

## Article

# The Impact of Adaptation-Oriented HRM on Exploration: Mediating Effects of Self-Organization

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**Abstract:** Organizations must pursue efficiency and exploration at the same time to respond to environmental changes. Especially, it is necessary for firms to implement adaptation-oriented Human Resource Management (HRM) to respond successively and quickly to environmental changes. Some organizations attempt to achieve these goals through self-organization. The purpose of this study is to examine the relationship between adaptation-oriented human resource management and exploration, and the mediating role of self-organization in this relationship. Using a nationally representative dataset from South Korea (173 companies and 692 observations), this study analyzes the relationship between adaptation-oriented HRM and exploration with panel regression analysis. The results show that there is a positive relationship between adaptation-oriented HRM and self-organization and that self-organization has a statistically significant positive effect on the exploration of a firm. Moreover, the results support the partial mediation model for self-organization in the relationship between adaptation-oriented HRM and exploration. This study shows that for the organizations which pursue innovation to cope with the rapidly changing times, they should adopt adaptation-oriented human resource (HR) practices and also pay more attention to the formation of self-organization.

**Keywords:** adaptation-oriented HRM; self-organization; exploration



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## 1. Introduction

A firm's survival depends on innovation that builds barriers against imitation [1]. Innovation is categorized as exploration and exploitation: the former means a significant improvement over the past, and the latter focuses on efficiency improvements [2]. Thus, organizational strategies vary depending on the type of innovation a firm pursues [3]. For example, exploration-seeking firms promote decentralization and informalization of their activities, while exploitation-seeking firms promote the centralization of decision-making and formalization of organizational activities [4].

Although most firms feel the importance of their own coping strategies, they simply imitate leading companies in their industry [5]. Therefore, this paper aims to discover what kind of HR system should be planned for the innovative performance pursued by the organization.

From this perspective, discussions have ensued on the construction of HR systems to pursue exploration and exploitation [6]. According to Patel et al. (2013) [6], adaptation-oriented HRM, based on trust and support, influences exploration by forming a firm's adaptation context. In addition, alignment-oriented HRM, based on stretch and discipline, forms an alignment context.

Due to rapid environmental changes, such as the Fourth Industrial Revolution and COVID-19, firms need to show significant improvement in managing their organizations rather than merely increasing operational efficiency [7]. This circumstance suggests it is necessary to implement adaptation-oriented HRM for firms to respond successively and quickly to rapid environmental changes.

This study discusses a firm's survival strategy by explaining the relationship between adaptation-oriented HRM, self-organization, and innovation (exploration). In developing the discussion, this study tries to explain the relationship between adaptation-oriented HRM and exploration using the concept of self-organization. Self-organization is the collective action of members of an organization to adapt to the environment voluntarily [8].

In this study, firstly, the hypotheses will be set up through theoretical research, and then the hypotheses will be examined using a dataset collected from firms, and finally some implications will be provided. In particular, this study examines the impact of adaptation-oriented HR system in the context of South Korea because, for many South Korean firms, innovation has become the steppingstone of rapid growth in East Asia.

The hypotheses are tested by panel regression analysis with the Human Capital Corporation Panel (HCCP)'s third to seventh waves of data from the Korea Research Institute for Vocational Education and Training.

Since most SHRM (Strategic Human Resource Management) studies have been based on traditional manufacturing-oriented organizational management, discussions on which HRM is relatively suitable for the knowledge economy era are insufficient. This study presents the guiding principle of adaptation-oriented HRM to companies seeking innovation in a new era. This guiding principle would be helpful for companies that attempt to form their own a personnel system suitable for the new business environments, away from copying the personnel system of leading companies in their industries.

## 2. Theoretical Background

### 2.1. Adaptation-Oriented HRM

Huselid (1995) conceptualizes a bundle of HR practices that positively affect the effectiveness of a firm's operations (e.g., ROA, Tobin's Q) as high-performance work systems (HPWS) [9]. According to Becker and Huselid (1998), HPWS is determined by the consistency of the organization's strategic objectives [10], which means that HPWS configurations must be designed purposely to achieve their goals [11,12].

Patel et al. (2013) typified HPWS as adaptation-oriented and alignment-oriented HRMs from an organizational ambidexterity perspective [6]. As shown in Table 1, Adaptation-oriented HR is based on trust and support. Trust creates beliefs based on mutual understanding between members on other members' competence and provides opportunities for participation in collective decision-making. Support facilitates organizational members' efforts to easily access each other's intellectual resources and help and guide each other. On the other hand, alignment-oriented HRM is based on stretch and discipline. Stretch means that organizational members pursue higher goals by giving shared aspirations, collective identities, and personal meaning to work. "Discipline" refers to inducing voluntary efforts by establishing clear criteria for performance and providing feedback.

**Table 1.** Comparison between adaptation-oriented HRM and alignment-oriented HRM.

|            | Adaptation-Oriented HRM  | Alignment-Oriented HRM   |
|------------|--|--|
| Definition | A bundle of HR practices based on the principles of trust and support for the purpose of creating an organizational context for adaptation | A bundle of HR practices based on the principles of stretch and discipline for the purpose of creating an organizational context for alignment |
| Principle  | Trust, Support   | Stretch, Discipline  |
| Mechanism  | Adaptation context → Exploration   | Alignment context → Exploitation   |

From an organizational ambidexterity perspective, the mechanisms of human resource management should be differentiated. Therefore, suitable HRM configurations depend on the organizational purpose. In this regard, if organizations seek exploration, they should introduce adaptation-oriented HRM, while exploitation-seeking organizations should introduce alignment-oriented HRM. However, although there are many theoretical studies

on adaptation and alignment-oriented HRM, only a handful of empirical studies address this issue [13].

## 2.2. Self-Organization

Colbert (2004) and Xu and Wilkinson (2018) argue that analyzing phenomena based on self-organizing concepts in SHRM research would be useful in explaining complex social processes [8,14]. Self-organization is the process by which people with different schemas interact to create new ideas and innovations [8]. According to Carapiet and Harris (2007), self-organization consists of actors' autonomy, interaction, and value systems [15].

Autonomy refers to autonomous and independent judgments based on the different schemas used by members [16]. Members can derive diverse information within the organization by interpreting environmental changes based on their schema, enabling the organization to adopt the best information to increase the probability of survival [16].

Interaction refers to frequent and varied contact between multiple actors [8]. Members learn and share information within the organization through interaction. Furthermore, as the organization's interactive information transfer, storage, and processing capabilities increase, more results can be obtained than expected [17].

A value system is a harmonized state organically coupled with a member and an organizational system [18,19]. The value system can also be seen as a layered concept in which the output of members' learning and adaptive behavior is stacked onto the organizational system [16]. Value systems help to achieve collective outcomes by pursuing shared objectives of members and organizations.

Similarly, Comfort (1994) explains that the components of self-organization comprise actors' individual choices, communication behaviors and interconnectivity, and commitment to common goals [20]. Eoyang and Conway (1999) argue that self-organization should allow actors in the organization to present themselves freely with independent thought and judgment, perform complementary interactions with others, and maintain communities in which they can exist together [21]. Thus, there are many similarities regarding the components of self-organization espoused by scholars.

Emergence (exploration) could appear if each component of self-organization is met within an organization. "Emergence" refers to radical novelty unobserved in existing routine [16,22]. Relatedly, Koch and Leitner (2008) demonstrate that new ideas and radical results emerge from the department where self-organization is formed within semiconductor companies. In this regard, it is necessary to pay attention to the formation of self-organization in that emergence becomes a unique and valuable output of an entity [23].

## 3. Hypothesis

### 3.1. Adaptation-Oriented HRM and Exploration

Innovation in a firm is typified by exploration and exploitation, and firms facing drastic environmental changes should actively pursue exploration [3,24]. Previous work has shown that adaptation-oriented HRM positively impacts exploration and is based on trust and support [6]. Adaptation-oriented HRMs are a set of HR schemes that enhance an organization's adaptability capabilities and positively impact innovation.

Trust is the creation of beliefs based on members' mutual competence and the provision of opportunities for participation in collective decision-making [6]. For example, the organizational actions based on trust include:

- developing and operating a company's specialized training system;
- providing employees with the opportunity to propose their opinions and ideas;
- empowering them to make decisions in groups;
- establishing a system of fair promotion;
- providing job security.

Trust-based schemes generally facilitate career development, internal training, job security, participation fairness, suggestion systems, and job rotation. Job security and career development schemes signal to employees that they are valuable to an organization,

which positively influences exploration by inducing extra-role behaviors and risk-taking attitudes among employees [25]. Training and job rotation positively affect exploration by developing employees' capacity to proactively respond to environmental changes and motivate them to solve problems [26]. Furthermore, participation fairness and suggestion systems will encourage the organization's members to engage in open communication and idea development [27,28].

Support enables organizational members to easily access each other's intellectual resources and help and guide each other [6]. For example, organizational actions based on support include:

- developing and operating systems that share ideas created by members or departments;
- encouraging formal and informal gatherings so members could share their thoughts and ideas freely;
- establishing learning organizations to share and discuss problems.

Support-based practices include information sharing, team systems, mentoring, and socialization [29]. Information sharing systems and socialization promote organizational learning and the free exchange of information or ideas, which positively affects exploration, such as developing novel solutions and technologies that are difficult for members to create independently [30]. In addition, teamwork will lead to creative communication and problem solving among team members through task autonomy and flexible work practices [31]. Team systems also give members a sense of responsibility for decision-making and induce creative thinking for the firm's survival, positively impacting exploration [32].

As such, adaptation-oriented HR practices will positively impact organizational exploration by influencing members' attitudes (e.g., autonomy, risk-taking, and creative thinking) and behaviors (e.g., extra-role behavior, idea exchange, and suggestions).

**Hypothesis 1.** *Adaptation-oriented HRM will have a positive effect on exploration.*

### 3.2. Adaptation-Oriented HRM and Self-Organization

As mentioned above, self-organization consists of actors' autonomy, interaction, and value systems [15]. Adaptation-oriented HRM, which is based on support and trust, will positively affect autonomy. Information sharing and socialization, which corresponds to support, will expand members' schemas. Information sharing schemes will expand individual schemas by allowing members of an organization to access various types of information easily, and socialization induces sharing of experiences among people [33,34]. The team system entrusts members with organizational authority and responsibility, providing opportunities for exercising autonomous and independent judgment [35]. They can employ various job skills to form their own schemas through career development, internal training schemes, and job rotation [36]. Therefore, adaptation-oriented HRM will positively influence the formation of autonomous self-organization by expanding individual schema and supporting independent decision-making.

Adaptation-oriented HRM will have a positive impact on the interactions of the components of self-organization. Information sharing, team systems, and support-based socialization will lead to frequent engagement among people [30]. Socialization and team systems encourage the mutual exchange of views by creating diverse interests in common issues [37]. The information-sharing scheme provides access to knowledge produced by other departments without significant barriers [38]. Fairness-related policies based on trust facilitate communication with management and other departmental staff [38]. Adaptation-oriented HRM will induce frequent engagement and the exchange of diverse opinions among members of the organization, ultimately affecting the interaction of self-organization.

Adaptation-oriented HRM can have a positive impact on value systems, one of the components of self-organization. Training and career development systems based on trust develop individual abilities, which could be applied to task accomplishment [26]. Trust-based job security and fairness policies and support-based socialization and team systems will enhance social exchange between an organization and individuals, thereby creating

attachments to organizations [27]. Therefore, adaptation-oriented HRM will strengthen the organic connectivity between members and organizations to satisfy the value system of self-organization.

**Hypothesis 2.** *Adaption-oriented HRM will have a positive effect on self-organization.*

### 3.3. Mediation Effects of Self-Organization

This study examines the positive impact of adaptation-oriented HRM on exploration in a firm, mediated by three components of self-organization: autonomy, interaction, and value systems.

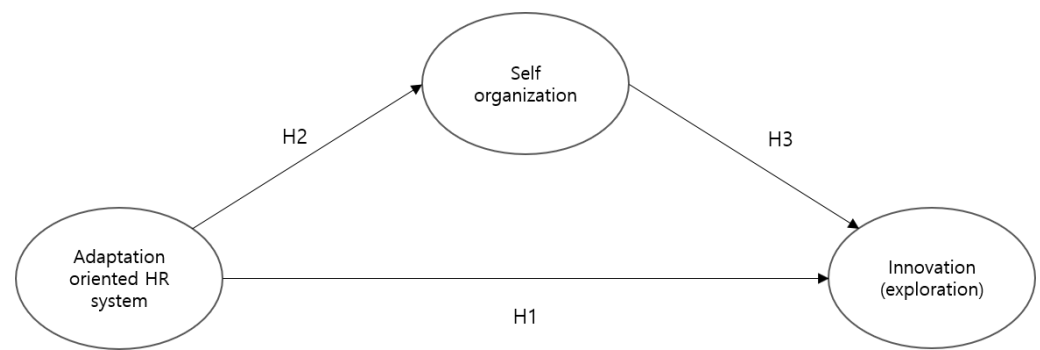
Autonomy, one of the components of self-organization, will have a positive impact on exploration. Anderson (1999) states that, in the state of autonomy, members produce various types of information based on their schema [16]. Since people develop their interpretation of things, where members in the organization have substantial autonomy, there is also a substantial increase in information. This information is then accumulated and combined intra-organizationally, resulting in new ideas and innovations [39]. Adaption-oriented HRM builds autonomy, a component of self-organization, and autonomy will positively impact exploration as it becomes the basis for producing and accumulating diverse knowledge within the organization.

Interaction, another component of self-organization, will have a positive impact on exploration. The frequent exchange of views and coordination between members results in more than a simple sum [16]. In other words, mutual coordination to find the optimal solution forms a virtuous cycle feedback loop [17,40]. Such feedback loops further extend existing knowledge to produce new ideas. Furthermore, according to Kauffeld (2006), the opinion-coordination process triggers intellectual stimuli, which helps convert a member's idea into group-level capabilities [41]. Thus, adaptation-oriented HRM forms interactions, which are components of self-organization, and interactions positively impact exploration by inducing frequent exchange and coordination processes among organization members.

The other component of self-organization, the value system, will have a positive impact on exploration. The value system encourages commitment toward members' ideas being considered assets in the organization [16]. Members make various attempts to survive in the organization when they are organically bound to it [16]. In other words, the value system can be seen as constantly combining diverse internal knowledge for the organization's survival and creating innovation through numerous trials and errors to ensure that original ideas are commercialized [17]. Thus, adaption-oriented HRM will form a value system that is a component of self-organization, which will induce an organization to attempt exploration in securing its survival.

**Hypothesis 3.** *Self-organization will mediate adaption-oriented HRM and exploration.*

Summarizing the hypothesis of this study, as shown in Figure 1, this study aims to verify the mediating relationship between variables between adaptation-oriented HRM, self-organization, and innovation.



**Figure 1.** The research framework.

## 4. Method

### 4.1. Sample

This study was conducted with panel regression analysis with the HCCP's third to seventh waves of data from the Korea Research Institute for Vocational Education and Training. The survey consisted of a corporate-level survey and an employee-level survey. The corporate-level survey included HR practices of a firm, a firm's strategy, and external factors such as the characteristics of the market and changes in technology, while the employee-level survey included employees' attitudes and perceptions in implementing HR programs within their firms.

At over 80%, the corporate-level response rate far exceeded that of most US studies, whose response rates are about 25% [10]. Because this survey was conducted with the help of the South Korean government (the Ministry of Labor of Korea), the response rate was high. For example, in the Korean Labor Income Panel Survey, which was also conducted with the help of the South Korean government, the response rates ranged from 76.0% to 87.6%. The employee-level response rate was 89.5%.

Adaptation-oriented HRM was measured using data from a corporate-level survey, and data from a employee-level survey were used for measuring self-organization and innovation. For the hypothesis test of this paper, a sample was selected based on the following criteria. First, a sample in which the survey items of the main variables of the study were not omitted was selected. Second, a sample was selected for companies which were surveyed for more than two years. This is to set the lag between the independent variable and the dependent variable. For example, the independent variable measured in 2009 and the dependent variable measured in 2011 were paired. Third, a sample was collected from the manufacturing industry. The final sample selected in this study was 173 companies (692 observations) and 2089 employees.

### 4.2. Variables

#### 4.2.1. Adaptation-Oriented HRM

This study defines adaptation-oriented HRM as a bundle of HR systems based on trust and support that creates an organization's adaptation context. In many SHRM studies, variables are measured by additive methods [42]. Thus, adaptation-oriented HRM is measured by the additive sum of HR practices based on trust and support.

"Trust" was measured by implementing suggestion systems, internal training, position simplification, job rotation, job security, and career development plans [6]. "Support" was measured by implementing information sharing systems, team systems, and mentoring systems. This study asked HR managers to respond with "1" if they had implemented such HR practices and with "0" if they had not.

#### 4.2.2. Self-Organization

This study measured self-organization by the natural logarithm from multiplying three components of self-organization [15]. According to Minbaeva (2005), multiplication

methods have the advantage of weighting the variance among components over aggregating methods [43]. Respondents (employees of a firm) were asked to indicate the level of three components of self-organization within a firm.

**Autonomy:** “Autonomy” means autonomous and independent judgment based on an individual’s own schema [16]. This study measured autonomy by three items:

- (1) Active participation in a team’s problem-solving and decision-making process;
- (2) Sufficient autonomy to lead the task;
- (3) Having capabilities and experience in different tasks.

Each question was measured using a five-point Likert-type scale. Reliability coefficients were above 0.7 for each year (2009 = 0.81, 2011 = 0.71, 2013 = 0.80, 2015 = 0.80). Items measured at the individual level should be merged into organizational levels. Thus, ICC (1) and ICC (2) were calculated, which are the most commonly used methods for testing reliability in multi-level studies. The annual values of ICC (1) (2011 = 0.13, 2013 = 0.13, 2015 = 0.14, 2017 = 0.16) and annual values of ICC (2) (2011 = 0.60, 2013 = 0.60, 2015 = 0.61, and 2017 = 0.63) do not have major problems in merging individual-level responses into organizational levels.

**Interaction:** In this study, interaction was averaged on a five-point Likert-type scale (5 = absolutely agree, 1 = totally disagree) for three categories:

- (1) My company gives employees detailed information about the company’s current situation;
- (2) I feel free to give my opinion to my supervisor;
- (3) It is easy for departments in my company to communicate with each other.

The reliability coefficients exceeded 0.7 or higher for each year (2009 = 0.81, 2011 = 0.81, 2013 = 0.81, 2015 = 0.81). In addition, annual values of ICC (1) (2011 = 0.13, 2013 = 0.14, 2015 = 0.12, 2017 = 0.11) and annual values of ICC (2) (2011 = 0.77, 2013 = 0.80, 2015 = 0.78, 2017 = 0.75) were shown to have no significant problems in merging individual-level responses at the organizational level.

**Value System:** In this study, the value system averaged responses on a five-point scale (5 = absolutely agree, 1 = totally disagree) for the following three items:

- (1) I feel like the company’s problem is my own problem;
- (2) I will lose a lot of things if I leave my current company;
- (3) It is worth being loyal to the company (Ok, 2017).

The reliability coefficients were above 0.7 for each year (2009 = 0.80, 2011 = 0.75, 2013 = 0.75, 2015 = 0.77). Annual values of ICC (1) (2011 = 0.14, 2013 = 0.14, 2015 = 0.11, 2017 = 0.15) and annual values of ICC (2) (2011 = 0.78, 2013 = 0.79, 2015 = 0.73, 2017 = 0.81) were found to have no major problems in merging individual-level responses to the organizational level.

Since three components of self-organization were not hypothetically tested [15], exploratory factor analysis (EFA) was conducted to verify the validity of each component. As shown in Table 2, each concept of composition was grouped into one factor. In addition, confirmatory factor analysis (CFA) was conducted as a multi-factor structure, based on nine questions from three subfactors for self-organization. The CFA results showed that the model was appropriate, with RMSEA = 0.04, CFI = 0.97, and TLI = 0.96.

**Table 2.** EFA results of self-organization components.

| Component    | Item          | Factor Loading | Eigenvalues | Var (%) | AVE  | CR   |
|--------------|---------------|----------------|-------------|---------|------|------|
| Autonomy     | autonomy1     | 0.836          | 2.15        | 23.90   | 0.64 | 0.84 |
|              | autonomy2     | 0.814          |             |         |      |      |
|              | autonomy3     | 0.761          |             |         |      |      |
| Interaction  | Interaction1  | 0.800          | 2.02        | 22.50   | 0.60 | 0.81 |
|              | Interaction2  | 0.798          |             |         |      |      |
|              | Interaction3  | 0.729          |             |         |      |      |
| Value system | Value system1 | 0.808          | 1.99        | 22.18   | 0.60 | 0.82 |
|              | Value system2 | 0.789          |             |         |      |      |
|              | Value system3 | 0.741          |             |         |      |      |

#### 4.2.3. Exploration

The conceptual definition of exploration is new development and significant improvement in production, organizational management, and marketing techniques [44]. In this study, exploration is defined as the development of new products or services, product or service diversification, and speed of response to the customer's needs. In the HCCP dataset, innovation was measured using three criteria:

- (1) The development of new goods and services;
- (2) The ability to respond quickly to customer needs;
- (3) The diversity of goods and services.

Based on three questions, respondents (employees of a firm) were asked to indicate the level of the firm's exploration. Each question was measured using a five-point Likert-type scale (1 = far less than the industry average, 5 = far more than the industry average). The reliability coefficients exceeded 0.7 or higher for each year (2011 = 0.75, 2013 = 0.27, 2015 = 0.80, 2017 = 0.76). Annual values of ICC (1) (2011 = 0.26, 2013 = 0.14, 2015 = 0.22, 2017 = 0.28) and annual values of ICC (2) (2011 = 0.62, 2013 = 0.65, 2015 = 0.60, and 2017 = 0.66) were shown to have no major problems in merging individual-level responses into organizational levels.

#### 4.2.4. Control Variables

This study introduced variables to control exogenous effects such as industry, the number of employees, the firm's age, the presence of foreign equity, firm strategy, past performance, R&D intensity, and R&D workforce ratio [3,45]. The industry variable was measured based on the Korea Standard Industry Classification. The number of employees was measured by taking the number of full-time employees in a natural logarithm. The firm's age was measured by deriving the difference between its years of establishment and data collection. Firm strategy is a commitment to management's innovation and, therefore, is very closely related to innovation. The firm's strategy was measured separately by prospector, analyst, and defender. It is said that R&D intensity improves innovation by enhancing capabilities for experiments [46]. In this regard, the R&D intensity was measured by dividing the R&D expenditure into sales. The R&D workforce ratio was measured by dividing the number of employees in the R&D function by the number of full-time employees. Past performance was measured by the natural logarithm of the previous year's sales when measuring the independent variable.

## 5. Results

First, the study constructed the HCCP's third wave of data (2009) to the seventh wave of data (2017), as shown in Table 3, to satisfy the condition that the independent variable should precede the dependent variable in time. Although it is composed of five data panels, the seventh data can only be utilized as mediators and dependent variables, making only four repeated measurements possible (T1, T2, T3, and T4).



**Table 3.** Variable measurement time.

| Variable  | T1   | T2   | T3   | T4   |
|---|------|------|------|------|
| Independent variable<br>(Adaptation-oriented HRM) | 2009 | 2011 | 2013 | 2015 |
| Mediator (Self organization)                      | 2009 | 2011 | 2013 | 2015 |
| Dependent variable (Exploration)                  | 2011 | 2013 | 2015 | 2017 |

This study uses panel regression analysis. Since panel regression analysis includes information on temporal dynamics and uniqueness of independents, the influence of omitted variables can be controlled. Panel regression also reduces multicollinearity problems because it provides a lot of freedom and object characteristic information. Panel regression analysis is divided into fixed effect model and random effect mode. The fixed effect model presupposes that the independent effect and the independent variable have a significant correlation, while the random effect model presupposes that the variation based on the unique characteristics of the independents is arbitrary. The advantage of the random effect model is that even if the size of the sample increases, the limitations of the fixed effect model can be overcome in that the number of parameters is constant.

The Least Square Dummy Variable (LSDV) test, in order to establish an optimal panel model for a given panel data in this study, shows that a model with an object dummy variable and a time dummy variable is more suitable than pooled OLS with no dummy variable. Moreover, Hausman tests show that independent variables and time characteristics do not have covariance, using a random effect model (Chi sq. = 24.33,  $p > 0.05$ ). This study uses a generalized least square (GLS) estimation method to address autocorrelation and heteroskedasticity. The study also adds a year-dummy variable to control the fixed effects of a particular year.

Table 4 presents basic statistics and correlation coefficients among variables based on 173 sample companies and 692 observations. Looking at the correlation coefficients between variables, exploration represents statistically significant relationships in self-organization ( $r = 0.43$ ), adaptation-oriented HRM ( $r = 0.23$ ), number of employees ( $r = 0.27$ ), and past performance ( $r = 0.25$ ).

**Table 4.** Correlation.

| Variables                         | Mean | SD   | (1)    | (2)    | (3)    | (4)     | (5)     | (6)    | (7)    |
|-----------------------------------|------|------|--------|--------|--------|---------|---------|--------|--------|
| (1) Exploration                   | 3.55 | 0.44 |        |        |        |         |         |        |        |
| (2) Self organization             | 3.69 | 0.25 | 0.43 * |        |        |         |         |        |        |
| (3) Adaptation-oriented HRM       | 4.28 | 1.78 | 0.23 * | −0.02  |        |         |         |        |        |
| (4) R&D intensity                 | 0.02 | 0.05 | 0.03   | −0.04  | −0.02  |         |         |        |        |
| (5) R&D workforce ratio           | 0.08 | 0.07 | −0.02  | 0.39 * | −0.06  | 0.36 *  |         |        |        |
| (6) Number of full-time employees | 5.84 | 1.03 | 0.27 * | 0.30 * | 0.33 * | −0.07 * | −0.16 * |        |        |
| (7) Firm age                      | 38.0 | 17.4 | 0.05   | 0.04   | 0.00   | −0.02   | −0.08 * | 0.11 * |        |
| (8) Previous performance          | 18.8 | 1.32 | 0.25 * | 0.33 * | 0.34 * | −0.18 * | −0.14 * | 0.81 * | 0.09 * |

Industry, year, foreign ownership, strategy variables are not reported for brevity., \*  $p < 0.05$ ,  $n = 173$ .

The results of testing the theoretical models for the relationship between adaptation-oriented HRM and self-organization and exploration are presented in Table 5. Models 1 and 2 analyze the effects of HRM on self-organization, Models 3 and 5 analyze the effects of HRM on innovation, and, finally, Models 4 and 6 analyze the mediating effects of self-organization.

**Table 5.** The results of panel regression analysis.

| Variables                     | Self-Organization    |                      |                      | Exploration          |                      |                      |
|-------------------------------|----------------------|----------------------|----------------------|----------------------|----------------------|----------------------|
|                               | Model 1              | Model 2              | Model 3              | Model 4              | Model 5              | Model 6              |
| R&D intensity                 | 0.532 **<br>(0.187)  | 0.522 **<br>(0.185)  | 0.382<br>(0.342)     | 0.263<br>(0.335)     | 0.382<br>(0.342)     | 0.258<br>(0.334)     |
| R&D workforce ratio           | −0.255<br>(0.155)    | −0.258<br>(0.150)    | 0.089 **<br>(0.279)  | 0.188<br>(0.251)     | 0.080<br>(0.275)     | 0.173<br>(0.251)     |
| Number of full-time employees | 0.008<br>(0.021)     | −0.002<br>(0.020)    | 0.106<br>(0.037)     | 0.103 **<br>(0.032)  | 0.097 **<br>(0.037)  | 0.096<br>(0.032)     |
| Firm age                      | 0.000<br>(0.000)     | 0.000<br>(0.000)     | 0.000<br>(0.001)     | 0.000<br>(0.001)     | 0.001<br>(0.001)     | 0.001<br>(0.001)     |
| Previous performance          | 0.054 **<br>(0.016)  | 0.053 ***<br>(0.015) | 0.015<br>(0.028)     | −0.004<br>(0.025)    | 0.014<br>(0.028)     | −0.005<br>(0.025)    |
| Adaptation-oriented HRM       |                      | 0.022 ***<br>(0.005) |                      |                      | 0.019 *<br>(0.010)   | 0.014<br>(0.007)     |
| Self-organization             |                      |                      |                      | 0.448 ***<br>(0.068) |                      | 0.423 **<br>(0.069)  |
| Constant                      | 2.512 ***<br>(0.239) | 2.496 ***<br>(0.226) | 2.330 ***<br>(0.424) | 1.136 **<br>(0.392)  | 2.330 ***<br>(0.414) | 1.756 ***<br>(0.435) |
| Chi square                    | 141.68 ***           | 175.17 ***           | 119.69 ***           | 205.50 ***           | 128.17 ***           | 208.22 ***           |
| R-sq (within)                 | 0.092                | 0.088                | 0.087                | 0.057                | 0.081                | 0.056                |
| R-sq (between)                | 0.386                | 0.469                | 0.330                | 0.549                | 0.366                | 0.556                |
| R-sq (overall)                | 0.265                | 0.308                | 0.217                | 0.301                | 0.233                | 0.305                |

Industry, year, foreign ownership, strategy variables are not reported for brevity, \*  $p < 0.05$ , \*\*  $p < 0.01$ , \*\*\*  $p < 0.001$ , number of groups = 173, number of obs. = 599.

As seen in Model 4, self-organization is shown to have a statistically significant positive effect on exploration ( $b = 0.448$ ,  $p < 0.001$ ), which means that Hypothesis 1 is supported. As seen in Model 2, there is a positive relationship between adaptation-oriented HRM and self-organization ( $b = 0.022$ ,  $p < 0.001$ ). Thus, Hypothesis 2 is supported.

The mediating effect is established based on the following criteria. First, the independent variable influences the mediator in the first equation. Second, the independent variable influences the dependent variable in the second equation. Third, the mediator influences the dependent variable in the third equation. If all these criteria are satisfied in the predicted direction, the independent variable's effect on the dependent variable will be weaker in the third equation than in the second.

These results support the partial mediation model for self-organization. The adaptation-oriented HRM is a significant predictor of self-organization (Model 2 in Table 5;  $b = 0.22$ ,  $p < 0.001$ ) and exploration (Model 5 in Table 5;  $b = 0.019$ ,  $p < 0.05$ ). With the adaptation-oriented HRM and self-organization considered in the equation simultaneously, self-organization has a significant effect on exploration (Model 6 in Table 5;  $b = 0.423$ ,  $p < 0.01$ ), adaptation-oriented HRM does not have a significant effect on exploration (Model 6 in Table 5;  $b = 0.016$ ,  $p > 0.05$ ).

These results support Hypothesis 3 (the mediating effect of self-organization in the relationship between adaptation-oriented HRM and exploration). In addition, the Sobel test also showed significant indirect effects ( $z = 3.659$ ,  $p = 0.001$ ).

## 6. Conclusions

Organizational strategies vary depending on the type of innovation a firm pursues. Innovation is categorized as exploration and exploitation. From this perspective, discussions have taken place on the construction of HR systems to pursue exploration and exploitation. Patel et al. (2013) classified HPWS into adaptation-oriented and alignment-oriented: the former means a bundle of HR practices based on the principles of trust and support for the purpose of creating an organizational context for adaptation while the latter focuses

on another bundle of HR practices based on the principles of stretch and discipline for the purpose of creating an organizational context for alignment. This study shows that adaptation-oriented HR practices are related to the exploration (innovation) of a firm and self-organization shows the mediation effect in this relationship.

Lee and Edmondson (2017) argue that a commonality of successful companies in the knowledge economy is that members in these organizations are sensitive to environmental changes and naturally interact to pursue new ideas and innovations [47]. In this context, exploration can be understood as being based on voluntary interactions by members of the organization rather than on top-down control mechanisms within an organization. This study accordingly explores the impact of adaptation-oriented HRM on exploration based on the concept of self-organization. Its results showed that adaptation-oriented HRM positively impacts corporate innovation (exploration) and that the level of the company's self-organization mediates this process.

## 7. Discussion

Based on these findings, this study presents the following theoretical implications. First, it empirically analyzes adaptation-oriented HRM effective for exploration. Based on prior research that separates innovation into exploration and exploitation, Patel et al. (2013) explain that differentiated HR systems, such as adaptation-oriented HRM and alignment-oriented HRM [6], are critical to achieving each. They argue that, in the former case, there is a significant effect on the exploration for significant development. In the latter case, there is an effect on the exploitation of improving efficiency in existing situations. There is only a conceptual explanation concerning this issue, and this study attempts to conduct an empirical analysis to support the prior conceptual study.

Second, this paper analyzes the mediating effect of self-organization in the relationship between HRM and exploration and extends the theoretical model of SHRM research. The study's results reveal that adaptation-oriented HRM forms self-organization within the organization, positively affecting its exploration. Leading innovators such as Google, HP, and Apple are believed to have a high level of self-organization in that they create new ideas through free information sharing and frequent interactions among members to achieve common goals [48].

This study has a methodological implication. This study could be meaningful since it minimized reverse causality, missing variable bias, and the common method variance problem in measuring independent and dependent variables [49]. Most SHRM studies measure HR practices and organizational performance simultaneously, which may lead to questions about whether a well-performing firm reflects good HRM. This paper measures independent and dependent variables at different intervals and constructs the data in the form of a longitudinal study. This study is also conducted with panel regression analysis to diminish the issue of missing variables. In general regression analysis, the value of the regression coefficient of the independent variable for the dependent variable may be affected by upward or downward bias. However, panel regression analysis can control the influence of missing variables because it contains information about temporal dynamics and the uniqueness of objects [50].

Moreover, based on this study's findings, some practical implications can be suggested. First, exploration-seeking organizations should introduce HR systems based on the guiding principles of adaptation-oriented HRM. For example, in terms of trust, which is one of the components of adaptation-oriented HRM, organizations should introduce suggestion systems, internal training, position simplification, and career development plans. Furthermore, in terms of support, which is the other component of adaptation-oriented HRM, organizations should use information-sharing systems, team systems, and mentoring systems.

Second, exploration-seeking organizations should pay attention to the formation of self-organization. As shown in this paper, HRM directly impacts the formation of self-organization, which positively affects exploration. Therefore, the organization needs to go

beyond considering its members as targets of monitoring and control and treat them as active sources of innovation. Therefore, managers of exploration-seeking organizations might need to coordinate management methods to form self-organization.

## 8. Limitations and Future Studies

This study also has some limitations. First, it fails to describe the moderating effects of external environments in the relationship between adaptation-oriented HRM and exploration. Adaptation-oriented HRM is a useful system for enhancing an organization's capacity for environmental adaptation. However, this paper fails to construct the dynamics of the environment as variables. It can be expected that the effectiveness of adaptation-oriented HRM will differ between industries with high dynamics and those without high dynamics. Therefore, it is necessary to shed light on the moderating effects of environmental dynamics in the relationship between adaptation-oriented HRM and exploration.

Second, this study measures self-organization using three components as surrogate variables. Because self-organization involves a continuous process of organizational change, measuring at a point in time may not be feasible. The limitation of using secondary data is that it is not possible to construct accurate questionnaires for concepts. However, this study could be considered meaningful since the phenomenon was measured indirectly through surrogate variables, which are closely related to each variable's concept. Future research needs to be conducted to measure the concept of self-organization.

Third, there may be a selection bias. Only companies that did not close down during 2009–2017 and companies with no major variables missing should be selected to form a balanced panel. Consequently, the study may imply a survival bias in that the analysis was conducted with data from relatively well-performing companies. In future studies, research that includes diverse types of businesses needs to be conducted for a sophisticated analysis of the phenomenon.

Fourth, this study only focused on companies in the manufacturing industry. Although distribution and commodity innovation are also emerging in the service and financial industries, they may have different industrial characteristics regarding the speed of innovation and employee competencies, making it challenging to conduct a comparative analysis with the manufacturing industry [51]. Moreover, this study was conducted in the context of South Korea. Because there could be many differences between the firms in different countries, this could decrease the chance of generalizability in the findings of this study. In future studies, research focusing on the different industries should be conducted and should examine if the findings in this study could be applied to firms in different countries.

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