

Factors affecting Human Resource Development of Mechanical Enterprises in Vietnam

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Abstract- The aim of this study is to determine factors influencing human resource development of mechanical enterprises in Vietnam. The 392 usable data were collected; the Exploratory Factor Analysis (EFA) and the model and hypotheses were tested with Pearson's Correlation Coefficient. The research findings indicated that four factors affecting human resource development of mechanical enterprises including (i) Technology, (ii) Learning Motivation, (iii) Learning Culture of the enterprise and (iv) Abilities of employees. Furthermore, recommendations are proposed to enhance human resource development in mechanical enterprises.

Keywords: human resource; human resource development; mechanical enterprise; Vietnam

1. INTRODUCTION

The basic content of human resource development is to increase the value of human resource in capacity and quality. Enhancing employees' knowledge and skills through training is essential for each enterprise to successfully persist in the challenging business environment. Organizations gain a variety of benefits through the improved performance and increased productivity that accompany employee development, while employees enjoy extrinsic and intrinsic rewards associated with skill development and performance improvement (Elangovan et.al., 1999)[7]. Effectiveness is measured by how many training participants successfully apply their learning on the job (penetration); how long training participants continue to apply the learning on the job (sustainability); and how quickly the organization will realize the benefits for the entire target audience (speed).

However, in order to have an effective training program, every enterprise needs to identify factors that affect its. Mechanical enterprises also have their own characteristics, so doing survey and exploring basic factors affecting human resource development will help enterprises have solutions to get high efficiency in business.

There are 22.000 mechanic enterprises in Vietnam in 2017, with more than 500 types of products such as machine tools, electric motors and metal products. We guaranteed 32.5% of domestic demand and 30% for export. In 2015 we import \$ 32.5 billion of mechanical equipment while the export value is only \$ 26.6 billion. In

fact, if the domestic mechanical companies develop, occupy the domestic market, exporting will make a big revenue. At present, the output of mechanical engineering accounts for only 22% of the total industrial production value, while investment capital accounts for more than 16% and the labor force accounts for 12% with over 1 million employees.

Actually, the mechanical industry lacked the strength of R&D consultants and leading experts. Human resources in mechanical companies do not have suitable training and development plans. In addition, there is not a contractual cooperation between training institutions, laborers and employers; Employment structure in labor market is still unreasonable. Currently, mechanical enterprises face with serious shortage of research and development engineers, especially the forces of designers, general engineers or chief engineers for the whole design projects. On the other hand, the mechanical industry in Vietnam depends heavily on foreign supervisors and consultants. In general, the quality of human resources does not meet the requirements of high-tech manufacturing in the market mechanism. Moreover, the management level of enterprises' owners is quite low, not active and sensitive to the competition. Strategic relation between enterprises in accordance with the basic principles of the process of production organizing in deep specialization and wide cooperation has not been paid attention and developed.

2. THEORETICAL FRAMEWORK

Table 1: Summary of Factors affecting Human resource development in Researches

Factor	Reference source (Author and year)
Self characteristics	A.R.Elangovan, Leonard Karakowski (1999), Jayawardana et al. (2008)
Lifelong learning, self efficacy	Phana Dullayaphut, Subchat Untachai (2012), Avram Tripon (2013), Noe et al. (2013), Gary Dessler (2015)

Technology	Graham Beaver and Jim Stewart (2004), Rosemary Hill and Jim Stewart (2000)
Learning culture	Tracey, J.B. et al (1995), Peter L. Jennings, Paul Banfield (1996), Graham Beaver and Jim Stewart (2004), Xiao J.(2005), Ji Hoon Song et al. (2012)
Support	A.R.Elangovan, Leonard Karakowski (1999), Xiao J.(2005), Jayawardana et al. (2008), Graham Beaver and Jim Stewart (2004)
Motivation	A.R.Elangovan, Leonard Karakowski (1999), Noe, 1986, Tsai, W. C et al. (2003), Jayawardana et al. (2008), Gary Dessler (2015)
Working environment	Noe A. Raymond et al (1993), A.R.Elangovan, Leonard Karakowski (1999), Jayawardana et al. (2008)

In this study, the author examines the internal factors affecting the human resource development of a mechanical enterprise. This allows the enterprise to have proactive adjustments to achieve the most positive effects.

2.1. Technology

Technology is an important factor in assessing the production capacity, which directly affects the production quality. The technology reduces labor expenses, thus reduces costs of labor and raw materials, leading to business efficiency. The human factor of technology covers the knowledge, skills and habits of participants in the implementation of technology. Therefore, the development of human resource is to meet the demands of production technology in the enterprise. Technology changes, workers also need to adapt to master the technology. This ensures efficient exploitation of the fourth industrial revolution brings mass difference in manufacturing process and requires the mechanical industry change in human resource. Industry 4.0 is expected to lift people from the production lines, also creates a breaking by supplying chance for the development of each individual with support of information, knowledge and new technology. New requirement of knowledge and skills for Vietnamese mechanical engineers in an age of smart manufacturing is to improve the efficiency, quality, and utilization of operation in modern mechanical factories.

H1: Technology (T) has a positive effect on human resource development

2.2. Learning Culture of the Enterprise

The learning culture of the enterprise is understood as the process of forming, developing and maintaining the interest of learning and improving the level of all employees in the enterprise. The role of leaders is very important in this process. Leaders and all managers of the company consider the human resources development as an investment activity besides do encourage self-studying and self-improvement. Moreover, the company builds a synergy between the colleagues in each unit. To what extent are supervisors involved in clarifying performance expectations after training; identifying opportunities to apply new skills and knowledge; setting realistic goals based on training; working with individuals with problems encountered while applying new skills; and providing feedback when individuals successfully apply new abilities (Holton et al., 1999). Research focusing on how individual differences and the work context influence

informal learning is growing but incomplete. Informal learning provides opportunities for individuals to acquire knowledge and skills on-the-job through work-related tasks, activities and interactions with others (Tannenbaum et al., 2010)[26]. Van Noy et al. (2016)[28] argue that informal learning is an efficient and effective way to learn because knowledge and skills necessary for effective performance can be obtained on a 'just-in-time' basis.

Informal learning is similar, yet unique, from other ways individuals learn in the workplace. Informal learning, continuous learning, workplace learning, deliberate practice and self-development all focus on individuals learning in anticipation of future needs and taking responsibility for learning (Orvis & Leffler, 2011[18]; Raelin, 1997)[22]. Informal learning is more organic, continuous, and learner-driven than instructor-led training, the most prevalent type of formal training method used by organizations (Association for Talent Development, 2015)[3]. Informal learning typically occurs outside of a classroom context, the learning approach and duration is determined by the learner, and learning may extend beyond the boundaries of the organization itself (Van Noy et al., 2016)[28]. Further, the learner determines what and when to learn and evaluates whether or not learning has been successful.

In learning culture, self - studying is very important and it is a part of informal learning. We adopt Noe et al. (2013) definition of informal learning which is theoretically grounded and based on empirical studies that have shown that informal learning includes both self-focused and other-focused activities (Doornbos et al., 2008)[6]. Specifically, Noe et al. (2013) characterize informal learning as cognitive activities and behaviors that can be subsumed in three categories: learning from oneself (spending time reflecting how to improve one's performance and experimenting with new ways of performing), learning from others (interacting with peers and superiors to solicit feedback on ideas and devise strategies for performance improvement), and learning from non-interpersonal sources (reading trade publications and searching the internet for useful resources and information). Informal learning is both learner-driven and contextual in nature which means it is influenced by both individual differences and features of the work setting.

H2: Learning Culture of the enterprise (C) has a positive effect on human resource development

2.3. Abilities of Employees (Self-Efficacy)

It is possible to say that the ability of the employee is an important factor influencing the effectiveness of human resource development. When employees are well aware of learning activities, they will achieve high academic efficiency as well as apply the knowledge and skills learned in work the best. People's judgments of their capabilities to organize and execute courses of action required to attain designated types of performance. Other researchers also suggested that the characteristics of trainees such as motivation and attitudes are more important to training success than are course's contents (Quinones, 1997).

H3: Abilities of Employees (A) has a positive effect on human resource development

2.4. Learning Motivation

The role of motivation for human resource development can not be excluded. The learning motivation of employees is the catalyst to increase training effectiveness. Learning motivation comes from readiness to attend the training course of the workers. If workers know the true benefits from their activities in human resources development, they will participate voluntarily and actively. Learning motivation from the business is mainly through the design of useful courses, increasing the value of learners in career after learning.

Some researchers indicated that if employees had no choice of participation, their training motivation would decrease (Guerrero and Sire, 2001[11]; Quinones, 1997[21]; Baldwin and Magjuka, 1991)[4]. So, they must know aim and content of each course before taking place. Clark et al. (1993)[5] found that job utility and career utility have significant influences on employees' training motivation. Thus, training programs that are job- or

career-related will influence employees' training motivation (Mathieu and Martineau, 1997)[15]. Noe and Wilk (1993)[17] showed that the more benefits that employees feel they can obtain from participating in training activities, the higher their rates of participation in such activities.

One critical determinant of training effectiveness is the trainees' level of training motivation (Mathieu et al., 1993[16]; Mathieu and Martineau, 1997[15]; Tannenbaum and Yukl, 1992)[25]. Noe (1986) suggested that characteristics such as motivation and attitudes are malleable individual difference factors that play a critical role in achieving training effectiveness. Even if trainees possess the ability to learn the content of a course, they may fail to benefit from training because of low motivation.

Pay attention to motivating in the learning environment for learners besides demanding the necessary skills. Learners will have more motivation to learn what makes sense to them. For effective learning, it is essential to transfer the skills and behaviors of the training environment to the work environment in order to direct the worker to the aspects of the job. The author also emphasizes lifelong learning within the enterprise to ensure the opportunity to learn the skills needed to work and to expand the career opportunities of individuals. It is also important to note when designing and evaluating the training of human resource development in enterprises. Learning requires both ability and motivation, and the training program's design should consider both. Learners are more motivated to learn something that has meaning for them (Gary Dessler, 2016)

H4: Learning Motivation has a positive effect on human resource development

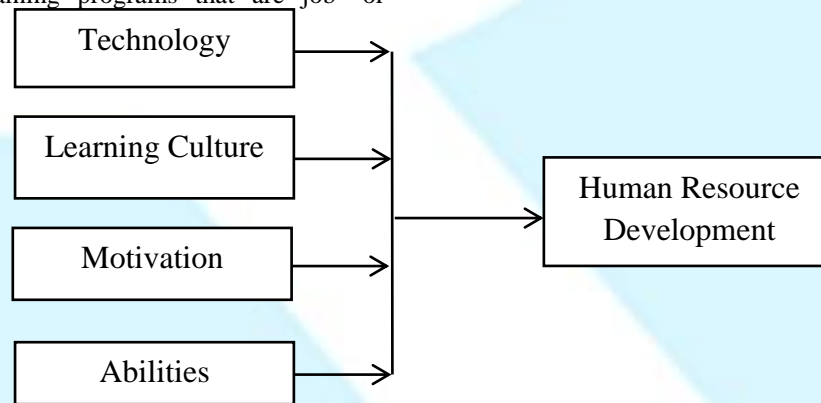


Figure 1. Proposed research framework

3. METHODOLOGY

3.1. Sampling

The questionnaires were answered by 392 employees of 24 mechanical enterprises in 2017, including managers (69 votes), engineers and mechanical workers (323 votes). The participants work in 24 mechanical enterprises in Thai Nguyen province – the biggest province of producing mechanical products in Vietnam. The

mechanical enterprises' group is selected according to criteria that are similar in size, operations, and types of enterprise based on Report 2017. After collection and cleaning, 376 valid responses were used for analysis.

The questionnaire consisted of 43 questions, in which there are 36 quantitative questions and 07 close-ended questions to collect the respondent's information. The survey collects the participants' assessments of the

observed variables of 4 factors affecting affecting human resource development in mechanical industry by using a 1-5 point Likert scale. Respondents would be presented in the column corresponding to the Likert scale which has 5 ranges.: 5: strongly agree; 4: agree; 3: Neutral; 2: Disagree; 1: strongly disagree. The questionnaire was designed and adjusted with the advice of 12 managers

who are businessmen and professionals in the field of mechanics.

Of the 376 valid samples after having been screened, demographic characteristics such as age, gender, wage, working time for the current company, education and position were aggregated in Table 2.

Table 2. Respondents' profile and characteristics

Variable	Categories (N = 392)	Frequency	Percentage
Age	Under 25 years old	49	13.0
	From 25 to 34 years old	123	32.7
	From 35 to 44 years old	117	31.1
	From 45 to 54 years old	66	17.6
	From 54 years old	21	5.6
Gender	Male	310	82.4
	Female	66	17.6
Education background	Normal labor	85	22.6
	Intermediate graduate	90	23.9
	College graduate	42	11.2
	Postgraduate	159	42.3
Working time for the current company	Under 5 years	66	17.6
	From 5 to below 10 years	126	33.5
	From 10 to below 15 years	121	32.2
	From 15 years	63	16.8
Working position	Worker	187	49.7
	Official Employee	24	6.4
	Engineer	101	26.9
	Manager	64	17.0
Salary	Under 7 mi. VND	75	19.9
	From 7 to below 9 mi.VND	150	39.9
	From 9 mi.VND	151	40.2

3.2. Measurement and Analysis

In this study, a questionnaire comprising 24 determinants was designed to measure employees' agreement toward each determinant. The determinants pertaining to human resource development were developed from the theories and studies discusses above.

The Statistical Package for Social Science ver 22.0 (SPSS) is used for data analysis. First, simple frequencies were generated to display characteristics of employees in mechanical enterprises. Second, exploratory factor analysis with varimax rotation was employed to identify level of the agreeing with statement. Finally, regression analyses were conducted to investigate the impact of each factor to human resource development in their enterprise.

4. RESULTS

4.1. Factor Analysis

Of 376 samples collected from formal study, the independent factor-observation variables were rated differently by employees. Independent variables had an average value of 3.5, ranging from 3.28 to 4.13. Learning Motivation (M), Learning Culture of the enterprise (C) and Abilities of employees (A) all had an average value of over 3.00, fluctuating from 3.6 to 4.13. Besides, all variables were tested to ensure the satisfied level of reliability basing on the Cronbach's Alpha coefficient testing. As shown in Table 3, after testing the reliability of scales, all of the measurement scales had Cronbach's Alpha coefficient ≥ 0.7 (Table 3). This result is a consequence of a well-designed, clear questionnaire, well-grouped, and satisfied samples (Hair et al., 1998).

Table 3. Cronbach's Alpha coefficient results

Items	The observed variables	Std. Deviation	Mean	Cronbach's Alpha if delete variable
Manufacturing Technology (T)		.72551	3.6503	0.889
T1	The company's technology always change	.69305	3.12	.873
T2	Product quality depends on technology	.84572	4.06	.859
T3	Technology determines the competitiveness of the business	.87401	3.87	.835
T4	Training employees to update new technology is essential	.92159	4.11	.857
Learning Motivation (M)		.74284	3.7553	0.898
M1	Training helps me get things done more efficiently	.93546	4.11	.876
M2	Training helps myself in developing career	.94573	3.84	.867
M3	Being sent to study is my honor	.83515	3.78	.863
M4	I look forward to the opportunity to learn more	.84285	3.89	.880
M5	Achievement in my work is always recorded and paid appropriately	.83989	4.02	.891
Learning Culture of the Enterprise (C)		.63973	3.9517	0.899
C1	Leaders consider training as an investment activity of enterprises	.83722	3.23	.882
C2	The training process is designed and implemented well	.87194	2.94	.886
C3	The line manager understands my work	.83406	4.12	.888
C4	Learning opportunities for employees are fair	.77766	3.51	.889
C5	Line manager always support staff when needed	.79934	3.94	.884
C6	The company always encourages self-studying	.74094	4.23	.886
C7	Retraining and additional training takes place regularly at the Company	.80410	3.79	.875
Abilities of Employees (A)		.75748	3.7174	0.876
A1	I find myself able to learn fast	.92658	3.58	.841
A2	I find myself better at work than my colleagues	.95588	3.31	.822
A3	I always observe and learn from those who are better than me	.81941	3.85	.826
A4	I am aware of and active in learning the knowledge and skills for the job	.83969	4.02	.872
Effectiveness of Human Resource Development (E)		.62886	3.9940	0.876
E1	I can apply the knowledge learned to the job	.73212	3.99	.829
E2	The quality of my work increases after each course	.75715	4.01	.744
E3	The spirit of work and the loyalty to the company increase after each training course	.77803	4.00	.775
E4	I am more confident with my expertise	.81948	3.98	.785

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4.2. Exploratory Factor Analysis (EFA) of independent variables

The exploratory factor analysis (EFA) was conducted to test the validity of the measurement of four independent variables that met the requirements of Cronbach's Alpha reliability testing. The exploratory factor analysis produced the results as presented in table 4 below. The results of EFA satisfied four elements: (1) Sig value.

Bartlett's test = 0.000 < 0.05; (2) 0.5 < KMO coefficient = 0.852 < 1;

Exploratory factor analysis (EFA) with varimax rotation was employed to determine the determinants of human resource development. The EFA analysis verified the five factors as predetermined in the questionnaire development as the table below:

Table 4: Exploratory factor analysis (EFA) with varimax rotation

Variable	Component				
	1	2	3	4	5
T1	.828				
T2	.792				
T3	.859				
T4	.791				
C1		.746			
C2		.688			
C3		.733			
C4		.730			
C5		.677			
C6		.738			
C7		.845			
M1			.753		
M2			.800		
M3			.789		
M4			.761		
M5			.690		
A1				.822	
A2				.874	
A3				.851	
A4				.757	
E1					.660
E2					.772
E3					.760
E4					.752

Prior to multiple regression analysis, the 24 determinants were factor analyzed using principal component analyses with varimax rotation in order to identify the structure of determinants related to human resource management. Table 4 present the results relevant to the question of which determinants are important to explain the total variances in all the variables. The number of factors was determined by retaining only the factors with an eigenvalue of 1 or higher.

As seen, all factor loading scores were higher than 0.50 and the five extracted factors accounted for 38.1% of the variation in this study.

In order to investigate whether the independent variables (four factors) had significant impacts on the dependent variables (human resource development), Pearson correlation and regression analyses were conducted.

The samples of 376 valid questionnaires for existing customers were analyzed to measure the reliability of Cronbach's alpha. The results of Cronbach Alpha helped to eliminate variables, including T, A, M and C. Other 24 variables are acceptable and considered to be adequate. The outputs of EFA with Promax rotation, forcing 4 factors produce 38.1% total variance extracted.

4.3. Pearson Correlation analysis

Table 5: Pearson Correlation analysis

		E	T	M	C	A
Pearson Correlation	E	1.000	.419	.514	.521	.362
	T	.419	1.000	.467	.424	.260
	M	.514	.467	1.000	.554	.384

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	C	.521	.424	.554	1.000	.251
	A	.362	.260	.384	.251	1.000
Sig. (1-tailed)	E	.	.000	.000	.000	.000
	T	.000	.	.000	.000	.000
	M	.000	.000	.	.000	.000
	C	.000	.000	.000	.	.000
	A	.000	.000	.000	.000	.
N	E	376	376	376	376	376
	T	376	376	376	376	376
	M	376	376	376	376	376
	C	376	376	376	376	376
	A	376	376	376	376	376

Based on the results of Pearson Correlation analysis in Table 5, the Sig. of all factors (T, C, M, A) > 0.05; therefore, there are correlations between them and the dependent variable (E).

4.4. Multiple Regression Analysis

To determine the importance of each factor to online reservation intention, a multiple regression analysis was

conducted. Human resource development was the dependent variable, while the four determinant factors were the independent variables. All variables were entered at the same time. Table 6 reports the results of the multiple regression analysis.

Table 6: Multiple regression analysis

	Std. β	Sig.	VIF
T	1.172	.000	1.172
M	.129	.002	.129
C	.184	.000	.184
A	.290	.000	.290
$R^2 = 0.388$			
Adjusted $R^2 = 0.381$			

The result showed an adjusted R^2 of 0.381, suggesting that about 38.1% of the variation in overall satisfaction was explained by the regression equation, and there is no multi-collinear phenomenon because the VIF of all factors < 10.

$$E = \beta_0 + \beta_1 T + \beta_2 M + \beta_3 C + \beta_4 A$$

$$E = 1.172 + 0.129 T + 0.184 M + 0.290 C + 0.138 A$$

Based on the coefficient of each independent variable, it is possible to assess the impact of each variable on the dependent variable. Table 6 reveals that *Learning Culture of the enterprise (C)* was the most important factor in explaining the HRD in mechanical enterprise. *Learning Motivation (M)* and *Abilities of employee (A)* followed in importance. Besides, Technology (T) has the least impact on the on HRD of mechanical enterprise. That shows managers do not pay attention to influence of technology requirement in developing skills and knowledge for employees.

5. DISCUSSION

The research findings showed that human resource development in a mechanical enterprise is influenced by four factors which have a direct impact in descending order: *Learning Culture of the enterprise (C)*, *Learning*

Motivation (M), *Abilities of employee (A)* and Technology (T).

According to the results of the study, from the practical perspective, if the enterprises would like to enhance human resource development, they should pay enough attention to the following:

Learning culture: In mechanical industry, most of managers are matured from working in production unit; so they know clearly about tasks of workers and can observe all aspects of their work. Managers encourage subordinates to self-study at work place as the main method to improve their performance. However, the training process is not designed and implemented in mechanical enterprises as well as needed. Furthermore, training budget in each enterprise is different, quite little in small and medium scale. This depends on what leaders' viewpoint and desire. Actually, the learning culture of the enterprise is the strongest factor in developing human resources in the mechanical enterprise. Because the production lines in the enterprise are equipped with technology in line with the requirements of production increasingly. Workers need to learn more often in the workplace to be able to carry on the job. They learn from the manager's advice, especially from the co-worker's whenever at workplace. Therefore, the enterprise need to focus on building and maintaining a culture of mutual

learning in the workplace so that employees constantly learn from others and self-learning. It also creates a working environment of unity and efficiency.

Technology: Results from the survey shows that although technology does not change regularly, it adds value to the business competitiveness. Then, training employees to adapt requirements of production is very necessary and in time. That reflects the fact that mechanical enterprises do not dare to invest much to innovate technology. It leads to the backward level of technology, does not meet the needs of development in the Industry 4.0 and deep integration nowadays. Enterprises need to identify technology as the key point for the developing human resources to promote efficiency in production and business. From the requirements of owning machines and equipment, workers will be able to identify new skills and knowledge in modern technology operations.

Learning motivation of employees should be considered as an important tool to increase the quality of human resources. Businesses need motivation through the tools of compensation, job autonomy and promotion opportunities. From that, workers will work on their own, with attitude and will increase work effectiveness.

Motivation: Majority of mechanical enterprises know how to make motivation for worker by using management's tools as compensation, and promotion.

The learning capacity of the employees is always a prerequisite for absorbing the knowledge and skills and applying them to the job. Therefore, other important steps that enterprises should pay attention to the selection of high quality human resources, the assignment and placement of appropriate and accurate work. **Abilities of Employees:** The ability of employees to make the most of the efficiency of human resource development as well as the effectiveness of the work. The application of knowledge and skills to work is largely dependent on their ability.

6. OTHER RECOMMENDATIONS

The selection of trainees is an important task, so it is necessary to develop criteria for evaluating the capacity of workers. It should be based on the production plan, personnel plan, the plan of each department or unit. Additionally, evaluating the achievements and capacity of employees to make a list of trainers for each unit. Encourage staff to self-assess to propose the required course.

The HR department is in charge for designing appropriate training programs, selecting teachers; organizing and monitoring the training process and evaluating post-training.

Evaluating each training program to see what has been not done and to take experience for the following programs.

Raise and nurture positive employee motivation in training and career development. In particular, creating conditions for workers to work, earn high income can

even get rich from their own career is considered the most meaningful and consistent with the current trend.

7. LIMITATIONS AND SUGGESTIONS FOR FUTURE RESEARCH

The article has built factors affecting human resources development of mechanical enterprises, including: Technology, Motivation, Learning Culture and Abilities of Employees. These enterprises need to adjust these to have positive effects on goals of human resource development. In future studies, we will analyze the impact of these factors and their effects on training effectiveness.

The findings suggest that the availability of four factors above influence human resource development. The implication for managers is that they need to focus on creating and sustaining a continuous learning culture in their organizations, and provide the required support for employees in the acquisition and application of skills and knowledge in order to improve activities of human resource development.

However, the research still has certain limitations which are expected to be improved in the future research. Firstly, only 38.1% of the variation in overall satisfaction was explained by the regression equation. Thus, 61,8% of the variation in external variables of the model influences human resource development has not been mentioned in this model. Therefore, this issue is proposed for further research. Secondly, due to the constraints of time and budget, the sample in mechanical enterprises is chosen in Thainguyen province, Vietnam. Further research may enlarge the scale or be done in others places and tested the differences among kinds of enterprises.

To conclude, our research has contributed to the literature in human resource development in mechanical enterprises in Vietnam. The findings of our study indicated the necessity for mechanical enterprises to care about factors for human resource. Development. We do expect that our study will stimulate more and more additional studies on this domain as well as on aspects of human resource management.

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