How Flexibility-Oriented HRM Systems Foster Innovation : The Key Role of Absorptive Capacity

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ABSTRACT

Flexibility has long been recognized as a key characteristic of effective HRM systems, yet empirical evidence regarding its outcomes—particularly in relation to innovation—remains limited. Drawing on dynamic capabilities theory, this study develops and tests a model examining the impact of flexibility-oriented HRM (FHRM) systems on firms' innovation performance through absorptive capacity. The empirical analysis is based on data collected from 210 managers of SMEs operating in the electrical and mechanical industries in Tunisia. The findings highlight distinct effects of FHRM on the two dimensions of absorptive capacity—potential and realized AC. Moreover, the results show that absorptive capacity partially mediates the relationship between flexibility-oriented HRM systems and innovation performance. These findings extend theoretical understanding of HRM as an organizational antecedent of absorptive capacity and underline its strategic role in shaping innovation outcomes. The paper concludes with a discussion of theoretical and managerial implications, as well as limitations and directions for future research.

Keywords : Flexibility-oriented HRM system, Potential absorptive capacity, Realized Absorptive capacity, Performance innovation.

How flexibility-oriented HRM systems foster innovation : the key role of absorptive capacity

INTRODUCTION

Firms today operate in an exceptionally turbulent environment characterized by intense competition and rapid technological change (Teece, 2007; Chang et al., 2013; Distel, 2019; Angel Martínez-Sánchez et al., 2020). In response to this dynamic context, they must innovate to ensure their survival and maintain their competitive advantages (Liao et al., 2018; Distel, 2019). Within this perspective, several studies highlight the central role played by external knowledge sources in fostering innovation and sustaining a durable competitive advantage (Grant, 1996; Lichtenthaler, 2009; Distel, 2019; Lau & Lo, 2019; Elidjen et al., 2025).

To be innovative, firms must have trained employees capable of adapting to environmental changes, as well as continuously updated knowledge portfolios derived from internal R&D or external sources. Absorptive capacity (AC) thus emerges as a critical element: it enables the identification, assimilation, transformation, and exploitation of valuable external knowledge, thereby enhancing product innovation and, more broadly, organizational performance (Elidjen et al., 2025; Alok Kumar Singh et al., 2023). Cohen and Levinthal (1990) clearly asserted that a firm's innovation performance depends on its absorptive capacity. They define it as "the ability to recognize the value of new information, assimilate it, and apply it to commercial ends." Absorptive capacity therefore represents a key mechanism through which firms can fully benefit from external knowledge opportunities and strengthen their innovation potential. Cohen and Levinthal (1990) were also explicit in stating that organizational mechanisms—such as human resource practices—are important determinants of absorptive capacity (Jansen et al., 2005; Chang et al., 2013; Distel, 2019). Indeed, human resource (HR) practices constitute an effective lever not only to enhance the acquisition and use of knowledge within the firm but also to develop

organizational learning capacity (Lado & Wilson, 1994) and to generate competitive advantage (Lado & Wilson, 1994; Daghfous, 2004).

At the same time, HRM research has often examined the effect of individual HR practices on firm performance. However, studying HR systems—coherent sets of mutually reinforcing HR practices—is likely to provide stronger support for performance outcomes than investigating practices individually (Kehoe & Wright, 2013; Ben Guedria et al., 2025). These systems strengthen employees' abilities and motivation and contribute significantly to absorptive capacity (Roy, 2018; Ben Guedria et al., 2025). In the existing literature, there remains limited understanding of how HR systems influence innovation performance and of the role of absorptive capacity in this relationship (Soo et al., 2017). Martínez-Sánchez et al. (2021) emphasized that firms must be sufficiently flexible and innovative to remain competitive. They highlight that flexibility and innovation should be central topics in labor relations, particularly in industries such as the automotive sector. HR flexibility provides employees with the skills necessary to improve operations and integrate new knowledge, while absorptive capacity helps firms remain technologically up-to-date and responsive to market changes. However, the literature has devoted limited attention to the relationship between HR flexibility and absorptive capacity (Chang et al., 2013; Ben Guedria et al., 2025; Soo et al., 2017; Martínez-Sánchez et al., 2021).

In this study, we focus on flexibility-oriented HRM (FOHRM) as an HRM system that enables firms to cope with environmental instability by enhancing organizational flexibility (Chang et al., 2013). Chang et al. define FOHRM as "a set of internally consistent HR practices that enable a firm to acquire and develop human resources for a wide range of alternative uses and to redeploy these resources quickly and efficiently" (Chang et al., 2013, p. 1928). These authors identify two subsystems within FOHRM.
The **resource-flexibility-oriented HRM subsystem (RFOHRM)** refers to HR practices that allow a firm to acquire and develop human resources for multiple alternative uses (e.g., extensive training beyond basic job requirements, job rotation). This subsystem facilitates the development of flexible human resources (Wright & Snell, 1998).

The **coordination-flexibility-oriented HRM subsystem (CFOHRM)** refers to HR practices that collectively enable the rapid and efficient redeployment of human resources (e.g., participative management, group-based compensation and performance evaluation). This subsystem facilitates the swift redeployment of human resources (Wright & Snell, 1998). Chang et al. (2013) demonstrated how FOHRM can foster the development of absorptive capacity. However, they did not specifically examine potential and realized absorptive capacity as mediating mechanisms linking FOHRM to firms' innovation performance (Soo et al., 2017).

This research seeks to address this gap by examining the effect of FOHRM on innovation performance as well as the mediating role of potential and realized absorptive capacity. It is particularly relevant to study these sub-dimensions given that the literature reports different outcomes regarding the distinct roles of potential and realized absorptive capacity. Drawing on prior research, we make three major contributions to the understanding of absorptive capacity in the development of firms' innovation performance. First, we contribute to the absorptive capacity literature by identifying flexibility-oriented HRM as a key organizational antecedent. Second, we help address the theoretical limitation of studying HR practices in isolation. Third, we extend existing knowledge on the impact of HR systems on organizational outcomes (innovation performance). Furthermore, our study enhances understanding of the role of absorptive capacity as the mechanism through which FOHRM contributes to firms' innovation performance—one of the central contributions of this research.

Building on existing literature, this study seeks to fill this gap by addressing the following research questions:

1. **1.1 Does flexibility-oriented HRM influence potential absorptive capacity?**

1.2 Does flexibility-oriented HRM influence realized absorptive capacity?

2. 2.1 **Does potential absorptive capacity enhance innovation performance?**

2.2 **Does realized absorptive capacity enhance innovation performance?**

3. **Does absorptive capacity strengthen the relationship between FOHRM and innovation performance?**

To answer these questions, we conducted a quantitative survey using a questionnaire measuring our variables among 210 managers in Tunisian firms operating in the electronics and electrical sectors. The collected data were analyzed using the structural equation modeling (SEM) method.

To provide answers to our research questions, the remainder of this paper is structured as follows: the first section presents the theoretical framework and hypotheses. The second section describes the empirical methodology. The third section presents the main findings of the empirical study. Finally, we discuss the results.

Theoretical Foundation and Hypotheses Development

The resource-based view of the firm (RBV) and the dynamic capabilities perspective are frequently mobilized organizational theories supporting innovation research. Absorptive capacity is considered a central and essential component of a firm's innovation capability and performance (Cohen & Levinthal, 1989, 1990, 1994; Zahra & George, 2002; Chang et al., 2013; Distel, 2019; Elidjen et al., 2025). This concept has attracted considerable scholarly attention, prompting several attempts at reconceptualization (e.g., Zahra & George, 2002; Todorova & Durisin, 2007). The most widely adopted reconceptualization is that proposed by Zahra and George (2002), which is theoretically grounded and empirically validated by numerous studies (Daspit & D'Souza, 2013). Zahra and George (2002) highlight two key sub-dimensions: potential absorptive capacity (PACAP), comprising acquisition and assimilation, and realized absorptive capacity (RACAP), comprising transformation and exploitation.

Despite its prominence in the literature, several authors argue that understanding the factors that trigger and enable successful absorptive capacity development remains an important area for further inquiry (Volberda et al., 2010; Chang et al., 2013; Soo et al., 2017; Distel, 2019; Ben Guedria et al., 2025).

Researchers in strategic human resource management (SHRM) have adopted the RBV logic to suggest that HR practices can cultivate the highest levels of valuable and rare organizational capabilities (Park et al., 2019). HR practices can indeed enhance innovation performance through their influence on the firm's ability to acquire, assimilate, redeploy, or reconfigure new and existing knowledge and resources (Foss & Minbaeva, 2009; Minbaeva, 2005; Minbaeva et al., 2003). Studies examining the relationship between specific individual HR practices and absorptive capacity have yielded promising results (Jansen et al., 2005). However, most research has focused on individual HR practices and their impact on knowledge creation, sharing, and transfer, rather than on HR systems.

Chang et al. (2013) advanced our understanding by examining how flexibility-oriented HRM systems (FOHRM) contribute to the development of absorptive capacity. Their study provided valuable insights into how FOHRM enhances absorptive capacity within firms. Nevertheless, the authors did not directly investigate absorptive capacity as a mediating mechanism linking FOHRM to firms' innovation performance (Soo et al., 2017).

Liao et al. (2019) demonstrated that high-commitment work systems (HCWS) act as an antecedent of a firm's absorptive capacity and strengthen the positive relationship between absorptive capacity and new product and service performance. They also showed that realized absorptive capacity partially mediates the relationship between potential absorptive capacity and new product and service performance. However, these authors did not distinguish the separate roles of these sub-dimensions in shaping innovation performance.

Flexibility-Oriented HRM System and Absorptive Capacity

Flexibility-Oriented HRM System and Potential Absorptive Capacity

Numerous scholars have examined the antecedents of potential absorptive capacity (PAC), which refers to knowledge acquisition and assimilation. Chang et al. (2013) define the resource flexibility–oriented HRM subsystem (RFHRM) as a set of practices that enable firms to acquire and develop versatile human resources.

This subsystem broadens employees' expertise, thereby enhancing their ability to search for external knowledge, scan the environment, and engage in exploratory learning. Employees with broader expertise are able to conduct more effective analyses and obtain more comprehensive and reliable knowledge (Gong, 2003; Huber, 1991). The findings of Chang et al. (2013) show that RFHRM practices—such as recruitment, diversified training, and job rotation—strengthen PAC. For instance, training helps expand employees' knowledge bases (Nekka & Aribi, 2017). Chang et al. (2013) further argue that job rotation, multi-skill training, polyvalent recruitment, and well-designed jobs collectively constitute RFHRM, which enhances employees' ability to identify and assimilate new knowledge.

The coordination flexibility–oriented HRM subsystem (CFHRM) facilitates the redeployment and reconfiguration of a firm's existing knowledge repertoire. Such redeployment can influence potential absorptive capacity, and several arguments support this claim. First, the combination of existing knowledge from different functions often leads not only to new information but also to new understanding (Huber, 1991). Second, when employees are encouraged to share and transfer knowledge through CFHRM practices (e.g., compensation and performance management practices, employee suggestion systems), synergistic effects emerge. Moreover, through communication, employees pool their information and knowledge, thereby enriching the organization's overall knowledge base (Nonaka, 2007). Enhancing the stock of knowledge enables the firm to better understand and assimilate new external knowledge.

Overall, these findings demonstrate a link between the flexibility–oriented HRM system and potential absorptive capacity. This leads us to formulate the following hypothesis:

H1a: The flexibility-oriented HRM system has a direct and positive effect on potential absorptive capacity.

Flexibility-Oriented HRM System and Realized Absorptive Capacity

Zahra and George (2002) emphasized that *"potential absorptive capacity captures… the ability to value and acquire external knowledge, but does not guarantee the exploitation of that knowledge"* (p. 190). Similarly, Jansen et al. (2005) found that realized absorptive capacity relies on a set of firm-level antecedents different from those influencing potential absorptive capacity. Organizational activities that foster strong social norms and trust—such as socialization tactics—facilitate the internal transformation of knowledge and thereby enhance realized absorptive capacity (Jansen et al., 2005). Firms often fail not because they lack employees capable of acquiring or assimilating new knowledge, but because they are unable to integrate this knowledge with existing knowledge and apply it effectively. Likewise, Lichtenthaler (2009) argues that firms require greater prior knowledge to successfully develop their realized absorptive capacity.

Chang et al. (2013) reported that resource-flexibility–oriented HRM practices do not directly contribute to the development of realized absorptive capacity. In contrast, Ben Guedria et al. (2025) found contradictory results, which may be attributed to differences in industry and contextual factors.Knowledge sharing is considered the main mechanism through which realized absorptive capacity is formed (Jansen et al., 2005; Zahra & George, 2002; Chang, 2013). Existing evidence highlights that HRM practices reinforcing coordination flexibility—such as group-based compensation, the use of information systems, organization-based rewards, and performance evaluation based on coordination—are precisely those practices that facilitate information flow and encourage knowledge sharing within organizations. Taken together, these practices are likely to support firms in rapidly recombining their existing knowledge and employee skills (Chang et al., 2013). Such practices enhance the integration and implementation of new knowledge, thereby increasing the likelihood of improving realized absorptive capacity through internal reconfiguration.

The CFHRM subsystem may thus have a direct impact on realized absorptive capacity for several reasons. First, by redeploying and reconfiguring existing human resources, CFHRM facilitates the alignment of employees' knowledge with newly acquired and assimilated external knowledge. Second, CFHRM increases opportunities for interaction among employees with diverse knowledge bases, thereby supporting the integration and combination of newly acquired knowledge. For instance, to foster the internal transfer and exploitation of tacit and socially complex knowledge, firms must implement reward systems (a key CFHRM practice) that link incentives for key personnel to firm-level performance measures, thus facilitating internal knowledge transfer

(Lord & Ranft, 2000). Such systems cultivate shared responsibility and trust among knowledge workers, thereby enhancing the integration and exploitation of external knowledge into firm-specific expertise (Jansen et al., 2005).

Third, the use of information systems to document employees' knowledge and skills facilitates the storage, access, and use of existing organizational knowledge. This is crucial because, *"due to specialization, differentiation, and departmentalization, organizations often do not know what they know"*, and information storage and retrieval are core components of organizational learning (Huber, 1991, p. 106). Finally, CFHRM enables better utilization of employees who hold critical knowledge. Research shows that allowing such employees more autonomy and incorporating their suggestions is essential for preserving, transferring, and exploiting knowledge—particularly in high-technology sectors (Ranft & Lord, 2000). In sum, CFHRM not only increases the overall knowledge base of the firm but also creates structural opportunities and motivational conditions that facilitate the transformation and exploitation of previously acquired and assimilated knowledge.

Overall, these findings demonstrate a clear link between the flexibility–oriented HRM system and realized absorptive capacity. This leads us to formulate the following hypothesis:

H1b: The flexibility-oriented HRM system has a direct and positive effect on realized absorptive capacity.

Absorptive Capacity and Innovation Performance

It is widely acknowledged in the literature that in a continuously changing environment, a firm's innovation performance depends on its absorptive capacity (Distel, 2019). According to organizational learning theory, for organizations to innovate, they must be able to recognize the value of new external knowledge, assimilate it, and apply it to create value (Cohen & Levinthal, 1990; Todorova & Durisin, 2007). Numerous studies have confirmed the positive relationship between absorptive capacity and innovation (Tseng et al., 2011; Fosfuri & Tribo, 2008; Knott, 2008; Kostopoulos et al., 2011; Tsai, 2001; Soo et al., 2017). These studies support Cohen and Levinthal's (1990, p. 128) assertion that "the ability to exploit external knowledge is a critical component of innovative capabilities."

Potential absorptive capacity (PACAP), represented by the acquisition and assimilation dimensions, helps firms access new sources of external knowledge and become aware of radical innovations that reshape industries (Cohen & Levinthal, 1989; Lau & Lo, 2015). Absorbed knowledge enhances strategic flexibility by enabling the rapid, low-cost reconfiguration and redeployment of knowledge and resources (Zahra & George, 2002; Lau & Lo, 2019).

H2a : Potential absorptive capacity has a direct and positive effect on innovation performance.

Realized absorptive capacity (RACAP) reflects a firm's ability to transform and exploit knowledge. The transformation dimension helps firms develop new interpretive schemas and modify existing processes (Zahra & George, 2002). The exploitation dimension enables firms to convert knowledge into new products (Lau & Lo, 2019; Gao et al., 2008; Lau & Lo, 2015). Based on previous studies, we propose the following hypothesis:

H2b : Realized absorptive capacity has a direct and positive effect on innovation performance.

Flexibility-Oriented HRM System and Innovation Performance

The FHRM system enables researchers to understand how firms can redesign their HR practices to support a broader range of employee skills and behaviors that foster organizational innovation (Chang et al., 2013; Lakshman et al., 2020). Chang et al. (2013) demonstrated that the CFHRM subsystem can enhance a firm's innovation capability. It improves knowledge flows and facilitates the recombination of resources, which in turn drives innovation. Moreover, this subsystem supports the redeployment and reconfiguration of a firm's existing knowledge base. Prior research has shown that the greater the stock of existing knowledge resources within a firm, the easier it becomes to adopt or generate new ideas (Cohen & Levinthal, 1990; Zahra & George, 2002). Similarly, the RFHRM subsystem helps firms acquire and develop diverse knowledge and skills. Several studies

have emphasized the importance of diverse knowledge and competencies in promoting innovation (Chang et al., 2013; Gong, 2003; Huber, 1991). Based on this literature, we propose the following hypothesis:

H3 : The flexibility-oriented HRM system has a direct and positive effect on innovation performance.

Absorptive Capacity as a Mediator between the Flexibility-Oriented HRM System and Innovation Performance

Becker and Huselid (2006) argue that the link between HRM systems and firm performance remains a "black box." The mechanisms through which flexibility-oriented HRM (FHRM) systems influence innovation performance remain understudied (Chang et al., 2013). Several scholars acknowledge that this relationship does not directly increase firm performance (Park et al., 2019). The findings of Soo et al. (2017) confirmed that various HR practices enhancing intellectual capital affect innovation performance through their impact on a firm's absorptive capacity. Chang et al. (2013) further demonstrated that an organization's flexibility-oriented HRM system affects innovation performance by shaping its ability to acquire, assimilate, redeploy, or reconfigure new and existing knowledge and resources (Minbaeva et al., 2003; Minbaeva, 2005; Foss & Minbaeva, 2009). Based on these insights, we propose the following hypothesis:

H4: The positive relationship between the flexibility-oriented HRM system and innovation performance is mediated by absorptive capacity.

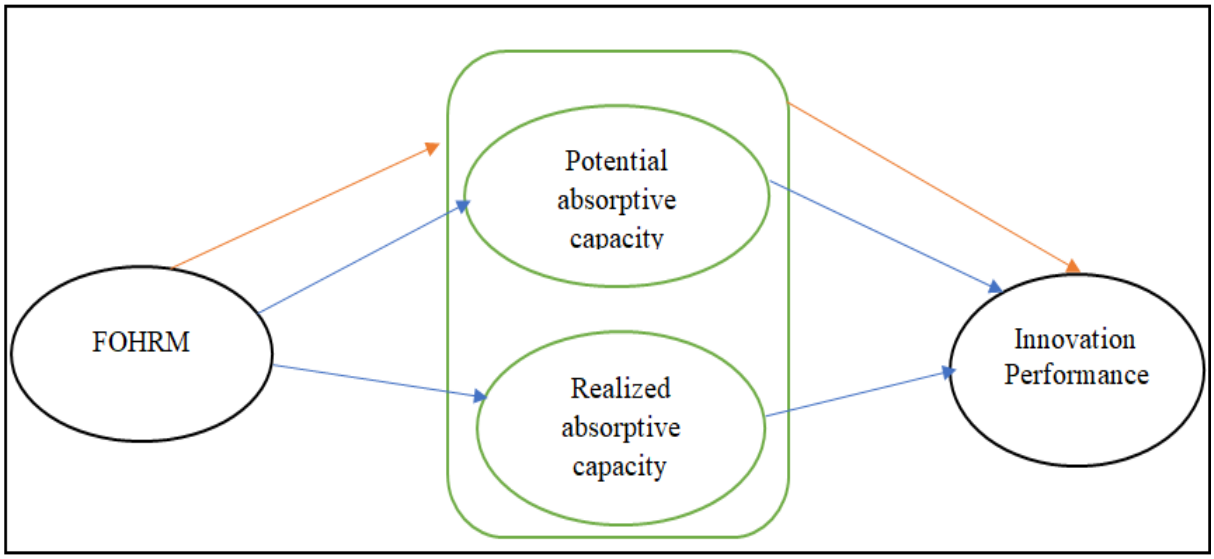

Figure 1 : Conceptual Framework

METHODOLOGY

Sample and Data Collection

To test our research hypotheses, we conducted a quantitative study among managers working in the mechanical and electrical industries sector. Data were collected through a questionnaire survey. The selection of this sector is justified by its strategic importance within the Tunisian economy. The mechanical and electrical industries (MEIs), which are divided into two subsectors—the mechanical and metallurgical industries (574 firms) and the electrical, electronic, and home-appliance industries (340 firms) constitute one of the main pillars of national manufacturing activity. This sector plays a decisive role in the country's economic dynamics, generating more than 51% of the total export volume of manufacturing industries, with a value exceeding 24 billion dinars. It also accounts for more than 30% of industrial employment and nearly 20% of foreign investment. Moreover, official statistics indicate that the mechanical, electrical, and electronic industries represent the primary driver of Tunisian exports, contributing 46% of the country's total exports. These elements fully justify the focus on this sector, whose contribution to competitiveness, innovation, and value creation lends particular relevance to the present study.

We were able to collect 210 usable responses from company directors, representing a response rate of 23.67%. The respondents' profile indicates that 73% of the directors are male. The results also show that 60% of the surveyed directors are between 31 and 40 years old. Those aged between 20 and 30 and those between 41 and 60 represent 15% and 25% of the sample, respectively. The majority of respondents hold either a Master's degree or an engineering diploma (59%), followed by those with a bachelor's degree or equivalent (31%).

Variables and Scales

To measure our constructs, we adapted scales from the existing literature. A five-point Likert scale was used, where 1 = strongly disagree and 5 = strongly agree. The reliability of the constructs was assessed using Cronbach's alpha (α).

Innovation Performance: To comprehensively capture the different aspects of innovation performance, we followed Prajogo and Ahmed (2006), who conceptualized it based on multiple criteria: the number of innovations, speed of innovation, level of innovation (novelty or technological novelty), and being the "first" to market. These four characteristics were grouped into two main dimensions of innovation: product innovation and process innovation. Conceptually, product innovation involves the generation of ideas or the creation of entirely new offerings reflected in changes to the final product, whereas process innovation represents changes in how firms produce final products or services, either through the adoption of innovations developed elsewhere or through internally developed new practices. Innovation performance is conceptualized as a second-order construct with two first-order constructs: product innovation and process innovation. Together, they define the second-order construct "innovation performance" (Cronbach's $\alpha = 0.86$, CR = 0.889).

Absorptive Capacity: Absorptive capacity was operationalized using the four dimensions proposed by Zahra and George (2002). Each firm's manager assessed absorptive capacity using the scale developed by Distel (2019). The first dimension, *acquisition*, was measured with three items, capturing the firm's efforts to acquire new knowledge from external sources. The second dimension, *assimilation*, was also measured with three items and reflects the firm's ability to analyze and understand new external information. The third dimension, *transformation*, was measured with four items and reflects the extent to which a firm can combine existing knowledge with new information and reinterpret existing knowledge in novel ways. Finally, the fourth dimension, *exploitation*, was measured with four items and assesses the firm's ability to exploit new knowledge and apply technologies to new products. Cronbach's alphas for acquisition, assimilation, transformation, and exploitation were 0.88, 0.86, 0.86, and 0.90, respectively.

Flexibility-Oriented HRM System: We followed Chang et al. (2013), Sanchez (1995), and other relevant works (Stinchcombe, 1990; Volberda, 1996) that distinguish two dimensions of the FHRM system: *coordination flexibility* and *resource flexibility*. In this study, we adopted the measurement scales developed by Chang et al. (2013). The FHRM system was measured using 11 items: the first sub-dimension, *RFHRM*, was assessed with a 5-item scale, and the second sub-dimension, *CFHRM*, was assessed with a 6-item scale. The flexibility-oriented HRM system was conceptualized as a second-order construct with two first-order sub-constructs, RFHRM and CFHRM. Together, they define the second-order construct "flexibility-oriented HRM system" (Cronbach's $\alpha = 0.82$; CR = 0.858).

Control Variables: Several control variables were tested for their effects on innovation performance. These include firm age, as older firms may have more developed structures and organizational systems (Chang et al., 2013), measured as the logarithm of years of operation; and firm size, as previous research indicates that size impacts productivity and firm performance (Gong, Law, Chang, & Xin, 2009; Soo et al., 2017), measured as the logarithm of the number of employees.

Statistical Method

To test our hypotheses, we employed the Structural Equation Modeling (SEM) approach. SEM was preferred due to its ability to examine hypothetical causal relationships among structural parameters, which are often latent in nature. In addition, the use of this technique was justified by its capacity to address the multidimensional

nature of our key variables. SEM also helps identify significant relationships between variables within the model and determines which model provides the best fit to the data (Gkypali et al., 2018).

ANALYSE DES RESULTATS

Descriptive statistics

Table 1 presents the descriptive statistics (mean and standard deviation) and the correlations among the variables examined in this study. It can be observed that the flexibility-oriented HRM system is positively and significantly correlated with absorptive capacity and with innovation performance. Firm size, which serves as a control variable, has a positive but non-significant effect on innovation performance. Firm age, the second control variable in this study, has a negative and non-significant effect on performance.

Table1 : Correlation Matrix

	Means	S.E	FHRM	RFHRM	CFHRM	CA	PCA	RCA	Perf.innovation	size	Age
FHRM	3.7	0.83	1								
RFHRM	3.6	0.85	0.850**	1							
CFHRM	3.7	0.81	0.820**	0.605**	1						
CA	3.8	0.82	0.645**	0.630**	0.660**	1					
PCA	3.9	0.84	0.660**	0.635**	0.705**	0.750**	1				
RCA	3.8	0.82	0.550**	0.500**	0.755**	0.780**	0.623**	1			
Perf.innovation	3.6	0.91	0.588**	0.500**	0.550**	0.650**	0.568**	0.645**	1		
size	1.8	0.39	0.056	0.050	0.052	0.051	0.055	0.053	0.142	1	
Age	13.02	6.62	0.007	0.055	0.062	0.060	0.068	0.070	-0.024	0.119	1
			Correlation is significant at the 0.01 level (two-tailed).								

Reliability and Validity of the Model

Before testing our hypotheses, we first assessed the psychometric quality of the measurement scales. First, we analyzed the unidimensionality of the constructs for our three latent variables using Principal Component Analysis (PCA). The factor loadings of the items are statistically significant, as their values exceed the acceptable threshold of 0.55 (Hair et al., 2010). Additionally, the Kaiser-Meyer-Olkin (KMO) index indicates whether the correlations among the questionnaire items are adequate, with a recommended value above 0.5. The **absorptive capacity** variable consists of 14 items. The Kaiser criterion retained 2 factors explaining 65.709% of the total variance. The KMO index is 0.914, and Bartlett's test is significant at 0.000. However, the item "assimilation4" did not meet the minimum threshold of 0.5 and was removed, which improved the total variance explained from 65.709% to 70.121%. The **innovation performance** variable consists of 9 items, explaining 70% of the total variance. The Kaiser criterion retained 2 factors explaining 80.3% of the variance. The KMO index is 0.912, and Bartlett's test is significant at 0.000. The **flexibility-oriented HRM system** variable consists of 11 items. The Kaiser criterion retained 2 factors explaining 70.421% of the total variance. The KMO index is 0.906, and Bartlett's test is significant at 0.000.

Second, we assessed the **reliability** of our measures to determine whether the items accurately reflect the intended constructs. Reliability can be estimated using Cronbach's alpha (Akrout, 2010). A value of $\alpha \geq 0.70$ indicates acceptable reliability (Hair, Black, Babin, & Anderson, 2010). In our study, all Cronbach's alpha values

exceed 0.70, confirming the reliability of all variables. Finally, we evaluated the **construct validity** through two types: convergent validity and discriminant validity (Campbell & Fiske, 1959). Convergent validity was assessed by calculating the Average Variance Extracted (AVE). Convergent validity is established when AVE ≥ 0.5 (Fornell & Larcker, 1981). Table 1 shows that all AVEs exceed 0.5, confirming convergent validity.

Table 2: Convergent Validity

Construct	**AVE**
FOHRM	0.529
Absorptive capacity	0.583
Innovation performance	0.641

Discriminant validity was tested by comparing the square roots of AVEs with the correlations among constructs. According to Fornell and Larcker (1981), discriminant validity is confirmed when the square root of the AVE of each construct is higher than its correlations with other constructs.

Table 3: Correlations among Constructs and Discriminant Validity

Construct	**FGRH System**	**AC**	**IP**
FOHRM	0.728		
Absorptive Capacity	0.688	0.764	
Innovation Performance	0.621	0.607	0.801

The results show that correlations between constructs are lower than the square roots of their respective AVEs, confirming discriminant validity.

Hypotheses Testing

We now proceed to validate the hypotheses of our study. Using AMOS 23, we first calculated the path coefficients. The results indicate that all the hypothesized relationships are supported. Control variables were included in the model, and the results show that both firm age and firm size have no significant effect on the dependent variable.

Next, to analyze the mediating role of absorptive capacity in the relationship between the flexibility-oriented HRM system (FHRM) and innovation performance, we applied the methodological procedure proposed by Baron and Kenny (1986), which involves four steps through a series of regressions.

Step 1: This step involves performing a simple regression between the independent variable and the dependent variable. Here, we tested the relationship between the independent variable, the FHRM system, and the dependent variable, innovation performance. The results indicate that FHRM has a positive and significant effect on innovation performance ($\beta = 0.74$; $p = 0.001$). The model fit is acceptable ($\chi^2 = 319.7$, df = 159; NFI = 0.90; CFI = 0.94; RMSEA = 0.07).

Step 2: This step involves a simple regression between the independent variable, FHRM, and the mediating variable, absorptive capacity (AC). The results show that FHRM positively and significantly influences AC. The model fit is acceptable ($\chi^2 = 494.745$, df = 238; CFI = 0.92; NFI = 0.87; RMSEA = 0.07).

Step 3: At this step, we tested the relationship between FHRM and innovation performance while including AC as a mediating variable. The results, presented in the table below, show that the independent variable, FHRM,

positively influences the mediating variable, AC (β = 0.58; p = 0.000). Additionally, AC positively affects innovation performance (β = 0.39; p = 0.13). The model fit indices indicate a good model fit (χ^2 = 977.421, df = 532; CFI = 0.91; NFI = 0.89; RMSEA = 0.06).

These findings allow us to conclude that absorptive capacity serves as a mediating variable in the relationship between the FHRM system and innovation performance.

Tableau 4 : Effet direct (unstandardized)

Hypothesis	Estimate	S.E.	C.R.	P
Capacité <---Flexhrm (a)	**,586***	,081	7,233	0.001
Perfinov <--- Flexhrm (c')	,372*	,120	3,089	0.002
Perfinov <--- Capacité (b)	**,392***	,158	2,478	0.013

*= p< 0.05

Step 4: At this stage, we verify whether the mediation is full or partial. This involves testing the significance of the direct link between the independent variable, *FHRM system*, and the dependent variable. Our results show that this relationship is significant, indicating that absorptive capacity only partially mediates the relationship. In addition, we conducted the Sobel test to confirm the significance of the mediating effect. The results support the mediating role of absorptive capacity (Sobel test statistic = 2.346, p < 0.01).

Despite the popularity of the Baron and Kenny (1986) approach, recent research has criticized it for its relatively low statistical power and for not directly testing statistical mediation or the indirect effect (a × b) (Preacher & Hayes, 2004). Consequently, a more modern approach proposed by Preacher and Hayes (2008) has been widely used in management research (e.g., Naqshbandi & Tabche, 2018). This approach quantifies the indirect effect as the product of coefficients *a* and *b* when directly testing mediation hypotheses. The results obtained using the Baron and Kenny framework were confirmed using the Preacher and Hayes (2008) approach. Specifically, we employed the bootstrap method (2,000 resamples) and calculated bias-corrected confidence intervals. The upper and lower confidence intervals did not include zero, indicating a significant indirect effect. Table 5 presents the results.

Table5 : direct and indirect effect

	Effet direct	**Effet indirect**	Bootstrap results for indirect effect through mediator (a _ b)		**Resultat**
			LB 95% CI	**UL 95% CI**	
H1 : FHRM->CA	**0.586***				Hypothesis supported
H2 : CA->performance	0.392*				Hypothesis supported
H3 : FHRM -> performance	0.372*				Hypothesis supported
H4 : FHRM->CA-> performance		0.254 *	0.056	0.527	Hypothesis supported – Partial mediation

*=p < 0.05;

Robustness Analyses

Testing for Common Method Variance Bias:

According to Brannick et al. (2010), the presence of common method variance (CMV) bias in a given study can lead to incorrect inferences. For this reason, to reduce the issue of social desirability, respondents were assured that their answers would remain anonymous. Additionally, respondents were informed that there are no right or wrong answers and that they should respond as honestly as possible (Podsakoff et al., 2003). Furthermore, Harman's single-factor test was conducted to assess whether there is a serious CMV problem (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). A factor analysis was performed using the items for the three key variables of the present study. Our results indicate that no single factor emerges and that the first factor does not account for the majority of covariance among the measures. Therefore, we conclude that there are no substantial common method variance issues based on our current sampling strategy (Podsakoff et al., 2003).

DISCUSSION OF RESULTS

The objective of this research is to examine the impact of flexibility-oriented HRM systems as a key determinant of a firm's absorptive capacity (AC), and to demonstrate the role of this capacity in enhancing a firm's innovation performance. The results of our study yield several important insights regarding absorptive capacity and its sub-dimensions.

The first insight highlights the important role of HRM systems as organizational antecedents of AC (Chang et al., 2013; Jansen et al., 2005; Volberda et al., 2010). The findings confirm that flexibility-oriented human resource management systems have a positive and significant effect on the absorptive capacity of firms operating in the mechanical and electronic industries. These results align with prior research demonstrating a positive relationship between HRM systems and AC (Volberda et al., 2010; Cohen & Levinthal, 1990; Chang et al., 2013; Soo et al., 2017; Lewin, Massini & Peeters, 2011). This is consistent with the assertions of Cohen and Levinthal (1990), who explicitly argued that organizational mechanisms—such as HR practices—constitute important contributing factors to absorptive capacity. It is therefore essential for firms operating in dynamic environments to adopt flexibility-oriented HRM systems in order to enhance their absorptive capacity. These findings offer several contributions to the literature.

First, they highlight the importance of HRM systems as organizational antecedents that foster the development of absorptive capacity. Volberda et al. (2010) noted that several organizational antecedents of AC remain understudied, including reward systems and HRM systems. More specifically, our study shows that flexibility-oriented HRM systems exert a significant influence on both sub-dimensions of AC. Our results indicate that the "resource" dimension of flexibility-oriented HRM plays a more decisive role than the "coordination" dimension in developing potential AC, corroborating the work of Chang et al. (2013, 2020). Furthermore, both dimensions of flexibility-oriented HRM significantly influence potential and realized AC. Second, our study helps address a long-standing theoretical gap in the HRM literature, namely the tendency to examine HR practices in isolation (Chang et al., 2013; Kehoe & Wright, 2013; Ben Guedria et al., 2025). Coherent and mutually reinforcing HRM systems are more likely to support organizational performance than individual HR practices (Kehoe & Wright, 2013). Our findings therefore support the relevance of adopting a systemic approach to HRM when analyzing its influence on absorptive capacity. Regarding the relationship between absorptive capacity and innovation performance, our findings confirm previous studies showing a positive and significant association between these two variables (e.g., Kostopoulos et al., 2011; Tsai, 2001). The results underscore the critical role of AC in driving organizational innovation. Moreover, our findings show that realized absorptive capacity has a stronger effect on innovation performance than potential absorptive capacity. This is consistent with prior research, as realized AC reflects the transformation and exploitation of newly acquired knowledge—processes that are directly linked to the generation of innovation.

Additionally, this research not only corroborates earlier studies (Chang & Chen, 2010; Minbaeva, 2005; Minbaeva et al., 2003) that identified a direct relationship between HR practices and absorptive capacity, but also highlights that flexibility-oriented HRM systems indirectly influence innovation performance through their impact on AC. This finding contributes to the strategic HRM literature by demonstrating the strategic role played

by flexibility-oriented HRM systems in building exploration and exploitation capabilities that ultimately enhance innovation performance. Thus, the second major insight of this study concerns the mediating role of absorptive capacity in the relationship between flexibility-oriented HRM systems and innovation performance.

CONCLUSION

The purpose of this study was to examine the role of flexibility-oriented HRM systems as organizational antecedents of absorptive capacity (AC) and to illustrate their contribution to innovation performance in firms operating within the Tunisian chemical industry. Structural equation modeling was employed to estimate and test these relationships. The findings highlight the significant role of HRM systems as key organizational antecedents of absorptive capacity. Moreover, the results underline the mediating role of absorptive capacity in the relationship between HRM systems and firm innovation performance.

Theoretical Implications

This research advances the literature on absorptive capacity by empirically examining HRM systems as an important organizational antecedent of AC. First, the study responds to calls from recent research suggesting the need to investigate the influence of HR systems on absorptive capacity (Chang et al., 2013; Soo et al., 2017). These authors argue that coherent and mutually reinforcing HR practices are more likely to support sustainable performance outcomes than individual HR practices (Kehoe & Wright, 2013). Second, our study also answers calls from scholars advocating the examination of HRM practices and systems as organizational antecedents of AC (Volberda et al., 2010; Soo et al., 2017; Chang et al., 2013).

Managerial Implications :

Based on our findings, several managerial recommendations can be proposed. Managers should adopt coherent HRM systems and practices as a means to enhance their firm's absorptive capacity. To generate improvements in innovation performance—whether through knowledge enhancement or knowledge renewal—firms should implement appropriate HR systems (e.g., recruitment, training, job rotation, multiskilling, skill-based selection, and enriched job design). Such systems increase employees' knowledge breadth and enable them to identify, assimilate, and apply new and valuable knowledge.

Limitations and Directions for Future Research

Despite the promising results of this research, several limitations should be acknowledged. First, the findings are based on a non-probability sampling method, and data were collected exclusively from firm managers, which limits the generalizability of the results. Second, the cross-sectional design of the study restricts the ability to draw causal inferences among the variables. Third, the findings reflect the specific context of the Tunisian chemical industry, which raises questions about the generalizability of the results to other sectors.

Future research should consider longitudinal designs to better account for potential reverse causality. Additionally, to enhance the generalizability of findings, future studies should extend the investigation to other sectors and industries. Researchers may also consider employing alternative data collection methods, including increasing the number of respondents per firm,

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