

The influence of innovative organizational culture on innovativeness in Thai SMEs: The mediating effects of human resource management and innovative skills

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Abstract: The purpose of this research was to investigate the influence of innovative organizational culture on innovativeness through human resource management and the innovative skills of personnel. The population of this study comprised small and medium enterprises (SMEs) in Thailand from both the manufacturing and service sectors. Purposive sampling was employed to gather information from entrepreneurs, executives, or department managers of SMEs through an online questionnaire distributed via email, obtaining a total of 440 responses. Data were analyzed using descriptive statistics and structural equation models (SEM) for hypothesis testing. The results indicated that SMEs in this context had a moderate level of innovative organizational culture, human resource management, innovative skills, and innovativeness. Moreover, the structural equation model was consistent with the empirical data, revealing that innovative organizational culture has a direct influence on innovativeness. Furthermore, human resource management and the innovative skills of personnel were found to be partial mediators in the relationship between innovative organizational culture and innovativeness. The indirect effect through these two variables was greater than the direct effect. These findings confirmed the relationship between innovative organizational culture, human resource management, innovative skills, and innovativeness among SMEs in Thailand, leading to guidelines for businesses to improve their innovativeness.

Keywords: innovative organizational culture; human resource management; innovative skill; innovativeness; SMEs

1. Introduction

Innovation is considered a key element in today's business landscape because it determines competitive advantage, leading to the survivability and profitability of organizations (Popa et al., 2017; Sulistyono and Siyamtinah, 2016), including both large-sized and small to medium-sized enterprises (SMEs) (Wahyono and Hutahayan, 2022). However, there is still uncertainty regarding innovation practices between developed and developing countries, as previous studies have often focused on innovations in developed countries and large companies (Arenhardt et al., 2018). In developing countries, SMEs play a crucial role in the economy. For Thailand, a developing country, SMEs are significant in terms of economic value and employment. Yet, they often face challenges with innovation, as personnel in SMEs typically lack the preparation and knowledge necessary to innovate, a common issue for smaller businesses struggling with innovativeness (Martínez-Román and Romero, 2017; Saunila, 2020), especially the financial infrastructure (Rillo and Ali, 2018). Because

innovating requires substantial organizational resources, favoring larger companies with capital and organizational resources (Narver and Slater, 1990). However, Chen (2017) contended that SMEs have an advantage in innovativeness due to their more dynamic capabilities, which are an organization's ability to sense, decide, adapt, and integrate available resources to respond to rapid changes in the business environment. Despite SMEs' dynamic capabilities, there is still a need to support their innovativeness in other dimensions. Previous studies have shown that organizational culture, defined as the shared values of organizational members, plays a critical role in an organization's ability to achieve its objectives and plans, implement change, and enhance efficiency (Cameron and Quinn, 2011; Hartnell et al., 2019; Shayah and Sun, 2019). Therefore, we believe that if organizations have a stable culture, especially an innovative organizational culture, it will influence organization's innovativeness. Yet, the gap is remaining in the conception of how innovative organizational culture influences innovativeness.

In the SME context, where many organizations are family businesses, entrepreneurs are key decision-makers driving the business (Frese, et al., 2007). Thus, creating an organizational culture is an entrepreneur's responsibility to establish operating models and guidelines for future change (D'Angelo et al., 2016). Most SMEs exhibit a hierarchical organizational culture, characterized by formality and a top-down leadership approach where the leader sets the direction and work processes (Asif and Sajjad, 2018). However, such a culture can hinder the development of long-term innovative capabilities within the organization (Al-Khatib et al., 2022). To foster innovativeness, organizational executives should cultivate a culture that encourages openness. Dobni (2008) introduced the concept of an innovative organizational culture, which promotes the innovative behavior of personnel by encouraging innovation-related activities across all levels. This type of culture facilitates openness to external opinions from customers or suppliers, adaptation to changing business environments, promotion of a collaborative working atmosphere, and the establishment of wider networks between organizations. Consequently, this culture enhances the organization's connections with its stakeholders, leading to a more open system. According to systems theory, the more open an organization is, the more capable it is of leveraging a diverse range of resources and perspectives, both internally and externally (Heiden et al., 2023).

Changes within organizations stem not only from entrepreneurs or executives but also from the personnel. It is crucial for the organization to have suitable personnel, as human resources are considered a significant capital asset with economic value. This human capital plays a key role in determining the organization's direction and can contribute to its success (Nazarian et al., 2017). Particularly in enhancing organizational innovative capabilities, personnel are pivotal in driving innovativeness (Noe et al., 2013). Therefore, organizations must prioritize human resource management at every stage. Furthermore, an organization with a stable culture influences the behavior of its personnel, including both existing and new members (Chan et al., 2004). Consequently, maintaining an innovative culture can assist the organization in fostering innovation through human resource activities, enabling the acquisition of personnel with the requisite innovative skills.

From the discussion above, considering the open system and human capital

development within an organization, it is hypothesized that human resource management and the innovative skills of personnel would mediate the relationship between innovative organizational culture and innovativeness. However, this hypothesis remains an unproven gap in existing research. To address this gap, this research aims to investigate the influence of innovative organizational culture on innovativeness, mediated by human resource management and the innovative skills of personnel. The findings are expected to be academically beneficial by confirming the mediating role of human resource management and innovative skills in the relationship between innovative organizational culture and innovativeness. Additionally, the results should prove useful in establishing an innovative organizational culture and human resource practices that enhance the appropriate innovative skills of personnel in SMEs, potentially leading to increased innovativeness in these enterprises.

The structure of this study comprises six parts. The theoretical background and hypothesis development are introduced in the next section. Part 3 encompasses the research methodology, including data collection, survey instruments, and data analysis. The findings from the investigation are presented in the fourth section, which includes descriptive analysis, confirmatory factor analysis, and structural equation modeling. The discussion appears in the fifth section. The study concludes with the final section, which provides the conclusion.

2. Theoretical background

2.1. Innovation and innovativeness

Innovation refers to the introduction of new ideas aimed at simplifying business outcomes, improving internal business processes, organizational structures, and creating new entities (du Plessis, 2007). Therefore, innovation can manifest as a product, service, process, marketing strategy, or organizational structure (Tidd et al., 2005). The capacity to create or implement innovation within any organization is contingent upon its innovativeness, which signifies the organization's ability to initiate or adopt innovation in its business operations. Innovativeness precedes innovation (Hult et al., 2004). Rutherford and Holt (2007) identified two dimensions of innovativeness: organizational innovativeness, which is the propensity of the organization to engage in and support new ideas or entities, and individual innovativeness, characterized by inventive behavior and acceptance of innovation by individuals, reflected through their personality traits (Yuan and Woodman, 2010). However, the direction of change in an organization's behavior is influenced by its personnel. Leonard-Barton and Deschamps (1988) observed that organizations with a high level of innovative personnel tend to exhibit greater innovativeness, leading to the adoption of new technology.

2.2. Innovative organizational culture

Organizational culture comprises a system of collective actions, shared values, and beliefs that originate within an organization and influence its members' behavior (Schermerhorn et al., 2002). Establishing organizational culture is a strategic approach for controlling and determining the behavioral norms that people within the

organization follow (Schein, 2017). Additionally, Dobni (2008) introduced the concept of innovative organizational culture, which encompasses four dimensions to foster innovation within the organization. The first dimension, innovation intention, refers to the motivation among personnel to generate innovation. The second, innovation infrastructure, pertains to the organizational structures that support innovative efforts. The third, innovation influence, involves motivating employees to embrace and support the thoughts and actions necessary for innovation. Finally, innovation implementation is the creation of a business environment or context that nurtures innovation.

2.3. Human resource management (HRM)

Human resource management (HRM) is a crucial function in every organization, as humans are valuable resources capable of creating value for organizational success. It involves practices, processes, or systems related to managing the organization's human capital, enabling the efficient and effective utilization of personnel to achieve organizational goals (Armstrong, 2006; Mondy et al., 1999). In innovation-driven organizations, HRM may assume distinctive roles (Cao et al., 2021). To foster innovation, organizations should recruit and select personnel with appropriate skills, avoiding the hiring of individuals who merely mirror the characteristics of existing staff, as this can stifle new ideas and hinder innovation (Gittell, 2000). There should be training and development programs to enhance the knowledge and skills of personnel, thereby promoting greater innovation within the organization (Berber and Lekovic, 2018; Dostie, 2017). Moreover, performance evaluation is essential for continuous improvement and mitigating factors that negatively affect work performance (Aminuddin, 2018). Additionally, offering rewards and appropriate compensation can motivate personnel to exhibit innovative behaviors (De Clercq et al., 2016).

2.4. Innovative skill

Skill refers to the practical abilities or expertise acquired through learning, practice, or collaboration, necessary for task completion (Lertpiromsuk et al., 2022). Innovative skills, therefore, denote the expertise or capability to generate innovations. Academics have generally classified the skills influencing innovation into two categories (Ciarli et al., 2021; Hendarman and Cantner, 2018; Maduko and Puche, 2020; Sopa et al., 2020; Torres et al., 2020). The first category, hard skills, encompasses the technical abilities required for work, which can be acquired through formal education in educational institutions and informal education like personnel training and development (Rainsbury et al., 2002). The second category, soft skills, are interpersonal abilities crucial for fostering relationships within the organization, often tied to specific job duties and akin to personality traits that may evolve slowly (Cimatti, 2016; Gutman et al., 2014; Robles, 2012; Weber et al., 2012). These skills are essential for organizations to consider when evaluating existing or prospective members. Research has identified five critical skills for fostering innovation: communication skills, which facilitate idea exchange within the organization; critical thinking skills, involving the evaluation of problems and improvement of work

processes; collaboration skills, leading to effective teamwork and openness to others' opinions, thereby enhancing knowledge and perspective sharing; creativity skills, the ability to engage in a creative process to produce unique and innovative outcomes; and technical skills, related to the capacity to perform job-specific tasks efficiently using relevant tools and technology (Birdi et al., 2016; Hero et al., 2017; Hendarman and Cantner, 2018; Indrawati, 2021; Maduko and Puche, 2020).

2.5. Theoretical framework and hypothesis development

Organizational culture significantly influences the work roles, values, beliefs, attitudes, systems, and rules of personnel within an organization, making it a crucial element in fostering business innovation (Xie et al., 2016; Zheng et al., 2018). Previous research has confirmed that organizational culture positively affects organizations' innovativeness and innovation performance (Adelekan, 2016; Al-Khatib et al., 2022; Apsalone, 2018; Okatan and Alankus, 2017). Moreover, establishing a robust organizational culture is a key strategy for implementing innovative ideas, as it shapes employee behavior. When organization members understand and embrace an innovative culture, they are likely to find direction in their work, strive for improvement, and become more initiative-driven and creative (Rodzalan and Saat, 2013; Sabri et al., 2015; Yu, 2017). Consequently, employees in successful organizations tend to develop a broad range of skills crucial for innovation (Tomongkhon, 2022). Furthermore, Stone-Romero and Stone (2008) and Hartnell et al. (2019) observed that organizational culture influences human resources practices throughout the organization. This connection between organizational culture and HRM is also supported by Botelho (2020), Linh Huynh et al. (2020), Pandey (2020), Park and Doo (2020), and Chioma (2021). Therefore, a well-defined, innovative culture within an organization can enhance innovativeness, innovative skills, and HRM practices. Based on these insights, the following hypotheses can be proposed:

- H1: Innovative organizational culture is positively related to innovativeness
- H2: Innovative organizational culture is positively related to innovative skills of personnel
- H3: Innovative organizational culture is positively related to human resource management

In developing an innovative framework for an organization, reliance on existing human capital is essential. HRM plays a crucial role in recruitment, selection, and appraisal processes, key to enhancing and perfecting existing human capital in support of innovation activities (Hung et al., 2016). An organization that values human resources and adheres to effective HR practices will see its employees more motivated and satisfied, leading to their development and promoting efficiency. According to previous research (Alsabbah and Ibrahim, 2014; Okay-Somerville and Scholarios, 2018; Otoo, 2019), HRM significantly impacts the innovative skills of personnel within the organization. Furthermore, HRM influences changes in employees' attitudes, abilities, and behaviors, aligning them with organizational goals. Establishing innovative goals alongside human management practices supportive of innovation can enhance organizational innovativeness, as evidenced by studies showing a positive relationship between HRM and innovativeness (Cao et al., 2021;

Capelleras et al., 2021; Raj and Srivastava, 2014; Vanhala and Ritala, 2016). Therefore, HRM is vital as it facilitates the acquisition of appropriately skilled personnel and shapes work behavior to drive organizational innovation (Noe et al., 2013). Consequently, we propose the following hypotheses:

- H4: Human resource management is positively related to innovative skills of personnel
- H5: Human resource management is positively related to innovativeness

To promote innovation within an organization, it is essential to prioritize personnel, as they are the primary drivers of the organization. Therefore, the organization requires personnel with the necessary knowledge, abilities, and skills. Without the capability to transform ideas into practice, the innovative performance of the organization will not materialize (Birdi et al., 2016). Personnel with innovative skills are thus seen as a key factor in enhancing the organization's innovativeness, consistent with previous research indicating that an organization's innovativeness is influenced by the innovative skills of its personnel (Hendarman and Cantner, 2018; Maduko and Puche, 2020; Sopa et al., 2020). Following these studies, the following hypothesis is proposed:

- H6: Innovative skills of personnel are positively related to innovativeness

Based on the hypothesis development above, we can propose the theoretical framework as shown in **Figure 1**.

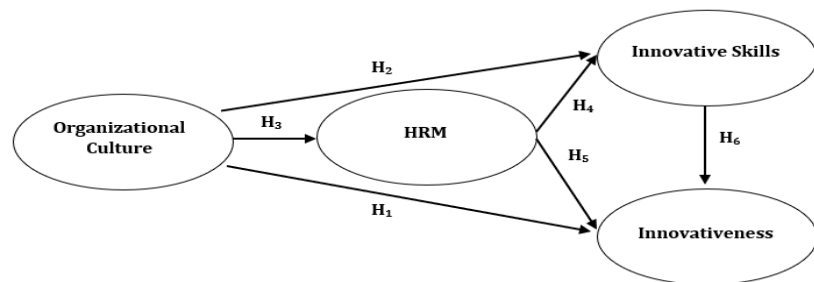


Figure 1. Theoretical framework.

3. Methodology

3.1. Sample and data collection

This study collected data from Thai SMEs in the manufacturing and service sectors. We selected these sectors because they are pivotal in driving innovation and creating economic value for Thai SMEs (Mora-Esquivel et al., 2018). Together, these sectors comprise 1,815,450 businesses, accounting for 57.12% of Thai SMEs and generating 78 percent of Thai SMEs' GDP (Office of Small and Medium Enterprise Promotion [OSMEP], 2022). A purposive sampling method was used, selecting SMEs from the OSMEP database. Questionnaires were emailed to 9,468 accounts, and the respondents were required to be owners, executives, or department managers of the SMEs.

We received 521 completed questionnaires, of which 440 were complete and valid for data analysis, resulting in a valid response rate of 4.65 percent. To address non-response bias, the data were divided into two groups of 50 each, based on the

response time to the questionnaire: the fastest and the slowest responders. This division was based on the assumption that the characteristics of non-respondents would be similar to those who responded later (Armstrong and Terry, 1977). A t-test revealed no significant difference between the two groups at the 0.05 significance level, indicating no bias in the study. Finally, the total number of observations met the requirements for structural equation modeling as specified by Hair et al. (2010), with more than 310 observations or five times the number of observed variables, given that this study had 62 observed variables.

3.2. Survey instrument

The survey's questionnaire was developed based on prior studies and its reliability was assessed using item-objective congruence (IOC) verification by six SME entrepreneurs from both the manufacturing and service sectors. Reliability was further confirmed through Cronbach's alpha, based on 30 samples, demonstrating high internal consistency with a range of 0.814 to 0.931, exceeding the recommended threshold of 0.70 (Nunnally, 1978). The questionnaire consists of two parts: the first section gathers respondent information, whereas the second section includes 12 items on innovative organizational culture, 15 on HRM, 15 on innovative skills, and 20 on innovativeness. The innovative organizational culture section, adapted from Dobni (2008), includes items on innovation intention, infrastructure, influence, and implementation. The HRM section covers recruitment and hiring, selection process, training and development, performance appraisals, and reward and compensation, with items adapted from Amin et al. (2013) and Saifalislam et al. (2014). The innovative skills section, comprising communication, critical thinking, collaboration, creativity, and technical skills, was adapted from Ngoo et al. (2015), Hecklaue et al. (2016), Kelly et al. (2019), and Martins-Pacheco et al. (2020). The innovativeness section was based on Hurt et al. (1977). Responses are measured on a 7-point scale, from 1 (strongly disagree) to 7 (strongly agree). The items were shown in the Appendix.

3.3. Data analysis

Descriptive statistics, such as frequency and percentage, were used to summarize the respondents' information. Meanwhile, mean and standard deviation were employed to assess the levels of innovative organizational culture, HRM, personnel's innovative skills, and the innovativeness of SMEs. The average scores were categorized into seven equal-sized groups: very low level (1.00–1.85), low level (1.86–2.71), slightly low level (2.72–3.57), moderate level (3.58–4.43), slightly high level (4.44–5.29), high level (5.30–6.15), and very high level (6.16–7.00). Confirmatory factor analysis (CFA) was conducted to ascertain the reliability and validity of the measurement models, whereas structural equation modeling (SEM) with AMOS software was used for hypothesis testing.

4. Result

4.1. Respondent’s Information

Of the 440 valid responses, most respondents were entrepreneurs or business owners (67.95%), followed by executives or managers (32.05%). A significant portion of the enterprises has been operating for 5–10 years (29.09%), with the next largest group for 10–15 years (25.00%). The majority are located in the Bangkok Metropolitan Region (48.41%), with the Northeastern region accounting for 12.50%. The service sector represents the largest share of enterprises (64.77%), followed by the manufacturing sector (35.23%). Among these, a predominant number are small enterprises (95.91%).

Within the service sector, a majority (82.11%) are engaged in commercial business, tourism and leisure, transport, and logistics, with real estate and construction industries accounting for 9.47%. In the manufacturing sector, the largest proportion operates in the agricultural and food industry (38.07%), followed by the consumer goods industry (32.90%). Descriptive statistics on Thai SMEs are presented in **Table 1**.

Among the four variables examined in this research, HRM attained the highest level among Thai SMEs, with a mean score of 4.386 and a standard deviation of 0.856 (**Table 1**). This was closely followed by innovative skills, which had a mean of 4.346 and a standard deviation of 0.827. Innovativeness ranked third, with a mean of 4.097 and a standard deviation of 0.900. The lowest score was for innovative organizational culture, with a mean of 4.038 and a standard deviation of 0.915. However, all variables were categorized as being at a moderate level.

Table 1. Descriptive statistics.

Construct	Mean	S.D.	Level
Innovative Organizational Culture	4.038	0.915	Moderate
Innovation intention	4.000	0.931	Moderate
Innovation infrastructure	3.714	0.974	Moderate
Innovation influence	4.310	0.923	Moderate
Innovation implementation	4.129	0.997	Moderate
Human Resource Management	4.386	0.857	Moderate
Recruitment and hiring	4.257	0.986	Moderate
Selection process	5.123	0.868	Slightly high
Training and development	4.319	1.003	Moderate
Performance appraisals	3.821	0.988	Moderate
Reward and Compensation	4.422	0.909	Moderate
Innovative Skills	4.346	0.827	Moderate
Communication skills	3.910	1.035	Moderate
Critical thinking skills	3.862	0.985	Moderate
Collaboration skills	5.469	0.737	Slightly high
Creativity skills	4.130	0.931	Moderate
Technical skills	4.361	0.844	Moderate
Innovativeness	4.097	0.900	Moderate

4.2. Measurement model

Table 2. Confirmatory factor analysis results.

Construct	Factor loading range	α	CR	AVE
Innovative Organizational Culture	0.985–0.998	0.963	0.993	0.980
Innovation infrastructure (IIF 1–3)	0.823–0.865	0.885	0.886	0.722
Innovation influence (IFL 1–3)	0.836–0.869	0.889	0.883	0.716
Innovation implementation (IIM 1–3)	0.887–0.911	0.930	0.930	0.815
Human Resource Management	0.870–0.994	0.956	0.978	0.898
Recruitment and hiring (RH 1–3)	0.738–0.899	0.852	0.739	0.586
Selection process (SP 1–3)	0.796–0.884	0.883	0.888	0.727
Training and development (TD 1–3)	0.689–0.813	0.827	0.785	0.550
Performance appraisals (PA 1–3)	0.699–0.831	0.815	0.797	0.568
Reward and Compensation (RC 1–3)	0.810–0.920	0.886	0.915	0.782
Innovative Skills	0.901–0.976	0.962	0.975	0.886
Communication skills (CMS 1–3)	0.819–0.907	0.905	0.906	0.763
Critical thinking skills (CTS 1–3)	0.815–0.908	0.902	0.899	0.748
Collaboration skills (CLS 1–3)	0.698–0.879	0.816	0.809	0.588
Creativity skills (CRS 1–3)	0.816–0.896	0.861	0.891	0.732
Technical skills (TCS 1–3)	0.765–0.824	0.841	0.860	0.673
Innovativeness (INV 1–20)	0.707–0.912	0.977	0.999	0.677

Table 3. Discriminant validity.

Construct	1	2	3	4
1. Innovative Organizational Culture	0.990			
2. Human Resource Management	0.523	0.948		
3. Innovative Skills	0.557	0.554	0.941	
4. Innovativeness	0.693	0.678	0.692	0.823

Note: The squared root of AVE is shown on the diagonal in bold.

In examining the SEM assumptions, it was discovered that the innovation intention, a second-order latent variable within the innovative organizational culture construct, exhibited negative variances. Consequently, this variable was removed from the model for failing to meet the requisite assumptions. The CFA results (**Table 2**) indicated that the factor loadings for all constructs exceeded the recommended threshold of 0.6 (Hair et al., 2010). Composite reliability (CR) measures for the constructs were above the recommended level of 0.70 (Zeller and Carmines, 1980), and Cronbach’s Alpha values were also above 0.7, meeting the standard set by Nunnally (1978). This confirms the reliability of the measurement model. Regarding validity, convergent validity was assessed using Average Variance Extracted (AVE), with results showing that the AVE for all constructs surpassed the critical level of 0.5 (Fornell and Larcker, 1981). Discriminant validity was evaluated by comparing the square root of AVE with the correlation coefficient between constructs. All constructs demonstrated a square root of AVE higher than the correlation coefficients, as

highlighted in the diagonal and shown in bold in **Table 3**, affirming the validity of the measurement model.

4.3. Structural model

The hypotheses were tested using SEM, and the assessment of the structural model indicated an acceptable fit. The model fit was evaluated using various adequacy indices: $\chi^2/df = 1.810 (< 3.00)$, $GFI = 0.809 (\geq 0.80)$, $NFI = 0.900 (\geq 0.90)$, $IFI = 0.952 (\geq 0.90)$, $TLI = 0.948 (\geq 0.90)$, $CFI = 0.952 (\geq 0.90)$, and $RMSEA = 0.043 (< 0.08)$, with recommended fit statistics shown in parentheses. All indices met the established criteria, confirming the model's adequacy (Hair et al., 2014). Therefore, the proposed model, comprising four constructs, was confirmed and used for hypothesis testing (**Figure 2**).

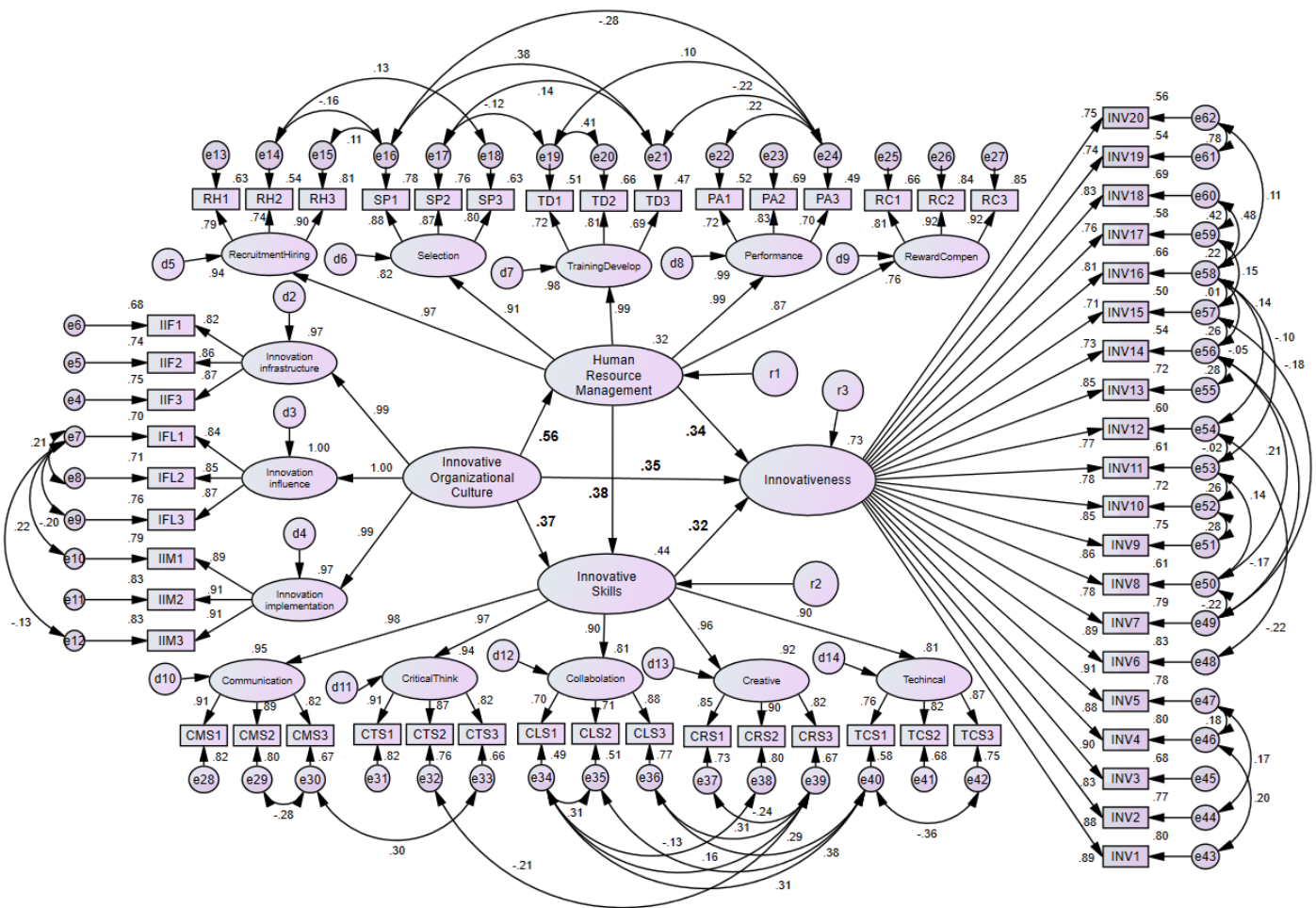


Figure 2. Structural model results.

Based on **Table 4** of the hypothesis testing result, innovative organizational culture was found to significantly influence innovativeness ($\beta = 0.347, p < 0.001$), innovative skill ($\beta = 0.371, p < 0.001$), and HRM ($\beta = 0.562, p < 0.001$), thus supporting hypotheses H1, H2, and H3, respectively. Additionally, HRM significantly positively affects innovative skills ($\beta = 0.341, p < 0.001$) and innovativeness ($\beta = 0.378, p < 0.001$), confirming hypotheses H4 and H5. Furthermore, hypothesis H6 was supported, indicating a positive association between innovativeness and innovative

skill ($\beta = 0.317, p < 0.001$). The analysis also revealed that control variables had no influence on innovativeness at the 0.05 significance level.

Table 4. Results of hypothesis testing.

Path	β	p-value	Hypothesis testing
Innovative Organization culture → Innovativeness	0.347	<0.001	Support H1
Innovative Organization culture → Innovative skills	0.371	<0.001	Support H2
Innovative Organization culture → HRM	0.562	<0.001	Support H3
HRM → Innovative skill	0.341	<0.001	Support H4
HRM → Innovativeness	0.378	<0.001	Support H5
Innovative skill → Innovativeness	0.317	<0.001	Support H6

According to the results of the path analysis, the direct effect (DE), indirect effect (IE), and total effect (TE) of the causal relationships within the model, which comprised four confirmed constructs in which no item was eliminated as already described in **Table 2**, and also shown in **Figure 2**, were examined (**Table 5**). The analysis revealed that HRM and innovative skills serve as partial mediators in the relationship between innovative organizational culture and innovativeness in SMEs. These two variables were identified as significant mediators in the relationship between innovative organizational culture and innovativeness among Thai SMEs, with the indirect effects through these variables on innovativeness being more substantial than the direct effect of innovative organizational culture alone. Additionally, the model accounted for 31.6% of the variance in HRM, 43.7% in innovative skill, and 72.5% in innovativeness.

Table 5. Results of path analysis.

Exogenous variables	Effect	Endogenous variables		
		HRM	Innovative skill	Innovativeness
Innovative organization culture	DE	0.562**	0.371**	0.347**
	IE	-	0.212**	0.376**
	TE	0.562**	0.583**	0.723**
HRM	DE	-	0.378**	0.341**
	IE	-	-	0.120*
	TE	-	0.378**	0.461**
Innovative skill	DE	-	-	0.317**
	IE	-	-	-
	TE	-	-	0.317**
R^2		0.316	0.437	0.725

Note: ** $p < 0.01$, * $p < 0.05$

5. Discussion

The descriptive analysis results indicated that Thai SMEs exhibit the highest level of HRM, followed by innovative skills, innovativeness, and innovative organizational culture, all of which are at a moderate level. This suggests that Thai SMEs may face

challenges in fostering innovative activities. Consistent with this observation, Manae and Pitchayadol (2020) noted that Thai SMEs often encounter innovation-related problems due to financial, technological, and human resource limitations (Bartik, 2020). The small structure of SMEs, often driven by their entrepreneurs who are the primary decision-makers, may hinder collaboration and the creation of a creative environment, thereby impeding innovation within the workplace. Furthermore, the structural equation modeling results demonstrated that innovative organizational culture directly influences innovativeness and also has an indirect effect through HRM and the innovative skills of personnel. These findings align with all the developed hypotheses and can be discussed as follows:

This finding underscores that an innovative organizational culture is positively related to innovativeness, corroborating the findings of previous research (Adelekan, 2016; Apsalone, 2018; Al-Khatib et al., 2022; Okatan and Alankus, 2017; Raj and Srivastava, 2014). Since organizational culture influences the ideas and behaviors of individuals within an organization, a culture geared towards innovation can motivate employees to take initiative. Dobni et al. (2022) highlighted that organizations with high innovation levels are more likely to engage in culture management, which in turn promotes innovativeness. The study also found that an innovative organizational culture positively associates with the innovative skills of personnel, suggesting that when organizational culture is innovative, employees are likely to develop skills that align with innovative work practices. This relationship was echoed in previous studies (Rodzalan and Saat, 2013; Sabri et al., 2015; Yu, 2017), which found that organizational culture fosters personnel's innovative skills. Additionally, the research identified a direct positive effect of innovative organizational culture on HRM, indicating that such a culture enhances human resource practices through active personnel involvement. This finding is consistent with earlier research that identified a link between organizational culture and HRM in various countries and larger companies (Botelho, 2020; Chioma, 2021; Linh Huynh et al., 2020; Park and Doo, 2020; Pandey, 2020). However, it contrasts with the study by Kunkeaw et al. (2022), which did not find a significant influence of organizational culture on green human resource practices in Thailand. This discrepancy may be attributed to the different focus of green HRM on sustainability, whereas innovative HRM emphasizes responsiveness to innovation.

The analysis revealed a positive influence of HRM on innovativeness, corroborating the findings of Raj and Srivastava (2014), Vanhala and Ritala (2016), Capelleras et al. (2021), and Cao et al. (2021). This positive impact suggests that HRM contributes to changing the attitudes, abilities, and behaviors of personnel, thereby facilitating the achievement of innovation goals within organizations. This contrasts with the study by Donate et al. (2015), which found no direct influence of HRM on innovativeness but noted an indirect effect through human and social capital. However, this still aligns with the current study's findings regarding HRM's impact on innovative skills, highlighting HRM's role in enhancing an organization's human capital, not only through recruitment but also through the development of existing personnel. As organizations prioritize HRM, they cultivate a more skilled workforce, a finding echoed by Alsabbah and Ibrahim (2014), Okay-Somerville and Scholarios (2018), Otoo (2019), and Park et al. (2023). Furthermore, the study confirms that the

innovative skills of personnel influence organizational innovativeness, aligning with previous research (Letonja et al., 2016; Hendarman and Cantner, 2018; Maduko and Puche, 2020; Sopa et al., 2020). Personnel with innovative skills enhance innovative work behavior, such as group communication, teamwork, and co-creation of new ideas, contributing to the organization's overall innovativeness.

6. Conclusion

This research aimed to explore the relationship between innovative organizational culture, HRM, innovative skills, and innovativeness in Thai SMEs. Data were gathered from 440 SMEs in the manufacturing and service sectors via an online questionnaire and analyzed using descriptive statistics and SEM. The findings indicated that all four variables were at a moderate level. The structural model developed through this research demonstrated that innovative organizational culture, HRM, and innovative skills are crucial in enhancing innovativeness in SMEs. The study presents theoretical implications, managerial implications, and limitations as follows.

6.1. Theoretical implications

The findings reinforce the view that innovative organizational culture, HRM, and innovative skills are essential for enhancing an organization's innovativeness. This study confirmed that the interplay of these elements could be activated in SMEs, paralleling findings in larger enterprises from previous research. Additionally, it was observed that an innovative organizational culture in Thai SMEs encompasses three components: innovation infrastructure, influence, and implementation, differing from Dobni's (2008) model. It is inferred that an innovative organizational culture fosters an organization's ability to innovate by enhancing connectivity among stakeholders and fostering a more open organizational environment. This aligns with systems theory, which posits that increased openness in an organization facilitates the utilization of diverse resources and perspectives, thereby augmenting innovative capabilities (Heiden et al., 2023). Moreover, the study identified that HRM and personnel's innovative skills significantly impact the relationship between innovative organizational culture and the innovative capabilities of SMEs, supporting human capital theory. This theory suggests that human resources, as a critical organizational asset, gain economic value through the enhancement of knowledge, skills, abilities, experience, and the motivation of personnel to contribute to organizational success (Nazarian et al., 2017; van den Broek, 2024; Zhang and Li, 2016).

6.2. Managerial implications

Entrepreneurs and executives of SMEs should systematically manage HRM by aligning recruitment or transfer of personnel with their capabilities and job requirements, conducting regular performance appraisals, and creating training programs to enhance work abilities. Moreover, fostering an innovative organizational culture is crucial, which can be achieved by establishing an organizational structure with an innovation leader to act as a role model and promote broader adoption of innovative practices. Agencies promoting innovation in SMEs should develop policies

or strategies to enhance innovative capabilities, such as facilitating events for knowledge exchange on innovation, enhancing enterprise-partner relations, and implementing mandatory policies for enterprises resistant to change. These actions could foster a culture and practices centered on innovation, leading to improved organizational innovation behavior. Although this research was conducted in the context of SMEs in Thailand, the implication can be applied to other countries, especially developing countries where SMEs play a huge role in driving the economy.

6.3. Limitations and further research

Future studies should investigate additional factors influencing innovative organizational culture, HRM, and innovative skills to further enhance the innovative culture and HR strategy, potentially boosting organizational competitiveness and performance. This study encountered limitations due to the predominance of small enterprise respondents; future research should aim to include a balanced sample of medium-sized enterprises for a more representative view of SMEs. Additionally, this research was conducted using quantitative methods. Future studies should consider qualitative approaches, such as in-depth interviews or focus groups with SME entrepreneurs or executives and innovation-promoting agencies, to gain more comprehensive insights that could better facilitate SME innovation.

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Appendix

Table A1. Items of measures.

Innovative organizational culture	
Innovation intention	
IIT1:	My organization demonstrates a willingness to drive innovation
IIT2:	My organization has established innovation goals
IIT3:	My organization's personnel can make their own decisions under the responsibilities
Innovation infrastructure	
IIF1:	My organization has a structure or positions to encourage innovation
IIF2:	My organization has leaders with appropriate qualifications to drive innovation
IIF3:	My organization has a work environment that is conducive to working together to co-innovate
Innovation influence	
IFL1:	My organization's personnel are well aware that innovation could affect business performance
IFL2:	My organization recognizes which products or services can be improved or developed to create greater benefits
IIM3:	My organization implies innovation for works
IIM4:	My organization encourages others to imply innovation for works
Human Resource Management	
Recruitment and hiring	
RC1:	My organization recruited personnel from appropriate external sources
RC2:	My organization transfers personnel from within the organization to suit the job
RC3:	My organization has specified the qualifications of applicants
Selection process	
SP1:	My organization has a transparent and fair method for selecting new personnel
SP2:	My organization assigns people with experience, and knowledge to select new personnel
SP3:	My organization selects new personnel who have appropriate knowledge, abilities, and attitudes.
Training and development	
TD1:	My organization has organized a training program, in which personnel can improve their performance.
TD2:	My organization provides opportunities for personnel to practice a variety of knowledge, skills, and abilities.
TD3:	My organization supports personnel to pursue higher education
Performance appraisals	
PA1:	My organization has set operational goals
PA2:	My organization uses performance reports as a deciding factor for salary increases and promotion
PA3:	My organization encourages personnel to participate in joint performance appraisals.
Rewarding and Compensation	
RC1:	My organization provides compensation according to the abilities of personnel
RC2:	My organization provides other compensation besides salary, such as allowances and overtime
RC3:	My organization provides appropriate benefits such as medical expenses and vacation days
Communication skills	
CMS1:	My organization's personnel can communicate their ideas clearly
CMS2:	My organization's personnel can negotiate and influence teammate to follow their opinion.
CMS3:	My organization's personnel can use language effectively in communication (in Thai, English, or other languages).

Table A1. (Continued).

Human Resource Management	
Critical thinking skills	
CTS1:	My organization's personnel can identify and analyze problems in complex situations.
CTS2:	My organization's personnel can think outside the box
CTS3:	My organization's personnel can reasonably evaluate the usefulness, accuracy, and reliability of information
Collaboration skills	
CLS1:	My organization's personnel interact well with others
CLS2:	My organization's personnel respect the attitudes, behaviors, and beliefs of others.
CLS3:	My organization's personnel can coordinate collaboration between groups
Creativity skills	
CRS1:	My organization's personnel always improve their operations to be more efficient
CRS2:	My organization's personnel can brainstorm to develop new ideas
CRS3:	My organization's personnel can solve problems that arise in a variety of ways
Technical skills	
TCS1:	My organization's personnel can perform their duties efficiently in all their work processes.
TCS2:	My organization's personnel can use information technology for data analysis such as programming
TCS3:	My organization's personnel can response to the cutting-edge technology such as Cloud systems, AI
Innovativeness	
INV1:	My organization is willing to try new inventions or new idea
INV2:	My organization is willing to use a new way of doing things, even if the results are not yet visible to other organizations
INV3:	My organization believes that new ideas are better even though most of the other organization still does not accept
INV4:	My organization dares to embrace new ideas.
INV5:	My organization can be a pioneer in using innovation, or following new idea
INV6:	My organization trusts emerging ideas.
INV7:	My organization often be the first in their group to adopt new things compared to other organizations in their industry
INV8:	My organization believes that the modern way operating process is the best approach
INV9:	My organization is a creative organization.
INV10:	My organization is an initiative organization
INV11:	My organization is always searching for new ways to do something
INV12:	My organization enjoys trying new working processes
INV13:	My organization often encourages personnel to express innovative ideas.
INV14:	My organization is open to the expression of diverse opinions
INV15:	My organization often comes up with new ways of working, when the old way has problems
INV16:	My organization is an organization that influences other organizations
INV17:	Other organizations often ask your organization for advice about their work
INV18:	My organization often participates in joint decision-making with other organizations in the industry
INV19:	My organization is challenged by an unanswered question in running a business
INV20:	My organization is challenged by ambiguities and unsolved problems in running a business
