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How to Establish a Sustainable Organization? A Study on the Relationship between Social Work Characteristics and Innovativeness for Employees of Organizations

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Abstract: The shaping of employees' innovativeness is an important way of building a sustainable organization. Therefore, in order to have a sustainable police organization, the innovativeness of the police must be established in order to achieve the objective of maintaining law and order. In this study, Taiwan's first-line border police officers served as the research subject, and the cross-level model perspective was adopted to investigate their innovativeness from task-oriented and socially oriented viewpoints. At the same time, investigations were made into the cross-level direct and indirect effects of social work characteristics and collective efficacy toward police officers' self-efficacy and innovativeness. A multilevel model was adopted to analyze the quantitative data obtained with 249 border police officers in Taiwan as the research objects. The results showed that social work characteristics have a positive influence on collective efficacy, and motivational work characteristics have a positive influence on employees' self-efficacy and innovativeness. Their self-efficacy showed a positive influence on innovativeness, and a mediating effect on the relationship between motivational work characteristics and innovativeness. Moreover, social work characteristics and collective efficacy have a cross-level contextual effect on self-efficacy and innovativeness, while social work characteristics and self-efficacy have a cross-level interaction on police officers' innovativeness. In general, this study confirmed the importance of employees' innovativeness for the establishment of a sustainable police organization. The characteristics of social and motivational work, self-efficacy, and collective effectiveness are important variables for establishing employees' innovativeness.

Keywords: motivational work characteristics; social work characteristics; self-efficacy; collective efficacy; innovativeness



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1. Introduction

It is generally believed that innovation is a key source of sustainable competition that is required to gain advantages in a constantly changing environment [1]. Studies have shown that innovation is vital to organizational effectiveness. Numerous studies have reported that innovation is crucial to organizational development [2–4]. For example, it can improve organizational performance and promote sustainable organizational development [5–7]. However, it is more valuable when employees have the creative ability to execute innovative measures in organizations [8–10]. In public sectors, to deal with the rapid changes in the outside world and respond to people's needs, they have to make their employees willing to execute the organization's innovative measures. Regarding carrying out the duties of security at international airports and harbors, Taiwan Border Police officers interact with numerous visitors arriving and departing, as well as staff, on a daily basis. Consequently, the ability to show innovative service quality is key to the promotion of Taiwan image.

Based on the above, at an individual level, it was considered that to make police officers accept organizational innovation and execute innovative measures, consideration should be given to the work contents and features for border police officers. For example, through appropriate work design, the organization enables employees to feel their self-value in work and be allowed to have opportunities to exert their specialties, thus leaving them satisfied and able to recognize organization, generate high interests in their own work, become more willing to work, and improve their work performance [11,12]. This “work design” is a critical component of human resource management. When understood and optimized, it improves job satisfaction, as well as the quality, safety, and efficiency of the work [13,14], and has positive impacts on performance, absenteeism, and turnover [15,16]. Eventually, the organization can achieve sustainability.

In 1975, Hackman and Oldham proposed a job design questionnaire, which proved that job characteristics have the motivational strength to improve employees’ psychological perspective and their behavioral performance [17–19]. Based on this viewpoint, Morgeson and Humphrey [13] proposed a comprehensive work design model, and developed the work design questionnaire, which included task, knowledge, social, and contextual characteristics (four different aspects of work characteristics). Task characteristics contained questions like “Can work make employees have autonomy, task variety, significance, identity, and feedback from their job?”. From the viewpoint of Morgeson and Humphrey [13], for Taiwan border police, the job design included various aspects of task characteristics. For example, their work contents include (1) checking the permits of tourists and related staff accessing restricted areas, (2) identifying document authenticity and identity, (3) checking whether the articles match with the application form record, and (4) security and traffic maintenance in the restricted areas. The aforesaid works, tasks, and jobs indicate that border police’s work is very important, and they need to use various skills or professional knowledge. In addition, assigning higher autonomy to them, and to their organization, is necessary to provide proper feedback, so as to complete every task. Furthermore, if the organization can design task characteristics for border police, and autonomy, variety, significance, identity, and feedback from their job showed in their work, it could make them identify the value and contribution from their work. This is one of the best policies to make police officers accept and execute an organization’s innovation.

Studies (e.g., [20]) have shown that employees have a better work performance when they are highly confident about achieving their work goals [21]. Innovation is a totally different thought or approach compared with before, as for such innovativeness or behavior, in addition to having strong motivation, individuals still need to have the belief of completing the task of innovation [14]. The research of Bobic et al. [22] emphasized that people with high task motivation have higher innovativeness [23]. Consequently, self-efficacy can improve the belief and confidence of innovators, from motivation to task completion, and this belief is crucial for the improvement of employees’ innovativeness.

Furthermore, at a group level, to match the contemporary management trend that emphasizes flexibility and change, job design concepts have gradually transformed from the position-based “job design” into the overall task-oriented “work design”, which contains external environment and situation factors [24]. However, Torraco [14] indicated that employees’ various work behaviors and results have to be measured from a multilevel viewpoint, as well as based on an individual level, department, or group level, so as to have an overall measurement of the organization. Consequently, this work design may perfectly match with the necessity of operation in contemporary organizations. Therefore, the comprehensive work design model developed by Morgeson and Humphrey [13] emphasizes the contextual effects of interpersonal society on social characteristics. If an individual is the smallest unit at their work, then the social contextual effect will be higher than the group influence at the individual or organizational level. Members in the same department or group may have a consistent action reaction that is affected by environmental design, but the work contents of an individual member may differ with various task characteristics, so as to make the cross-level work design a theoretical model.

That is, the overall level consists of the organizational environment context and social characteristics. As for the individual level, it is the task characteristics for individual members in an organization [17].

When researchers attempt to build a cross-level work design model, they not only need to consider the mediating and moderating effects on individual levels and cross-levels between variables in the building process of a conceptual structure, they also have to adopt a proper analytical strategy to carry out empirical analyses. Considering the work characteristic issues discussed in this study, as positive work characteristics are capable of effectively improving organization members' attitude, behavior, and work results, the aggregation of positive experiences can also improve an individual's self-efficacy for task completion [25,26]. Therefore, self-efficacy can be considered an important and proper mediating variable for this study [27]. Whether national border police officers accept organizational innovation and innovation executing measures or not, it is necessary to measure the innovativeness of police officers. Moreover, at a group level, self-efficacy is considered to be the influence of "whether their group is capable of organizing, executing, and achieving the cognition and confidence of group tasks" [25] by group members; that is, the collective efficacy. Thus, collective efficacy can also affect an individual's self-efficacy, as well as their belief and confidence in completing the task [28]. Meanwhile, this is based on the strong belief or group belongingness for members to achieve group tasks, which will thus influence the individual's innovativeness [29]. Based on this point, researchers extended the self-efficacy concept to collective efficacy, as it was considered that a collective belief existed in the individual efficacy to complete the organization or group tasks. Furthermore, there is positive influence of innovativeness across levels for individual police officers.

Based on the above, employees' innovativeness is vital to organizational sustainability. Therefore, if the organization can stimulate the self-efficacy and collective effectiveness of employees through work design, it can further promote employees' innovativeness. Most previous studies have discussed the relationship between organizational innovation and company performance, but few scholars have studied the importance of employees' innovativeness for organizational sustainability. Furthermore, in understanding work design and supporting its improvement, the validated work design questionnaire [13] has proven to be a valuable tool producing benefits in a range of industries, including information technology [30], nursing [31], and policing [32] ([16], p. 2).

In summary, the theoretical models of this study tended to regard individual self-efficacy as a mediating variable, and considered motivational work characteristics and collective efficacy as direct and indirect cross-level variables for conducting a multilevel model analysis on the influence of a task-oriented and socially oriented work design model toward individual innovativeness.

2. Literature Review and Hypotheses Development

2.1. Extended Work Design Model

In their study, Morgeson and Humphrey [13] developed a work design questionnaire with 21 factors for evaluating work tasks. For work task, it includes the knowledge, skills, or capabilities that are necessary for individuals to complete their tasks. Morgeson and Humphrey [13] summarized five key assessment indicators of work task from the literature, namely, autonomy, task variety, task significance, task identity, and feedback from job [33], which can be used to measure the levels of work to simulate employees' work interests and motivation [16,34], and has been applied in several types of organizations over the years [35]. Social characteristics refer to the assessment of the connection level of an individuals' work with others or an interpersonal connection. It can be regarded as a resource of the organizational work environment [36]. In such fine work divisions and high professional work environments, the completion of work tasks depends on group operation and interpersonal collaboration [37]. Therefore, social characteristics constitute an important influential factor of an individual's execution of work tasks. It contains the

social support, interdependence, interaction outside the organization, and feedback from others [38]. Among these, interdependence can be divided into initiated interdependence and received interdependence. In short, the comprehensive work design model and work design questionnaire assessment contents cannot only cover the job design model, developed by Hackman and Oldham [39], but can also be extended to the measurement of work society and contextual factor [17]. The main reason for this study, was to apply the work design questionnaire to the work characteristics model assessment.

2.2. Hierarchical Variation in Motivational Work and Social Work Characteristics

To view the work design questionnaire contents, (1) task characteristics and (2) knowledge characteristics had a certain level of overlap of ideas of contents and measurement ranges. For example, there is a similar meaning for the task variety of task characteristics and the skill variety of knowledge characteristics. These two aspects can be regarded as motivational work characteristics, and present differences at an individual level [17]. The task characteristics are involved in work significance, require employees to use various skills or professional capabilities, and give employees higher autonomy and feedback from the job, so as to complete various tasks successfully. As stated in the introduction, the work design of the border police organization includes many aspects of work tasks. For example, certificate identification, document checking, security in restricted areas, and traffic control. Based on this, task characteristics were applied to measure the Motivational work characteristics of the border police.

While analyzing criterion-related validity for a work design questionnaire, Morgeson and Humphrey [13] discovered different types with varied aspects in the correlation between 21 work design factors and work satisfaction. Data show that social work characteristics in the organization work scenario, including factors like social support, work interdependence, and feedback from others, can be considered among the interpersonal contexts for work, but it is a key factor that indirectly influences the individual's work performance [17]. As mentioned above, in the group-based work environment, social work characteristics reflected the positive interpersonal context that individuals sensed in work sites, stronger social work characteristics, and a higher influential level of positive support from the environment or group's background for individuals. In addition, the interpersonal context builds the collective mental models (such as coherence, trust, and collective efficacy) to influence the group's behavioral performance [18,40]. Such a collective interpersonal contextual effect can be approved based on the positive relation with collective efficacy [41].

This study adopted groups as the research unit, and in order to make the contextual effect of social work characteristics testable, it was based on the approaches of Kao [18] in order to exclude external organizational influence, and only internal organizational factors were adopted to show individuals with experienced social work characteristics. Secondly, from the viewpoint of data analysis, social work characteristics were also used as a single variable for the individual level. However, the compilation of the organization/group concept did not emphasize member consistence and consensus, which is an ideal contextual variable [42]. Consequently, this study defines social work characteristics as a group variable; when the compilation method is applied to get the average value of the dissensus idea, organization members may feel like responding to the existence of group concepts (such as collective satisfaction) [43,44]. The social work characteristics evaluated in the present study matched these characteristics. In conducting the actual analysis, the compilation model was used to determine social work characteristics, so as to investigate its influence on group and individual variables.

2.3. Mediating Variables in the Work-Design Model

Under the multi-level research framework, the individual level behavior is derived from the internal motivation of employees caused by the work design. Increasing work responsibility, meaning, and feedback can promote the manifest display of individuals [39], and this behavior may involve the mental state, responsibility, and mental state feedback,

which can be said to be the establishment of the self-belief and values of organization members [17]. Self-efficacy, which is an individual's belief about the degree of confidence to achieve desired goals [28], has a positive effect on an individual's work or life satisfaction [45,46]. Moreover, a high degree of self-efficacy is not only capable of alleviating their work pressure [47], nor is a higher level of professional work execution [48]. Therefore, self-efficacy plays a crucial role in career development as it influences successful behaviors and work decisions [49]. As self-efficacy is a key indicator that affects individual intention and behavioral performance, and employees' interpretation of achievement is far better than the impact of the achievement itself, self-efficacy is more predictive of an individual's future intentions or behaviors [50]. Based on this, people's perception of their own capabilities will affect their dominant performance and the self-regulation mechanism of persistent motivation, which, in turn, will affect their behavioral performance [51]. As mentioned above, task characteristics on self-efficacy may have an important impact, and self-efficacy may also act as a mediating motivation mechanism between work characteristics and individual intention. The empirical studies of Baillien, De Cuyper, and De Witte [29], and Huang and Huang [52] showed that self-efficacy is among the mediating variables of work characteristics and individual innovativeness (or organizational citizenship behavior). In addition, the overall level of behavior is derived from the context of the organization's work and social conditions, which affect the overall organization or group perception and feeling, and the final impact is the organization or group and individual performance [53]. Thus, at a group level, social work characteristics may affect the collective efficacy, and related research (e.g., [18,29]) has also found this possibility. In summary, this study has derived two different levels of hypotheses (as shown in Figure 1):

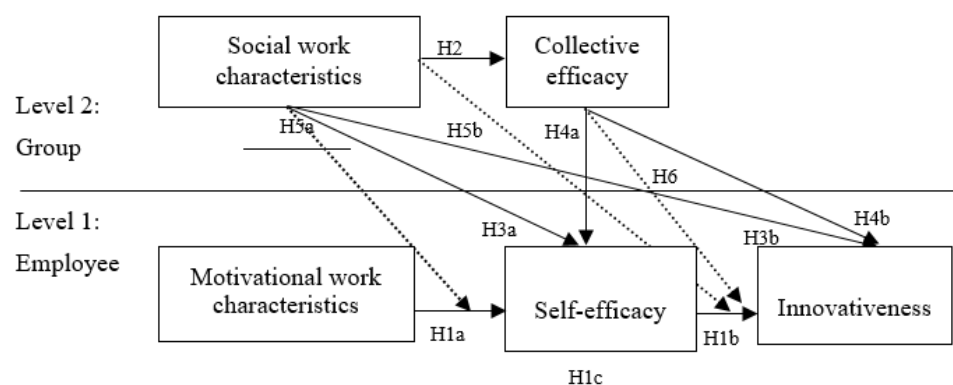


Figure 1. Research model.

Hypothesis 1. *Motivational work characteristics can positively affect self-efficacy (H1a) and self-efficacy can also positively affect innovativeness (H1b); at the same time, motivational work characteristics can positively affect innovativeness through the mediating effect of self-efficacy (H1c).*

Hypothesis 2. *Social work characteristics can positively affect collective efficacy (H2).*

2.4. Cross-Level Effect of Work Characteristics

In this study, social work characteristics are defined as group/department level variables, rather than traditional individual level variables. Therefore, social work characteristics belong to contextual variables [54]. From the perspective of statistical methods, the effect of contextual variables is the average value obtained by lower-level variables at a higher order. After forming contextual variables, the effect on the intercept or slope was tested [42]. Raudenbush and Bryk [55] pointed out that under the multi-level organization structure, group level variables also influence the results of individual levels. In addition to affecting collective efficacy, social work characteristics may also affect self-efficacy at an individual level. This may affect the presentation of employees' innovativeness. In

addition, previous research has confirmed that interpersonal relationships can promote employees' work motivation [56], improve job significance, and show positive behavior results [57]. This has also been confirmed by the research of Kao [18]. Thus, in group research and group work analysis, social factors serve as indispensable variables [41,58]. Based on this point, this study proposed two hypotheses of a cross-level direct effect:

Hypothesis 3. *Social work characteristics can positively affect individual level self-efficacy (H3a) and innovativeness (H3b).*

From a theoretical viewpoint, Bandura [20,25] pointed out that collective efficacy is a group's collective belief, which can influence people's behavior and input, and thus affect their behavioral performance. In this study, it is treated with group level variables. In addition, collective efficacy is the result of the dynamic process of members in the interaction, so it will affect the membership's determination of what to do with the group and how much effort should be invested [17]. Based on the perspective of social cognitive theory, it is an important situation affecting individual members [28]. Based on this, collective efficacy also affects an individual's innovativeness. This is because collective efficacy also affects an individual's task completion belief, that is, self-efficacy. It may be based on members' strong belief in group tasks or the sense of belonging to a group that affects the individual's innovativeness. In this study, two hypotheses of a cross-level direct effect were inferred:

Hypothesis 4. *Collective efficacy positively affects individual level self-efficacy (H4a) and innovativeness (H4b).*

2.5. Cross-Level Moderation of Work Characteristics

Cross-level model theoretical hypothesis: In addition to influencing individual level variables, group level variables may also affect the explanation of the resulting variables from individual level variables, that is, cross-level interactions.

In terms of statistical methods, group level variables act as a kind of moderator, affecting the individual level by explaining the explanatory power of variables to the results variables (the effect of slope) [55]. This theory has also been confirmed in the empirical study of the cross-level model (e.g., [18]). In other words, social work characteristics and collective efficacy (represented by Z_1 and Z_2) may not only directly affect the individual's innovativeness (Y), but may also interact with the individual's level of motivational work characteristics and self-efficacy (represented by X_1 and X_2) to affect innovativeness at the individual level [17]. Here it is expressed by the following equation:

$$Y_{ij} = \gamma_{00} + \gamma_{10}X_{ij} + \gamma_{01}Z_j + \gamma_{11}Z_jX_{ij} + u_{0j} + u_{1j}X_{ij} + \varepsilon_{ij}$$

γ_{10} is the influential force of self-efficacy (slope); γ_{01} is the influential force of collective efficacy (slope); and γ_{11} is the slope for $Z * X$, which reflects the combined effect strength of collective and self-efficacy at the individual level, that is, the slope of the second layer of variables explaining the first layer of slope. This is cross-level interaction, and is also known as moderation effect. From the design of this study, social work characteristics (Z_1) combined with motivational work characteristics (X_1) or self-efficacy (X_2) to generate 2 "cross-level interactions" on an individual's innovativeness, that is, $Z_1 * X_1$ and $Z_1 * X_2$, and collective efficacy (Z_2), combine with self-efficacy to interact with an individual's innovativeness, that is, the $Z_2 * X_2$. Therefore, three cross-level moderation effect hypotheses can be formed:

Hypothesis 5. *Social work characteristics and motivational work characteristics have an interactive effect on self-efficacy (H5a), and Social work characteristics and self-efficacy have an interactive effect on individual innovativeness (H5b).*

Hypothesis 6. *Collective efficacy and self-efficacy have an interactive effect on individual innovativeness.*

3. Research Methods

3.1. Research Framework

Based on the literature review and hypotheses, the analysis of the present study is presented with the following four sections: (1) individual-level causes and effects, as well as mediating effects; (2) group-level causes and effects, as well as mediating effects (social work characteristics → collective efficacy); (3) cross-level effects (social work characteristics → self-efficacy; social work characteristics → individual-level innovativeness; collective efficacy → self-efficacy; collective efficacy → individual-level innovativeness); and (4) cross-level moderating effects (social work characteristics and motivational work characteristics → self-efficacy; social work characteristics and self-efficacy → individual-level innovativeness; collective efficacy and self-efficacy → individual-level innovativeness). The research framework is presented in Figure 1.

3.2. Analytical Strategy

In this study, hierarchical linear modeling (HLM) was used as the main analytical tool. The analytical strategy was applied as follows: Firstly, confirmatory factor analysis (CFA) was used to prove that social work characteristics, motivational work characteristics, self-efficacy, collective efficacy, and innovativeness are independent constructs that can be measured. Secondly, structural equation modeling (SEM) was used to estimate whether self-efficacy has a mediating effect on the relationship between motivational work characteristics and an individual's innovativeness. Furthermore, hierarchical regression analysis was used to detect the relationship between group level variables. In addition, to measure the character of the group level variable, the present study referred to the study of Klein and Kozlowski [53], where r_{wg} was used to measure the group's internal consistency, that is, whether the perception of each research variable among different members of the same unit (such as a certain border police unit) is consistent. Finally, the interclass difference was measured using eta-squared (η^2) by performing ANOVA and using the intraclass correlation coefficient (ICC) in HLM to verify the variations in organizational-level characteristics [18].

3.3. Participants and Sampling

The present study is based on police officers of Taiwan's Police Agency stationed at various airports and ports in the country. It was conducted by first line police officers of the agencies and the international border police of the airport or the port, for which the work characteristics are the same, and the main work is as described in the introduction. In order to make the group-level data have a certain degree of reliability and provide good data quality, and because the HLM method was adopted, the number of people in each group should not be too small. The following restrictions were imposed when selecting the research limitations. (1) At least 10 first line police officers per unit; (2) police officers must have joined the unit for more than 6 months to have a specific understanding of their scope of work and work connotation; and (3) when sampling, the number of groups could be expanded, and the regional characteristics and work characteristics could be balanced. The police bureau served as the study unit, and 10 police stations were chosen from the Aviation Police Bureau and 10 branches from the Harbor Police Department, making 20 police units in total. Each of the 20 police stations mentioned above had at least 10 people, accounting for at least half of the border police stations in Taiwan. Therefore, the sample of this study was representative.

3.4. Research Variable and Measurement Method

The measurement of this variant was as follows:

The work characteristics (motivational work characteristics and social work characteristics) of the border police was measured with the work design questionnaire developed by Morgeson and Humphrey [13]. Because of the cross-level analytical strategy, the number of variables was not too large [44]. Using the method of Hackman and Oldham [33], the motivating potential score indicator was used as a measure of motivational work characteristics, that is, the motivational work characteristics were oriented to autonomy, task variety, job significance, task identity, and feedback from job, with five subscales, and the motivating potential score calculation formula was as follows: motivating potential score = (task variety + task significance + task identity)/3 * autonomy * feedback from job [17].

In addition, the social work characteristics scores were measured by social work characteristics social support, initiated interdependence, received interdependence and feedback from four other subscale measurements; four subscale scores were summed up to obtain individual social work characteristics scores. The scores were obtained by each group member. Thereafter, the multi-level aggregated accumulation model [59] was used to obtain the group mean as the social work characteristics score of the group level. The degree of change between groups was evaluated by the interclass correlation coefficient (ICC 1). This variable was defined by compiling the overall variable without considering the opinion consistency among members; that is, ICC (2) was disregarded [18].

3.5. Self-Efficacy and Collective Efficacy

The individual self-efficacy scale refers to the research scale of [18], which was revised from the “personal efficacy belief scale” developed by Riggs et al. [60]. The topic consists of 10 questions, which use the five-point Likert Scale (1 for very disagree, 5 for very agree). The collective efficacy was measured by the individual using the same environmental context, and the individual’s performance perception of the task or the organization’s performance at the organizational or group level of effectiveness. The collective efficacy score was referenced by Kao [18]. The research scale also revised the “collective efficacy belief scale” developed by Riggs et al. [60], which is a total of seven questions using the five-point Likert Scale. Both sets of efficacy scales were used by Kao [41] for work design studies, the reliability coefficients were 0.76 for the self-efficacy scale and 0.77 for the collective efficacy scale, and the results of the exploratory factors are two independent factors with good validity.

3.6. Innovativeness

The innovativeness of this study was measured using the scale developed by Hurt et al. [61], and was revised according to the Taiwan’s border police characteristics. This scale consists of 20 questions. The innovativeness of this study was for the individual level. According to the variable, it was intended to measure police officers’ acceptance of organizational innovation. The measure aimed at exploring the willingness of police officers to change, solve problems, and accept ideas.

3.7. Control Variables

This study involved the variable analysis of both group and individual levels, so there may be intervening variables in two levels [44]. At the group level, past studies have pointed out that group size is an important factor influencing group operation, the larger the group sizes, the higher the heterogeneity [62], and its impact on collective efficacy also increases [44]. This study included the size of the border police unit in the control variables. At an individual level, previous research has pointed out that the time individuals joined a group will influence their interpersonal interaction, which will in turn influence employees’ behavior [29]. This study incorporated police officers’ years of work into control variables. In addition, analytical data may also be influenced by border police age and education

level [17], hence both variables are also included. The control variables used in this study have been widely used by many researchers (e.g., [29,41]).

4. Results

4.1. Basic Analysis

To test whether SCs, collective efficacy, motivational work characteristics, self-efficacy, and innovativeness are different underlying constructs, this study used the LISREL maximum likelihood method for their comparison in a CFA. Table 1 presents the CFA indicators. The values of the study variables presented in Table 1 revealed that there are five different underlying constructs. Table 2 shows the mean and standard deviation of each variable in this study, as well as the relevant coefficients between variables. Table 3 shows the coefficient α of each variable. From Tables 2 and 3, it can be found that the reliabilities of all of the study variables are greater than 0.7. Moreover, there is a positive correlation among the majority of variables. In addition, this study used the statistical software SPSS for Windows 22.0 for the HLM analysis.

4.2. Test Results from Structural Equation Modeling

In order to detect the overall fitness of the individual level hypothesis model and the relationship between the various variables, an analysis was conducted with LISREL. After conducting the analysis, the overall fitness level of the hypothesis model was found to be good ($\chi^2/df = 2.87$, GFI = 0.95, NNFI = 0.96, PGFI = 0.64, and RMSEA = 0.043). Secondly, for the path coefficient of the research variable, motivational work characteristics, and self-efficacy ($\gamma = 0.35$; $t = 2.89$, $p < 0.01$), and for self-efficacy and innovativeness ($\gamma = 0.38$; $t = 3.12$), the relationship was significant at $p < 0.01$. Therefore, in this study, H1a and H1b were supported. This study also examined the relationship between motivational work characteristics and innovativeness, before self-efficacy was introduced into the SEM mode to investigate the self-efficacy mediating effect. The test showed that the relationship was significant ($\gamma = 0.241$; $t = 2.16$, $p < 0.05$), but it became insignificant after importing self-efficacy into the SEM mode ($\gamma = 0.09$; $t = 0.86$, $p > 0.05$). The mediating variable is the third variable, which shows the mechanism of the independent variable's influence on the outcome variable [63]. That is, this "indirect effect" is that the independent variable affects the outcome variable through the mediating variable. If the mediating variable can only explain partial influencing effects, it is called partial-mediation. If the correlation between the independent variable and the outcome variable is reduced to not significant, it is called complete-mediation. Through the analysis of the mediating variables, the influence of the independent variables on the outcome variables can be explored in more depth and detail [64] (Frazier, Tix, and Barron, 2004). Frazier et al. [64] pointed out that "indirect effects" can be tested using SEM and hierarchical regression analysis. As SEM requires a large sample, most studies adopt hierarchical regression analysis. In addition, Mathieu et al. [65] pointed out that whether indirect effects exist between the independent variable and the outcome variable, the following tests are required: (1) the independent variable (X) must be related to the mediating variable (M) ($X \rightarrow M$), and M must occur after X; (2) the mediating variable and the dependent (or outcome) variable (Y) are related ($M \rightarrow Y$); and (3) when three variables are detected at the same time, the original $X \rightarrow Y$ correlation effect will become smaller. Before this, self-efficacy showed complete indirect effects between motivational work characteristics and innovativeness, motivational work characteristics to self-efficacy, and self-efficacy to innovativeness. The path coefficient product was 13.3 (0.35×0.38), which showed that self-efficacy has a mediating effect of 13.3% in the relationship between motivational work characteristics and innovativeness. In summary, hypothesis H1c is also supported in this study.

4.3. Hierarchical Regression Analysis

This study applied a hierarchical regression analysis to investigate the group level hypothesis mode, and controlled the effect of the variable for individual and group level variables. The test results are presented in Table 4. Table 4 shows that the social work characteristics of mode 2 reached a significant level ($\beta = 0.422$, $p < 0.001$), the adjusted R^2 was 0.292, and the F value reached a significant level ($p < 0.001$). This indicated that group level social work characteristics had a strong explanatory power for collective efficacy, and H2 was supported. Table 4 shows that age, educational level, and current unit service years have no significant effect on self-efficacy and innovativeness. For the control variable of the group level, the number of group members had no significant effect on collective efficacy.

4.4. HLM Testing

Null model: To test whether the correlation between individual and group variables and the innovativeness of police officers was significant, a HLM null model was constructed for the explanatory variable, in order to discern any significant differences among the border police stations (branches). As shown in Table 5, the number of variances between groups was significantly non-zero ($\tau_{00} = 0.091$, $df = 19$, Wald $Z = 3.174$, $p < 0.001$), showing a different innovativeness for police officers in each police station (branch).

Contextual effects (intercepts-as-outcome models): This study conducted HLM's intercepts-as-outcomes model test for self-efficacy and individual innovativeness to explain the intercept variation of level 1. The social work characteristics and collective efficacy of the group level were explained as the variability for level 2. This study estimated the parameters of γ_{01} and evaluated whether the group level had a contextual effect on the individual level variable. From Table 5, the social work characteristics were self-efficacy ($\gamma_{01} = 0.375$, $SE = 0.131$, $t = 2.10$, $p < 0.05$) and innovativeness ($\gamma_{01} = 0.443$, $SE = 0.189$, $t = 2.224$, $p < 0.05$), and collective efficacy versus self-efficacy ($\gamma_{01} = 0.372$, $SE = 0.135$, $t = 2.17$, $p < 0.05$) and innovativeness ($\gamma_{01} = 0.482$, $SE = 0.150$, $t = 2.237$, $p < 0.05$), which have a cross-level effect. Therefore, H3a, H3b, H4a, and H4b are supported.

Moderating effects (slopes-as-outcomes model): In order to test whether H5a, H5b, and H6 are supported, this study analyzed the slopes-as-outcomes model and the results are presented in Table 5. The slope of social work characteristics between motivational work characteristics and self-efficacy was significant ($\gamma_{11} = 0.316$; $t = 1.985$, $p < 0.05$); social work characteristics have a significant degree of slope between self-efficacy and innovativeness ($\gamma_{11} = 0.243$; $t = 2.137$, $p < 0.05$). The slope between the self-efficacy and innovativeness relationship was not significant ($\gamma_{11} = 0.084$; $t = 1.043$, $p < 0.05$). H5a and H5b are supported, but H6 is not supported.

5. Discussion and Conclusions

5.1. Discussion

Based on the research results, several important findings of this study deserve further discussion. Firstly, this study showed that the influence of work characteristics with motivational strength and interpersonal context has a critical influence on improving the self-efficacy of employees and collective efficacy, and plays a decisive role in promoting the innovativeness of employees. Considering the interpersonal context, the cross-level effect of the individual level of research variables, such as motivational work characteristics, self-efficacy, and innovativeness, is a force that cannot be ignored. The results of the analysis are similar to previous studies (e.g., [18,44]), but there are still some differences, for example collective efficacy does not have a cross-level moderating effect. The result of this study shows that if the leadership of an organization can design appropriate work content and working methods based on its organizational structure and functions, it will directly have a positive impact on the behavior of its members. Therefore, if a police organization wants to motivate its employees to accept the organization's innovative measures and implement the organization's innovative actions, it must make its work have more motivational work characteristics. For example, the work content should have a certain degree of

autonomy and get more feedback about the work, so that the workers are willing to put more effort into the work in order to motivate the employees to have higher interest and motivation. This research finding also echoes the existing research findings (e.g., [66]), that is, another important feature of innovation is positive interpersonal exchanges, everyone can freely express their opinions [67,68]. This could mean that the organizations must provide adequate information about the change in order to meaningfully reduce anxiety and uncertainty. Furthermore, it should promote positive expectations about the future results of the change process [69]. Moreover, many studies have proved that management can effectively influence individual, group, or organizational performance by entrusting workers with responsibility roles and supporting coordinators [70–72]. To support and motivate people for organizational change, it actually leads to the development of a sense of participation and makes it easier to comply with the change itself [66]. In addition, Amabile et al. [73] found a significant positive correlation between autonomy and creative behavior; a higher rate of autonomy enables workers to commit to their tasks that sometimes require a non-conventional approach [74]. This is helpful to promote employee's innovativeness.

In addition, this study showed that the work characteristics of Taiwan border police have cross-level social forces that are sufficient to have a cross-level influence on individual behaviors. In addition, their work characteristics have motivational strength, which means police officers should have more professional knowledge, skills, and job feedback, which is necessary to complete their tasks, improve psychological perspective, and beliefs of the tasks, as well as the innovation and breakthrough of the concept and the implementation.

This result showed that the organization's motivational work characteristics and interpersonal society context have a far-reaching influence on individual self-efficacy and innovativeness. Moreover, although social work characteristics have a moderating effect on the relationship between individual level research variables, collective efficacy is not available. These research findings are contrary to our original hypothesis, have a cross-level interaction with group level variables, and the rationale is contradictory [55]. This study showed that regarding social work and motivational work characteristics, self-efficacy has a higher impact on police officers' innovativeness compared with collective efficacy. This phenomenon speculates that the main cause is be the work of Taiwan border police characters with a high degree of interpersonal context. Based on the work contents, the completion of police officers' work tasks depends on the group's operation and interpersonal cooperation. For example, the completion of their work depends on the mutual cooperation of members and the planning of the organization. Regarding the checking and identification of documents in and out of the control area, baggage inspection, transportation, and public security maintenance work, although the individuals completed their work, the work items of each were closely combined. Follow-up work will be difficult and may result in a chain of omission.

Therefore, work tasks must rely on cooperation between group members. Work characteristics are highly socialized. Based on this, social work characteristics not only have a great impact on the collective behavior of police officers, but also on their individual behavior.

5.2. Conclusions

From the results of the hypothesis test, it can be seen that most hypotheses are supported, except for collective efficacy and self-efficacy, which do not have an interactive effect on individual innovativeness. The results showed that social work characteristics have a positive influence on collective efficacy, and motivational work characteristics have a positive influence on both employees' self-efficacy and innovativeness. Their self-efficacy showed a positive influence on innovativeness, and a mediating effect on the relationship between motivational work characteristics and innovativeness. Moreover, social work characteristics and collective efficacy have a cross-level contextual effect on self-efficacy and innovativeness, while social work characteristics and self-efficacy have a cross-level interaction in police officers' innovativeness.

In general, this study confirmed the importance of employees' innovativeness to the establishment of a sustainable police organization. The characteristics of social and motivational work, self-efficacy, and collective effectiveness are important variables for establishing employees' innovativeness.

5.3. Theoretical and Practical Implications

As far as the results are concerned, from the perspective of applying multi-level theory to this article, HLM has the following theoretical implications when interpreting border police organization: (1) Through the statistical analysis of skills using HLM, we can find and consider the influence of interpersonal contexts on police conditions using collective and individual behavior. (2) Using multi-level theory, it was found that at both group and individual levels, the work characteristics of the border police organization have special meanings. For example, at a group level, through the interpersonal context shaped by social work characteristics, the team can be encouraged to complete their tasks, and further promote individual police officers. At an individual level, incentives can be created by the motivational properties of the work characteristics, which further enhance their innovativeness. (3) This study discovered the group level variable on the cross-level moderating effect of the individual level result variable, which allows the academic community to understand the work design. The organization must pay attention to the influence of the interpersonal context and work design. The motivational strength may be inherent, that is, the appropriate work design itself has an incentive force, which highlights the work design's contribution to the organizational incentive of police officers to the benefit of the organization's behavior.

In summary, the conclusion of this study has the following values that cannot be ignored in practice. First, it confirmed that motivational work characteristics influence the organizational behaviors of many police officers, and explained many reasons that encourage police officers to show organizational behaviors or attitudes, such as the power of motivation. We considered how to motivate employees' to complete their tasks, and encourage employees to accept the organization's innovative measures and execute them. This confirms the role and status of motivational work characteristics in work design. Secondly, this study confirmed the power of social work characteristics in work design to motivate team beliefs, such as affecting the collective efficacy of police officers. Furthermore, it was found that through the interaction of social work characteristics and self-efficacy, police officers can accept the organization's innovative measures and execute them. The foregoing explained the cross-level influence of social work characteristics. In addition, this allowed us to know that it is a highly group-oriented and interpersonal work. For work design, we need consider the interpersonal context factors shaped by work characteristics.

In addition, an appropriate work design can help employees understand and adapt to their current situation. It also enables police officers to demonstrate higher innovativeness through skill variety, significance, and the professional nature of their job. This study reported that work design can be achieved by the following: (1) Border police organization enables police officers to improve the variety of professional knowledge and skills required for the processing of their various training courses, such as providing sufficient police officers to deal with work, and the capability of independently solving and motivating their creative course content to improve their belief in completing tasks, thereby increasing individual innovativeness. (2) The management department can vertically extend the job responsibility of police officers and enable them to understand their work. This is important because it contributes to expanding the influence of task characteristics.

Although self-efficacy and collective efficacy are unique concepts [25], the study found that an organization's collective efficacy can cross-level the promotion of police officers' innovativeness, while self-efficacy also has a direct force. In the border police organization, in addition to self-efficacy, it is also necessary to develop the collective belief of police officers to complete the organizational innovation tasks, at the same time allowing police officers classify themselves into groups by relying on the strong beliefs of the group to

complete the tasks or the sense of belonging within the group. This makes them willing to project their goals, motivation, skills, and mental models into their group, thereby promoting the individual implementation of organizational innovation measures. From a practical point of view, it increases the responsibility of police officers towards the work, the trust of the organization, and strengthens the cohesiveness of group members, and should be a good way of improving the level of awareness and confidence of police officers in achieving group tasks.

Finally, this study considered increasing the participation of police officers in the design of the organization's work, shaping organization members' dialogue and communication channels, and inspiring members' beliefs to complete their tasks is also among the ways of improving police officers' innovativeness. Although Alan [75] emphasized that managers have a significant influence on organizational innovation decisions, the problems encountered in the implementation of innovation activities are not as direct and acute as employees, and this is more obvious in large-scale police organizations. Employees' innovativeness to increase the level of organizational innovation not only requires more effort, but should also avoid the possibility of mistakes in innovation decisions [76,77]. Therefore, this study suggested that managers of the border police organization should give first-line police officers the opportunity to participate in relevant decision-making when promoting organizational innovation. At the same time, employees should be allowed to participate in the planning of innovation policy and in making the organization relevant. Rules and regulations should be fairer and openly implemented. This will reduce the impact of innovation activities on employees and eliminate possible resistance. In general, this study confirmed the importance of employees' innovativeness on the establishment of a sustainable police organization. Work characteristics, self-efficacy, and collective effectiveness are important variables for establishing employees' innovativeness.

5.4. Limitations and Suggestions for Future Research

The following constitute the limitations of this research. (1) Sample Characteristics: the Taiwan border police organization served as the research subject, and the respondents were first line police officers. Whether the research results can be applied to other police organizations or other public sectors is worthy of further discussion. (2) Work characteristics often vary according to organizational characteristics or tasks. Different types of organizations also have different work characteristics, which may result in differences in research results. It is recommended that future researchers should consider organization characteristics. (3) A cross-sectional study design was applied in this work. In future, if it can be supplemented by an in-depth interview or longitudinal research orientation, the disadvantages of simultaneously collecting data can be avoided.

Table 1. Goodness of fit indicators for individual-level variables.

Research Variable	χ^2/df		GFI		NNFI		PGFI		RMSEA	
	Observed Value	Ideal Value	Observed Value	Ideal Value	Observed Value	Ideal Value	Observed Value	Ideal Value	Observed Value	Ideal Value
SWCs	2.99	1.00~3.00	0.94	>0.9	0.95	>0.9	0.62	≥ 0.5	0.044	<0.05
Collective efficacy	2.57		0.96		0.97		0.69		0.037	
MWCs	2.61		0.96		0.97		0.67		0.037	
Self-efficacy	2.72		0.94		0.95		0.64		0.042	
Innovativeness	2.23		0.98		0.98		0.75		0.032	
Hypothesized model	2.87		0.95		0.96		0.64		0.43	
References	Schumacker and Lomax [78]		Bentler [79]		Bagozzi and Yi [80]		Browne and Cudeck [81]			

MWCs = motivational work characteristics; SWCs = social work characteristics.

Table 2. Descriptive statistics and correlation coefficient.

Variable	M	SD	Research Variables						
			(1)	(2)	(3)	(4)	(5)	(6)	(7)
(1) MWCs	3.202	0.408	1.000						
(2) Self-efficacy	3.501	0.605	0.437 ***	1.000					
(3) Innovativeness	3.534	0.614	0.329 **	0.432 ***	1.000				
(4) SWCs	3.907	0.311	−0.044	0.277 *	0.195	1.000			
(5) Collective efficacy	3.611	0.347	0.124	0.354 **	0.325 **	0.477 ***	1.000		

(1)–(3) = individual level research variables; (4)–(5) = group level research variables. MWCs = motivational work characteristics; SWCs = social work characteristics; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

Table 3. Alpha Coefficient.

Variable	A Coefficient
1. Motivational work characteristics	0.843
(1) autonomy	0.874
(2) task variety	0.835
(3) job significance	0.794
(4) task identity	0.761
(5) feedback from job	0.703
2. Self-efficacy	0.821
3. Innovativeness	0.815
4. Social work characteristics	0.912
(1) social support	0.870
(2) initiated interdependence	0.851
(3) received interdependence	0.760
(4) feedback	0.827
5. Collective efficacy	0.869

1–3 = individual-level research variables; 4–5 = group-level research variables.

Table 4. Hierarchical regression analysis.

Model Independent Variables (Group-Level)	Model Number			
	1	2	3	4
Group size (control variables)	−0.039	−0.003		
SWCs (independent variable)		0.422 ***		
F	0.302	24.381 ***		
Adj. R^2	0.013	0.292		
Model independent variables (individual-level control variables)				
Age			0.041	0.088
Education level			0.038	0.039
Years of service			0.049	0.047
F			0.511	0.591
Adj. R^2			−0.012	0.011

Dependent variable: Models 1 and 2 are for collective efficacy; model 3 is for self-efficacy; model 4 is for innovativeness; SWCs = social work characteristics.

Table 5. Hierarchical linear modeling results for hypotheses 3–6.

Variable	γ_{01}	τ_{00}	γ_{11}
1. The null model		0.091 ***	
2. Context effects (intercepts-as-outcomes model)			
(1) SWCs: self-efficacy	0.375 ** (0.131)		0.316 * (0.267)
(2) SWCs: innovativeness	0.443 *** (0.189)		0.243 * (0.175)
(3) Collective efficacy: self-efficacy	0.372 ** (0.135)		0.084 (0.074)
(4) Collective efficacy: innovativeness	0.482 *** (0.150)		
		3. Moderating effects (slopes-as-outcomes model)	
		(5) SWCs (MWCs: self-efficacy)	
		(6) SWCs (self-efficacy–innovativeness)	
		(7) Collective efficacy (self-efficacy–innovativeness)	

The numbers in brackets are standard error; (1) to (4) are the contextual effects of group level variables for individual level variables. For example, SWCs: self-efficacy is the contextual effect of group-level SWCs on the individual level self-efficacy. (5) to (7) are the moderating effects of group-level variables on the relationship between individual level independent variables and the dependent variable. For example, group-level SWCs (MWCs: self-efficacy) moderate the relationship between the individual level independent variables (MWCs) and the dependent variable (self-efficacy). The table lists the indicators for the tested hypotheses only. MWCs = motivational work characteristics; SWCs = social work characteristics; * $p < 0.05$; ** $p < 0.01$; *** $p < 0.001$.

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