. (2019), this number must be greater than zero. Specifically, a Q^2 value greater than zero for a particular endogenous construct reflects the predictive importance of the route model for this specific construct. As shown in Table 6, all Q^2 values meet the mentioned standard, suggesting that the external constructions have predictive value for the endogenous construct under discussion.

4.5. Discussions

This study investigates whether talent management and collaborative activities with external organizations such as universities can enhance the capacity of innovation and knowledge acquisition, as well as generate competitive advantages for tenants in Science Parks in Vietnam. Aligning with findings from Löfsten et al. (2020), the PLS-SEM results obtained in this research indicate that the network attraction dimension significantly impacts talent attraction. This implies that a Science Park's extensive connections with academic institutes and business networks can be considered an appealing factor for talented students as it provides more opportunities such as writing papers, internship opportunities, and job recruiting. Additionally, effective talent attraction activities were also confirmed to play an essential role in enhancing the firm partnerships with talents. This result is supported by previous studies (Cadorin et al., 2021; Osburg et al., 2020; Roldan et al., 2018). This suggests that park managers can connect with universities and other institutions via talent attraction activities. In other words, the university-firm partnerships affirm the successful Science Park model, enabling tenant firms to access qualified potential workers.

However, the authors failed to find evidence for a significant correlation between network attraction dimension and firms' Partnership with talent. This result is unexpectedly not consistent with the findings from Löfsten et al. (2020). Based on the in-depth interviews with the top managers of QTSC, we recognized that they had created a business network such as the Chief Executive Officer Club at the Science Park, to exchange experiences and business information, plan recruitment activities, and participate in social responsibility programs. The network has not aimed to develop university-industry partnerships. Therefore, this may help us explain why network attraction does not directly affect partnerships with talents and firms/universities.

The result confirmed the role of knowledge from universities in enhancing tenant firms' innovation capacity, which is consistent with Díez-Vial and Montoro-Sánchez (2016) findings. Indeed, firms can exploit the availability of experts, researchers, and facilities in universities and gain creative ideas and knowledge for innovation (Soetanto & Van Geenhuizen, 2015). Moreover, firms can obtain knowledge from universities via collaboration activities such as seminars to access more information about the current market demand and new technologies or have agreements for conducting technology consulting services. On the other hand, there is no correlation between firms' partnerships with talents and innovation capacity. From the in-depth interviews with the top managers of QTSC, this could be explained that the cooperation activities between science parks and universities in Vietnam are still relatively ineffective and have yet to reach the desired objective of enhancing firms' innovation capacity.

The research found that the Partnership with talent and firms/universities significantly encourages knowledge acquisition among firms in science parks. This finding is consistent with

research by (Martinez-Canas & Ruiz-Palomino, 2011). This implies the first stage in integrating knowledge from academic institutes and transforming it into a standard form that can be used effectively and efficiently within an organization (Yang et al., 2006). As interpreted from the results, knowledge acquisition has a significant positive impact on innovation capacity. This finding is in line with a study by H. Liao et al. (2012). Firms can identify and absorb essential knowledge from beyond their limits by obtaining new knowledge, contributing to innovation capacity growth (Eisenhardt & Santos, 2002).

Based on the findings, both innovation capacity and knowledge acquisition were found to have a significant positive impact on firms' competitive advantage. From adapting knowledge and cutting-edge technologies, tenant firms eventually enhance innovation capacity and gain competitive advantages. This finding reinforces the knowledge-based theory by confirming that knowledge obtained from external sources via collaboration with other organizations is vital in enhancing firms' innovation capacity and competitive advantage.

5. Conclusion

This research investigates Vietnam Science Parks to provide deeper insights into talent attraction management in the context of innovation and competitive advantage. We have contributed to the existing literature by developing the current theoretical framework and providing a more comprehensive perspective of the subsequent talent management factors. The analysis investigates how the network attraction dimension affects talent management activities and the firm-university Partnership at Science Parks and whether these relationships can enhance innovation capacity and gain competitive advantages. Our results reveal the importance of talent management in fostering successful university-industry partnerships to achieve the sustainable development of Science Parks.

5.1. Theoretical contribution

This study contributes to the existing literature about how talented individuals at universities may be the critical factor for tenant firms located at Science Parks to enhance innovation capacity and gain competitive advantages to survive and challenge the intense competition in the IT industry. In addition, this research also extends knowledge-based and resource-based theories by examining whether knowledge acquisition from external sources (universities, talents) can contribute to fostering firms' innovation capacity and competitive advantage. These findings provide relevant and valuable implications for policymakers and the Science Park management team when developing strategic management for further development and for firms whose development is facilitated by the Science Park.

5.2. Practical implications

This study provides several practical implications for enhancing human resource management and growth strategies in Science Parks in emerging economies such as Vietnam. Firstly, Science Parks can attract talent from universities by offering funds for research facilities, attractive working conditions, and opportunities for undergraduate and graduate students in tenant firms. Additionally, conducting effective brand marketing and building prestigious branding can also make the environment in Science Parks more favorable for attracting talent. Secondly, this research confirms that knowledge acquired from universities can enable firms located in Science Parks to enhance their innovation capacity and competitive advantage. Thus, Science Park managers should encourage and foster more linkages between tenant firms, universities, and research centers by conducting frequent conferences and seminars for researchers to introduce new technologies and innovative ideas.

Thirdly, collaborations with external organizations like universities and research institutions can enhance tenant firms' capacity to acquire knowledge, enhancing innovation capacity and competitive advantage. Thus, Science Park managers should organize regular job fair events in collaboration with universities and institutes to increase the chance of recruiting excellent candidates

whose skills and knowledge can contribute to innovative activities. Moreover, they should establish collaborative partnerships with student offices to be an ambassador for students' goals and aspirations and spread information about science parks through social media. As a result, the Park will understand students' actual needs, contact current and prospective students in different regions or countries, and encourage them to seek appropriate jobs in the science park. Managers may also assist tenant firms in supporting local high schools to upgrade equipment and improve vocational training programs.

Finally, we have conducted in-depth interviews with the board management team of QTSC, and the results have demonstrated that companies at QTSC have shifted from business to talent. Digital transformation has raised the importance of attracting and retaining talent. QTSC works hard to internationalize its brand and spread information about its services, structures, innovative hubs, and research prospects for junior and senior personnel by utilizing its extensive network of contacts, the internet, and social media.

5.3. Limitations and directions for future research

This research poses several limitations that future studies can address. First, the study only emphasizes senior IT managers at firms located at two Science Parks with a limited sample size of 178 respondents. Thus, further data from other Science Parks is recommended to generate more comprehensive results. Second, while the current research focuses on IT firms in Vietnam, the findings may be limited to other sectors (e.g., manufacturing and services) since each industry has unique and distinct talent acquisition and management characteristics. To improve generalizability (external validity), future research may consider comparisons across sectors using multi-group SEM analysis. Third, while research indicates that cultural traits such as power distance are critical in managing talent and establishing an organization's competitive advantages, the current study does not consider this cultural perspective. This allows future studies to use cultural elements as moderators. This study only examines the consequences of the collaboration between universities and tenant firms. Thus, conducting empirical studies on the Partnership between tenant firms in the same Science Park and testing whether it can enhance firms' competitive advantage would be a promising research direction.

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