Prevalence and Predictors of Quality of Ethnic Minority Human Resources in the Central Highlands of Vietnam

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Abstract

This study investigates the prevalence and predictors of ethnic minority human resource (HR) quality in Vietnam's Central Highlands through a community-based cross-sectional survey across five provinces. The study assessed ten factors: "Overall Quality" (knowledge-KNO, attitude-ATT, skills-SKI, physical strength-PHY) and "Supporting Policies and Conditions" (utilization policy-USA, training and development-TRA, remuneration-REM, standard of living-EAR, working conditions-CON, culture-CUL). Significant relationships were found among the all factors of the group "Supporting Policies and Conditions" (p<0.001 all). Moreover, five factors (USA, TRA, EAR, CON, CUL) with demographic factors such as ethnicity, education, management experience, and years of work showed significant impacts the quality of ethnic minority HR (p<0.05 all). These results highlight the importance of comprehensive policies and targeted training programs to improve the overall quality of ethnic minority human resources, providing valuable insights for policymakers to enhance socio-economic development in Vietnam's ethnic minority communities.

Keywords: *Prevalence; Predictor; Quality; Human resources, Ethnic minorities; Central highlands.*

Introduction

Human resources (HRs) play an essential key in developing and positioning every organization and every region (Arifin et al., 2022; Darmawan et al., 2020; Sinambela et al., 2022). Vietnam, especially the Central Highlands of Vietnam, is no exception and is also influenced by human resources (Vietnam's Central Highlands, consists of Dak Lak, Dak Nong, Gia Lai, Kon Tum and Lam Dong, is a region with a diverse population of ethnic minorities, playing an important role in the development of Vietnam) (Hanh, 2020; Nga, 2024; Q. T. Pham et al., 2024; Truc et al., 2024).

Population of ethnic minority groups (2.1 million) was estimated 15.6% in the region of the central highlands and 37.6% of total population of Vietnam (Ha P. T. H. & Huyen, 2023). Most of the ethnic minorities reside in remote, rural areas across the region. Each ethnic minority group possesses its own unique language, lifestyle, and culture (UNFPA, 2009, 2011). Hence, the ethnic minority groups in the central highlands face unique challenges due to cultural, socio-economic, and educational factors. These challenges are barriers to these ethnic minority groups in order to develop their communities and individuals. To develop these communities, workers (employees) coming from these communities play a major role. Therefore, the government's efforts to enhance the quality of life and employment conditions for these communities, significant disparities in human resource quality persist.

Currently, there are studies that have conducted survey data to examine factors that affect the quality of HRs in various areas, including ethnic minorities. Hanh (2020) found six factors (development policy,

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training and vocational training institutions, scientific and technological development, state and provincial policies, business managers, and personal employees) influencing HR development for small and medium-sized enterprises service in Thai Nguyen province in the Fourth Industrial Revolution. Rahim and Kazem (2023) examined the quality of human resources in terms of recruitment, training, compensation, and employee relations impact on competitive advantage in terms of cost, quality, creativity, excellence, and knowledge. Erika et al. (2023) explored factors (work-life balance, perceived self-worth, respect, and organisational bureaucracy) that influenced employee engagement of Generation Z in Indonesia from the COVID-19 pandemic to the end pandemic. Tung et al. (2023) concerned factors developing high-quality HR for Hai Phong in Vietnam. The study showed that high-quality human resources in terms of quantity, quality, and structure increased from 2017 to 2021. The authors suggested policies to enhance the development of high-quality human resources in Hai Phong City. Ngoc et al. (2024) considered various factors developing HR in the public sector in Ho Chi Minh City. In the study, factors (e.g., culture, training and career development, working environment, remuneration) affected the development of HR. Ta et al. (2023) conducted their study across nine provinces to examine the impact of Industry 4.0 awareness on physical and mental strength, managerial skills, and the development of ethnic minority HRs in Vietnam. In addition, there are studies that suggested policies to enhance the quality of ethnic minority groups. Anh (2017) suggested that policies related to paying employees well encourage high performance from employees. Kho (2021) suggested that the qualifications of ethnic minorities in the Southwest region of Vietnam were increased if there were appropriate priority and remuneration regimes. Diep et al. (2023) introduced that traditional culture, lifestyles, and customs were essential elements in developing the capacity and quality of HRs. From these above studies, there is a lack of studies related to exploring factors that affect the quality of ethnic minority HRs in order to understand the prevalence and predictors of these disparities and formulate effective policies and interventions.

This study aims to explore the prevalence of quality human resources among ethnic minority workers in the central highlands and identify key predictors influencing this quality. By examining both intrinsic and extrinsic factors, including ethnic minority human resource utilization policies, training and development policies, remuneration, standard of living, working conditions, and cultural factors, this research provides a holistic understanding of the current state of ethnic minority human resources. The findings of this study are expected to inform policymakers and stakeholders about the critical areas that need attention and improvement. By highlighting the interconnectedness of various quality factors and the influence of supporting policies, this research underscores the importance of a multi-faceted approach in enhancing the overall quality of ethnic minority human resources in the central highlands of Vietnam.

Research Methodology

Study design, study areas and participants

This survey was a community-based cross-sectional study conducted in five provinces in the central highlands of Vietnam. The following criteria of participants are: (1) they are at least 18 years old, (2) they are the ethnic minority groups in the central highlands of Vietnam, and (3) they are working in the central highlands of Vietnam.

Study measures

Participants were instructed by well-trained research assistants to complete a structured questionnaire consisting of two parts. Part 1 included the sociodemographic characteristics of the respondent, such as gender, education degree, etc. Part 2 (67 items) gathered satisfied information. Participants were chosen with "1" indicating "strong dissatisfaction" and "5" indicating "strong satisfaction" for each item.

Data Collection

The research data was collected from 429 ethnic minority workers from institutions in the central highlands region of Vietnam through random selection. The survey consisted of 450 questionnaires, which included

demographic information (e.g., gender, education degree) and 67 items classified into ten factors: knowledge (KNO), attitude (ATT), skill (SKI), physical strength (PHY), ethnic minority human resource utilization policy (USA), training and development of ethnic minority human resources policy (TRA), remuneration policy (REM), standard of living - income (EAR), working conditions (CON), and culture (CUL). The 67 items were measured on a 5-point Likert scale, with "1" indicating "strong dissatisfaction" and "5" indicating "strong satisfaction". Data from participants' responses were recorded using hard-copy questionnaires.

Data analysis

The ten factors in this study were divided into two groups: the first group, named "Overall Quality," includes knowledge (KNO), attitude (ATT), skills (SKI), and physical strength (PHY). The second group, named "Supporting Policies and Conditions," includes ethnic minority human resource utilization policy (USA), training and development of ethnic minority human resources policy (TRA), remuneration policy (REM), standard of living-income (EAR), working conditions (CON), and culture (CUL) (Truc et al., 2024).

Our analysis was conducted with meticulous attention to detail. We calculated a standardized score for each factor in the "Overall Quality" and "Supporting Policies and Conditions" groups reported by study participants. This score summed all items in one factor and converted the total to a percentage. Each score was categorized as "Yes" if its value was greater than or equal to 50; otherwise, it was classified as "No". The associations among factors in the two groups were examined using the Odd ratio (OR) and Pearson's test. We hypothesized that the factors in the "Supporting Policies and Conditions" group among ethnic minority workers were likely to be associated with the factors in the "Overall Quality" group and the combined factors. The odds ratio (OR) was used to examine the association between the factors in the "Supporting Policies and Conditions" group and each factor in the "Overall Quality" group.

Our study employed a robust logistic regression model to identify effect factors associated with "Overall Quality" among participants. The explanatory variables investigated included gender, ethnicity, working sector, management experience level, political knowledge level, number of years of working experience, education, foreign language proficiency, and computer skills. Univariable models were first screened for all explanatory variables, and those with a p-value less than 0.20 were selected as candidates for the final model. The multivariable model consisted of variables with $p < 0.05$ and was used to identify significant effect factors associated with "Overall Quality" in ethnic minority workers. An examination of interactions between all pairs of explanatory variables was conducted to identify any potential confounding effects. All statistical analyses were performed using the R statistical software. The "stats" package was utilized to construct the logistic regression models, and the "ggplot2" package was used to create data visualizations.

Result

Participants' characteristics

There was a total of 429 participants in this study. Most respondents were male, accounting for 52.9% of the total. Among the ethnic groups, the two majority groups were Ede and Gia-rai (25.9% each). Participants working in the public sector accounted for 58.0%. More than half of the participants (55.2%) had management experience, with 17.2% at the senior level and 38.0% at the junior level. Similarly, 54.1% of participants had political knowledge, with 9.6% at the advanced level, 21.9% at the moderate level, and 22.6% at the elementary level. Additionally, more than half of the participants (57.2%) had a bachelor's degree or higher education status. A significant proportion of the participants possessed foreign language skills (46.9%) and computer skills (42.2%). The demographic information of the participants is outlined in Table 1.

Table 1. Characteristics of Study Participants

Characteristics of Participants (n=429)	Frequency (n)	Percentage (%)
Gender		
Male	227	52.9
Female	202	47.1
Ethnic		
Ba-Na	71	16.6
Co-ho	60	14.0
Ede	111	25.9
Gia-rai	111	25.9
MNong	23	5.4
Xo-dang	25	5.8
Others	28	6.5
Working sector		
Public	249	58.0
Private	180	42.0
Management experience level		
Senior	74	17.2
Junior	163	38.0
None	192	44.8
Political knowledge level		
Advance	41	9.6
Moderate	94	21.9
Elementary	97	22.6
None	197	45.9
No. of years of working experience		
> 15 years	108	25.2
10 – 15 years	166	38.7
5 – 10 years	102	23.8
<5 years	53	12.3
Education		
Primary school	29	6.8
Secondary school	62	14.5
High school	70	16.3
Vocational degree	14	3.3
Associate degree	9	2.1
Bachelor degree	183	42.7
Upper bachelor degree	62	14.5
Foreign language		
Yes	201	46.9
No	228	53.1
Computer skill		
Yes	181	42.2
No	248	57.8

The characteristics of factors for quality measurement among participants

A total of 429 participants reported four factors, e.g., knowledge (KNO), attitude (ATT), skill (SKI), and physical strength (PHY), to measure the quality of ethnic minority human resources in the central highlands of Vietnam. Most participants reported that these four factors were used for quality measurement, representing the median value with an interquartile range (IQR). Among participants, more than two-thirds of participants reported the KNO (65.58%, SE ±0.77) with median standardized score 64.0 [IQR: 52.0 –

76.0], ATT (64.60%, SE ±0.71) with median standardized score 65.0 [IQR: 50.0 –75.0], SKI (66.69%, SE ±0.70) with median standardized score 65.0 [IQR: 55.0 –80.0], and PHY (64.54%, SE ±0.70) with median standardized score 63.3 [IQR: 53.3 –73.3] (see Fig. 1). In our research, there were significant correlations among four factors related to quality measurement in ethnic human resources in the central highland of Vietnam (Pearson's coefficient R > 0.8, p < 0.001 all) (see Fig. 2).
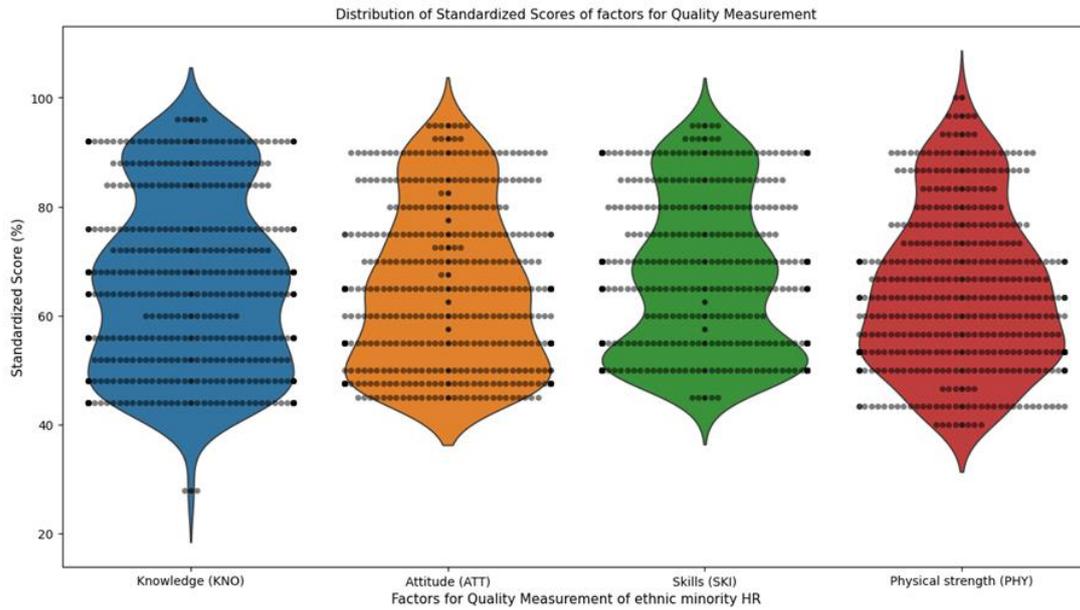

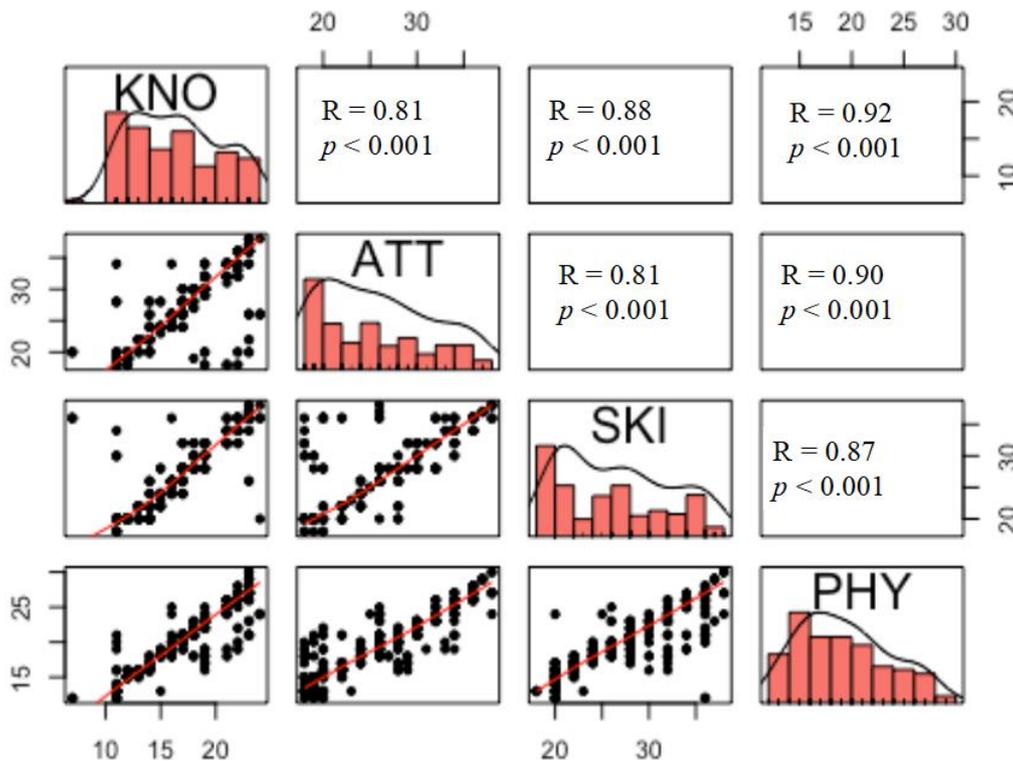**Fig. 1**. Standardized scores for each factor for quality measurement listed by participants

Fig. 2. The correlation among four factors for quality measurement of participants

Association of factors for quality measurement among participants

In our research, we analyzed the association between "Overall Quality"-based factors and the set of six factors in the group "Supporting Policies and Conditions" among ethnic minority participants. The results revealed a significant correlation between "Overall Quality" factors and all factors in the "Supporting Policies and Conditions" group for ethnic minorities working in the central highlands of Vietnam. The USA factor had the highest effect on "Overall Quality" factors, accounting for 11% of OR value ($p < 0.001$). This was followed by REM (OR=7%), EAR, and CUL (each OR=5%), all with $p < 0.001$. For KNO, the factors with the highest effect were USA (OR = 19%) and CON (OR = 14%), both with $p < 0.001$. For ATT, the leading effect factors were USA (OR = 14%) and CON (OR = 12%), both with $p < 0.001$. For SKI, the most significant effect factor was USA (OR= 1%), and for PHY, it was USA (OR=12%), both with $p < 0.001$. Further details on the relationship between "Overall Quality (KNO, ATT, SKI, PHY) and all factors in the "Supporting Policies and Conditions" group are provided in Table 2.

Table 2. The Association Between Factors For Quality Measurement Among Patients (N = 429)

		KNO (n=335)			ATT (n=349)			SKI (n=424)			PHY (n=381)			Combined factors (n=385)		
		Yes	No	ORs	Yes	No	ORs	Yes	No	ORs	Yes	No	ORs	Yes	No	ORs
USA (n=330)	Yes	293	37	0.19***	291	39	0.14***	329	1	0.01***	319	11	0.12***	320	10	0.11***
	No	42	57		58	41		95	4		62	37		65	34	
TRA (n=376)	Yes	306	70	0.08***	316	60	0.06***	372	4	0.003***	342	34	0.04***	343	33	0.03***
	No	29	24		33	20		52	1		39	14		42	11	
REM (n=329)	Yes	282	47	0.17***	278	51	0.10***	326	3	0.006***	305	24	0.08***	306	23	0.07***
	No	53	47		71	29		98	2		76	24		79	21	
EAR (n=391)	Yes	329	62	0.10***	331	60	0.06***	387	4	0.003***	366	25	0.06***	366	25	0.05***
	No	6	32		18	20		37	1		15	23		19	19	
CON (n=354)	Yes	304	50	0.14***	313	41	0.12***	350	4	0.003***	324	30	0.06***	324	30	0.04***
	No	31	44		36	39		74	1		57	18		61	14	
CUL (n=357)	Yes	292	65	0.09***	298	59	0.07***	355	2	0.003***	329	28	0.06***	330	27	0.05***

No	43	29	51	21	69	3	52	20	55	17

* p<0.05; ** p < 0.01; *** p < 0.001

Predictors for quality of ethnic minority human resources

In the univariable models, eleven variables associated with quality measurement of ethnic minority human resources were identified: ethnic, management experience level, political knowledge level, number of year working experience year, educational degree, USA, TRA, REM, EAR, CON, and CUL. These variables were selected for inclusion in the multivariable model. The findings from the multivariable model indicated that the three ethnic groups (Ba-Na, others, and Gia-rai) had 17.139, 15.976, and 7.205 times higher effect of quality measurement than the Xo-dang group (p<0.05 all). Participants categorized as senior had a 0.035 times higher impact on quality measurement than those in the management experience level group (p=0.022). Participants with more than 15 years of working experience were 6.11 times higher than those with less than five years of working experience (p=0.031). Participants with the better utilization policy (USA with "Yes") had 11.26 times higher than the USA with "No" (p<0.001). The better training and development policy (TRA with "Yes") was 0.71 times higher than TRA with "No" (p<0.001). Furthermore, employers having a higher standard of living-income (EAR), working conditions (CON), and culture (CUL) had respective 5.35, 3.23, and 5.96 times higher than the same groups (p=0.001, p=0.023, and p<0.001). Details of the factors analysis for quality measurement are described in Table 3.

Table 3. Predictors Of Factors For Quality Measurement Among Participants

Factors	Univariable models			Multivariable model*		
	OR	95% CI	p-value	OR	95% CI	p-value
Gender (baseline = Male)						
Female	1.08	-0.55 ; 0.71	0.819			
Ethnic (baseline = Xo-dang)						
Ba-Na	8.63	0.542 ; 4.15	0.014	17.14	0.53 ; 5.49	0.023
Co-ho	1.89	-0.67 ; 1.89	0.320	5.14	-0.34 ; 3.67	0.106
Ede	1.60	-0.74 ; 1.54	0.411	3.13	-0.62 ; 2.88	0.198
Gia-rai	2.83	-0.22 ; 2.21	0.087	7.21	0.10 ; 3.87	0.039
MNong	1.67	-1.02 ; 2.20	0.521	1.99	-1.56 ; 3.04	0.553
Others	2.08	-0.79 ; 2.41	0.353	15.98	0.32 ; 5.46	0.033
Working sector (baseline = Private)						
Public	1.06	-0.59 ; 0.68	0.862			
Management experience level (baseline = None)						
Senior	1.37	-0.53 ; 1.27	0.490	0.04	-6.35 ; -0.49	0.022
Junior	1.65	-0.20 ; 1.24	0.168	0.17	-4.26 ; 0.83	0.163
Political knowledge level (baseline = None)						
Advance	1.76	-28.85 ; 341.32	0.987	4.38e+08	-40.79 ; 482.81	0.989
Moderate	1.04	-0.68 ; 0.80	0.919	6.55	-0.63 ; 4.32	0.126
Elementary	2.31	-0.03 ; 1.85	0.076	11.53	-0.32 ; 5.11	0.072
No. year of working experience (baseline = <5 years)						
> 15 years	2.22	-0.26 ; 1.85	0.133	6.11	0.19 ; 3.51	0.031
10 – 15 years	1.56	-0.51 ; 1.32	0.336	4.02	-0.02 ; 2.83	0.053
5 – 10 years	1.47	-0.62 ; 1.36	0.440	2.45	-0.57 ; 2.40	0.234
Education (baseline = Associate degree)						
Primary school	3.86	-0.90 ; 3.62	0.214	8.66	-0.82 ; 5.23	0.153
Secondary school	1.33	-1.71 ; 1.86	0.746	3.97	-1.09 ; 3.70	0.248

High school	2.21	-1.22 ; 2.42	0.369	2.35	-1.61 ; 3.11	0.467
Vocational degree	3.71	-1.19 ; 4.49	0.317	2.02	-2.46 ; 4.41	0.673
Bachelor degree	2.79	-0.93 ; 2.54	0.223	5.84	-0.72 ; 3.99	0.132
Upper bachelor degree	5.62	-0.42 ; 3.69	0.083	14.54	-0.25 ; 5.65	0.070
Foreign language (baseline = No)						
Yes	1.18	-0.46 ; 0.81	0.607			
Computer skill (baseline = No)						
Yes	1.06	-0.57 ; 0.71	0.856			
USA (baseline = No)						
Yes	16.74	2.10 ; 3.62	<0.001	11.26	1.46 ; 3.48	<0.001
TRA (baseline = No)						
Yes	2.72	0.21 ; 1.73	0.009	0.71	-1.57 ; 0.82	<0.001
REM (baseline = No)						
Yes	3.54	0.62 ; 1.91	<0.001	2.32	-0.13 ; 1.83	0.090
EAR (baseline = No)						
Yes	14.64	1.93 ; 3.45	<0.001	5.35	0.68 ; 2.72	0.001
CON (baseline = No)						
Yes	2.48	0.19 ; 1.58	0.010	3.23	0.15 ; 2.20	0.023
CUL (baseline = No)						
Yes	3.79	0.64 ; 1.99	<0.001	5.96	0.81 ; 2.81	<0.001

* Intercept = 8.181e-04; SE = 1.996

Discussion

This research delves deeply into the overall quality experienced by individuals who are ethnic minority workers at the central highlands of Vietnam. Our findings highlighted a substantial prevalence of all factors (KNO, ATT, SKI, PHY) in the group "Overall Quality" for quality measurement in the ethnic minority workers, accounting for over 60 %. Additionally, among these four factors also had strong association with significant statictis ($p<0.001$). The strong positive correlations and the high statistical significance suggested that the factors within the "Overall Quality" group are closely interrelated. Improvements in one factor (e.g., KNO) are likely to be associated with other factors (e.g., ATT, SKI, and PHY). These findings emphasized the significance of taking a comprehensive approach in policy-making and training programs to enhance the overall quality of ethnic minority workers in the central highlands of Vietnam.

We observed a significant occurrence of all factors in the group "Supporting Policies and Conditions" being the most prevalent, with EAR affecting 391 workers (91.14%), TRA impacting 376 workers (87.65%), CUL affecting 357 workers (83.22%), CON affecting 354 workers (82.52%), and USA 330 workers (76.92%). Furthermore, our investigation pinpointed USA and REM as the primary effect factors influencing the quality of ethnic minority experiencing these factors. This aligned with other research emphasizing that factors were high prevalence (Adeagbo & Oyemogum, 2014; Appelbaum et al., 2017; Azizi et al., 2021; Hanh, 2020; Irawan et al., 2021; Nga, 2024; Q. T. Pham et al., 2024; Pouryazdan et al., 2015; Vu et al., 2024).

We identified significant predictors of quality, including ethnicity, management experience level, political knowledge level, number of years of working experience, educational degree, and specific policies related to human resource utilization (USA), training and development policy (TRA), remuneration, standard of living-income (EAR), working conditions (CON), and cultural support (CUL). Notably, ethnic groups such as Ba-Na, others, and Gia-rai showed higher quality measurement effects compared to the Xo-dang group. Participants with extensive working experience, better utilization policies, and favorable living and working conditions demonstrated significantly higher quality. These results aligned with other research emphasizing that factors were high prevalence (Adeagbo & Oyemogum, 2014; Appelbaum et al., 2017; Hanh, 2020; Nga, 2024; Pouryazdan et al., 2015). These findings highlight the importance of a holistic approach in policy-making and training programs to enhance the overall quality of ethnic minority workers in the central highlands of Vietnam. Improving education, training, working conditions, and cultural support can

significantly impact the quality of ethnic minority HRs, contributing to the region's socio-economic development.

However, our study faced several limitations, including a sample limited to ethnic minority workers in Vietnam's central highlands, which may not represent all ethnic minority groups nationwide. The self-reported nature of the survey introduces potential bias, and the cross-sectional design limits causal inferences. Additionally, while numerous relevant factors were examined, other unexamined variables might influence the quality of ethnic minority human resources. The findings are specific to the central highlands and may need to be more generalizable to other regions with different socio-economic and cultural contexts.

Conclusion

Our study aims to expand the understanding of the factors influencing the quality of ethnic minority human resources in the central highlands of Vietnam. The findings of this research may assist in creating effective strategies for enhancing the quality of ethnic minority human resources in this region. The six factors in the group "Supporting Policies and Conditions" (USA, TRA, REM, EAR, CON, CUL) were identified as significant contributors to the quality of ethnic minority human resources, with all showing significant statistical correlations ($p<0.001$). Additionally, five factors in the "Supporting Policies and Conditions" group (USA, TRA, EAR, CON, CUL) along with demographic factors (ethnic groups, education, management experience level, number of years of working experience) were significant predictors in the model ($p<0.05$ all). These findings could help policymakers understand the factors affecting the quality of ethnic minorities in the central highlands of Vietnam and suggest policies to encourage the socio-economic development of ethnic minority groups in the region. Future research should explore the disparities in human resource development between ethnic minorities and the general population in the central highlands. Specifically, studies should compare the factors affecting human resource development in ethnic minority groups versus the majority population. Additionally, examining the effectiveness of tailored policies and programs designed to enhance education, training, working conditions, and cultural support among ethnic minorities could provide valuable insights for improving socio-economic outcomes in the region.

Acknowledgments

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