

MODERATING ROLE OF DIGITAL TRANSFORMATION STRATEGIES AND INFORMATION TECHNOLOGY CAPACITY ON RELATIONSHIP BETWEEN HIGH-QUALITY HUMAN RESOURCE MANAGEMENT AND FIRM PERFORMANCE OF EXPORTERS ENTERPRISE IN VIETNAM

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Abstract: The study focuses on understanding the impact of high-quality human resource management on the performance of exporters in Vietnam through innovation capacity (product innovation, process innovation, innovative behavior of individuals) and smart supply chains. In addition, the study also considers the regulatory role of digital transformation strategies and information technology capacity for a number of other impacts in the research model. The official research sample includes 551 exporters of different industries in Vietnam. The results of the study show that independent variables all have a positive impact on the performance of the business. These findings contribute to a better understanding of the impact of high-quality human resource management in the context of digital transformation on the operational efficiency of exporters in particular and Vietnamese enterprises in general.

Keywords: Operational efficiency, digital transformation, human resource management, high quality human resources

1. Introduction

Over the past decade, HPHRM has been proven in numerous studies (Stewart & Kimber, 1996). Several studies on HPHRM strategies have evaluated HPHRM performance as enhancing workforce skills, participating in business decisions, and becoming a driver of development for both managers and employees in the context of CDS (Harrell-Cook et al., 2001). Soon after, when enterprises apply HPHRM, enterprises can achieve superior FP and sustainable competitive advantage in faster time with higher intensity (Way, 2002). Although many studies around the world confirm that there exists a relationship between HPHRM and the organization's business in the context of CDS (Arthur, 1994; J. Bae & Lawler, 2000a; Batt & Moynihan, 2002; Guthrie, 2001; Harrell-Cook et al., 2001; HUSELID, 1995a; Macduffie, 1995; Pujari et al., 2004), however, most of the research is limited in theory and methodology, not showing practicality when applied to specific enterprises and fields. The gap in previous studies sets the direction for future studies to assess both the direct and indirect impact of HPHRM on the FP of enterprises in the context of CDS (Batt & Moynihan, 2002; Sun et al., 2007).

In the world, the digital economy is considered a new focal point in the fierce competition between countries, industries and enterprises (Y.-Y. K. Chen et al., 2016). In Vietnam, HPHRM has become the subject of much attention from academia. Starting from the context of the digital economy and global integration, in the face of the rapid development of artificial intelligence and automatic robots, many workers in our country are at risk of unemployment. According to statistics, about 70% of jobs in the country could be replaced by automated technology within the next 20 years (International Labor Organization, 2020). Therefore, the fact that enterprises improve HRM is important in the process of developing and increasing FP of enterprises in the domestic and foreign markets. To that end, the relationship between HPHRM and corporate FP has been evaluated by several predecessor studies with impacts from PDI, PCI, IIB (Miczek et al., 1990), SSC, DTS (Audzeyeva & Hudson, 2016; Besson & Rowe, 2012; Rogers, 2016) and ITC (A. Bharadwaj et al., 2013; S. Hess et al., 2016; Indihar Štemberger et al., 2019a; J. Sebastian et al., 2017). Based on the results achieved, the study synthesized and added the influencing factors in the relationship between HPHRM and FP of enterprises in the context of CDS. Since then, the study proposes that MHNC is suitable to comprehensively assess the mechanism of impact from HPHRM to FP of enterprises in the context of exporting enterprises in Vietnam in the face of constant fluctuations from the international market.

It can be seen that currently, most scholars believe that innovation plays an important role to improve the FP of enterprises in the context of CDS, but there is rarely empirical research on this issue. In addition, the ability to innovate is confirmed to act as an intermediary between HPHRM and FP of enterprises, but there are no studies confirming whether this relationship is direct or indirect. At the same time, studies are limited when it comes to measuring innovation in the organization. Recently, some scholars have evaluated the relationship between HPHRM and FP on industrial enterprises in the context of CDS, but in Vietnam, there have been no studies looking at the impact between the two variables in export enterprises and service enterprises. At the same time, there is little consensus among researchers on whether the effect from HPHRM on FP of enterprises is a direct or indirect influence, positive or negative influence (Becker & Huselid,

2006; Collins & Smith, 2006; Datta et al., 2005; DELANEY & HUSELID, 1996; Sikora et al., 2015). That has suggested the urgent need for research to consider the relationship between HPHRM and FP in export enterprises in Vietnam in the current CDS context.

The 5-part study is (1) Introduction, (2) Foundational Theory, (3) Methodology, (4) Research Findings and (5) Discussion and Conclusion.

Through the results achieved, the study proposes a number of proposals on improving HPHRM and FP of export enterprises in Vietnam in the context of CDS.

2. Literature review

2.1. Resource-based theory, innovation theory and stakeholder theory

Resource-based theory

The view of resource-based was originated in 1991, referred to by (Barney, 1991) and later (Acedo et al., 2006) and developed by them into resource-based theory. The resource-based view is understood that each organization, each business always has different specific resources, it represents the ability of the business, which can be expressed in the form of physical assets or the ability to control, own, express the core characteristics and historicity of the business. The organization's resources are considered as a tool to make a difference, innovate as well as form the competitiveness of the business both in the long and short term. Therefore, it is possible to divide resources into general forms including:

- Material resources: finance, facilities, factories, machinery, equipment, technology,.
- Immaterial resources: brand, reputation, network of partnerships, licenses, databases,...
- Capacity: knowledge, ability to manage, organize the use of fixed assets, select business opportunities, innovate production,.

In the era of industrialization, modernization, and integrated markets, the utilization of external resources through forms such as cooperation and sales will be able to create a new, stronger resource (Das & Teng, 2000), thereby maximizing business value, improve the operational efficiency of the organization. It can be seen that investing in these resources will be quite expensive both materially and mentally, it cannot bring immediate benefits to the business in the short term. However, in the long term, it creates a premise for businesses to have sustainable and good development, improving the competitiveness of enterprises.

Innovation theory

The ten main types of innovation theory described include: (1) Development process, (2) Psychology, (3) Economics, (4) Stage and composition, (5) Cognition, (6) Problem-solving based on expertise, (7) Problem search, (8) Evolution, (9) Language, and (10) Systematic. Most theories have been discussed in literature for at least several decades, spanning multiple levels of analysis

and research methods. Within the scope of the study, the author focuses on clarifying the theory of innovation in the field of economics.

Innovation is an issue that has emerged over the past decade as a very lively topic in business management. Accordingly, businesses should set out innovation strategies in their products and services to be able to meet social, environmental and human needs. Since then, innovation has been known as an effective tool to satisfy today's social requirements. In the traditional approach, innovation encompasses both the ability to anticipate and react to market changes as well as the management strategies and decision-making. Therefore, according to Courtright & Smudde, 2009, these authors propose that a carefully analyzed consumer classification strategy should be put in place to create products that can deliver a positive experience of quality as well as innovation throughout the value chain of the business.

Stakeholder theory

According to stakeholder theory, the business should create value for all stakeholders, not just shareholders. (Freeman, 1984) presented for the first time the Theory of Stakeholders in Organizational Management and Business Ethics. This theory has become an important focus in the study of business ethics and is the foundation for further research and development in the research and publishing works of many other scholars.

The concept of "stakeholder," as we use it, was first mentioned at the Stanford Research Institute (SRI International, Inc.) in 1963 (Freeman, 1984). The term can be understood to refer to parties that have the ability to control or have significant influence over the other party in decision-making of financial and operational policies. Building on the theory of stakeholders suggests that if we analyze the relationships between a business and groups and individuals that may be affected or affected by it, there is a better chance of effectively solving the problems involved.

From there, this theory can be applied to the analysis of the behavior of individuals in the business in relation to HPHRM as well as in the intelligent supply chain, from which their impact can be easily analyzed on the performance of the business.

2.2. High-quality human resource management and innovation factor

(Gloet & Terziovski, 2004b) found that through empirical research, the practice of HRM activities can directly influence product and process innovation, therefore, they argue that in order for businesses to achieve innovation efficiency, more attention must be paid to HRM. (Beugelsdijk, 2008) through data analysis found that there is a positive relationship between HRM and product innovation, where HRM practices include job design, employee training, efficiency and compensation, etc. (S. S. Liu et al., 2007) conducted empirical research in the high-tech industry and found that creativity can improve efficiency. organizational innovation fruit. At the same time, it has a positive effect on the organization's ability to innovate high-efficiency working

systems. Therefore, it can be concluded that the application of HPHRM has a positive effect on the innovation factor. From there, the team hypothesized:

H1a hypothesis: HPHRM has a positive impact on product innovation

H1b hypothesis: HPHRM has a positive impact on process innovation

H1c hypothesis: HPHRM has a positive effect on individuals' innovative behavior

2.3. High-quality human resource management and smart supply chain

(Iles et al., 2010) concluded that organizations must ensure recruitment, selection should be in line with company practices, should focus on developing a good recruitment process to select employees to participate in the supply chain, based on the competencies required, including flexibility and adaptability to the change these jobs require. Indeed, the supply chain must ensure that the members of the company are ready and able to interact effectively with changes in the manufacturing business process, thus concluding that HRM has a positive impact on the implementation of the supply chain. (Tracey & Smith-Doerflein, 2001) argue that the synchronicity of supply chains depends on the people involved, as they play a role in the processes and technologies used. (Tracey & Smith-Doerflein, 2001) also believes that achieving this requires HRM to ensure the skills and behaviors needed for the supply chain, or in the context of digital transformation, the relationship between HPHRM and the intelligent supply chain. In summary, it can be concluded that the positive impact of HPHRM on smart supply chains. From there, the team hypothesized:

H2 hypothesis: HPHRM has a positive impact on smart supply chains

2.4. Innovation factors and operational efficiency of enterprises

Innovation has a lot of influencing factors, such as organization, environment, personal characteristics, and the advancement of science and technology (Tornatzky et al., 1990). These factors will have a great impact on innovation, and therefore affect the results of the organization's operations. (Lv, 2005) uses correlation analysis and variance analysis to study the relationship between empirical organizational innovation and business performance. The results show that management innovations and technological innovations can improve business performance. From there, the team hypothesized:

H3a hypothesis: Product innovation has a positive impact on business performance

H3b hypothesis: Process innovation has a positive impact on business performance

H3c hypothesis: Personal innovation behavior has a positive impact on business performance

2.5. Smart supply chain and business efficiency

A supply chain efficiency parameter is a set of parameters used to determine the efficiency and effectiveness of an existing supply chain system or to compare competing alternative systems. From the consideration of parameters, it is possible to assess the effectiveness of the supply chain Through qualitative and quantitative measures of efficiency (Qrunfleh & Tarafdar, 2014), which has assessed the effectiveness of the supply chain in the operation of the enterprise, increasing customer satisfaction, integration of information and material flows, effective and effective risk management of suppliers, minimizing costs, maximizing sales, maximizing profits, minimizing inventory investments, maximizing return on investment, maximizing occupancy rates, minimize product latency, minimize customer response time. An intelligent supply chain system will be able to meet the high requirements of stakeholders such as suppliers or customers, not only that, it can also adapt quickly to changing environments, ultimately leading to the purpose of improving the operational efficiency of the business.

From there, the team hypothesized:

Hypothesis H4: Smart supply chains have a positive impact on business performance

2.6. Direct relationship between high-quality human resource management and business performance

(COMBS et al., 2006) summarized the study and demonstrated a positive correlation between them using the meta-analysis method, giving a correlation coefficient of 0.20, which is more evident in the manufacturing industry, through this summary, the positive relationship between HPHRM and FP of enterprises is becoming more and more clear. (ERICKSEN, 2007) suggests that HPHRM will influence market relationships in terms of adaptability to business performance and internal labor market adjustments to related factors. (Barnard & Rodgers, 2000) investigated employee stability, staff placement and staff development in 105 Singapore companies and found that employee development and highly efficient work systems were significantly related to organizational performance. From many studies mentioned above, HPHRM has been gradually developed by businesses in practice, towards the performance of businesses in a sustainable way.

From there, the team hypothesized:

Hypothesis H5: HPHRM has a positive direct impact on the performance of the business

2.7. High-quality human resource management and operational efficiency of enterprises through innovation elements and smart supply chains

The indirect relationship between HPHRM in particular or HRM in general to the performance of enterprises has been analyzed through many different studies, with many different intermediate variables such as organizational culture, innovation factors, supply chain management, etc. It can be mentioned (ARMSTRONG et al., 2008) that high-quality human resource practices if combined with differential management will affect higher labor productivity, thereby leading to improved business efficiency. (TAKEUCHI et al., 2009) show that the impact of HPHRM on organizational performance is influenced by employee performance and motivation to achieve, which in turn impacts business performance. (Lu et al., 2015f) came to the same conclusion with the intermediate variable being the innovation factor including product innovation, process innovation, and employee innovation behavior. From there, the team hypothesized:

***H6 hypothesis:** HPHRM has an indirect positive impact on the operational efficiency of enterprises through innovation elements and smart supply chains*

2.8. Digital transformation strategy and information technology capacity with operational efficiency of enterprises

By continuous use of digital technologies, businesses can drive automated and intelligent internal operations, leading to cost minimization, improved operational efficiency and management quality, achieving business process change and business model innovation, and ultimately optimizing the customer experience. Using digital technologies, the agility of the organization will be improved with data collection, rapid information processing. Moreover, with the support of digital technologies, new organizational habits and common values can be formed, and their positive attitude towards cross-functional and inter-organizational goals can be developed to improve efficiency. (Neirotti et al., 2014) demonstrated that by taking full advantage of digital, businesses can gain new market opportunities and information about their customers as well as effectively improve the development of new products, leading to improving the operational efficiency of the business.

(Brynjolfsson, 1993) asserts that the resources that support information technology have an impact on sustainable competitive advantage. Furthermore, there is ample evidence on the importance of information technology in shaping a sustainable business atmosphere (M. Akram et al., 2018). Information technology infrastructure and resources have the potential to create a company-specific, rarely imitable and valuable capability (RAVICHANDRAN et al., 2005), which is information technology capabilities. The resource-based perspective of information technology suggests that businesses can compete based on their information technology resources. A company's IT infrastructure with human information technology skills and the ability to use IT for intangible benefits creates information technology capabilities for the whole company based on the company's specific resources.

From there, the team hypothesized:

H7a hypothesis: Digital transformation strategy positively impacts business performance

H7b hypothesis: Information technology capacity positively affects the performance of enterprises

2.9. The regulatory role of digital transformation strategy and information technology capacity in the relationship between high-quality human resource management and business performance

In fact, both digital transformation strategies and information technology capabilities are indispensable factors for businesses in this industry in the global supply chain. They create a competitive advantage for businesses as well as form a foundation for businesses to develop in a sustainable way. Indeed, businesses that invest in information technology capabilities and have effective digital transformation strategies will have a better basis to be able to develop in the market, which helps businesses adapt quickly to changes in today's market. In contrast, for businesses with low information technology capacity and no clear digital transformation strategy, the impact of HPHRM will not have much impact on the performance of businesses when the technology is still loose, inappropriate and has many shortcomings. Digital transformation rearranges processes to change a company's business logic (L. Li et al., 2018) or its value-creating process (Gölzer & Fritzsche, 2017). From there, the team hypothesized:

H8a hypothesis: Digital transformation strategy regulates the impact from HPHRM on business performance

H8b hypothesis: Information technology capacity regulates the impact of HPHRM on business performance

2.10. There are differences in the impact from high-quality human resource management to the performance of enterprises according to the type of enterprise and corporate reputation

Firstly, regarding the type of enterprise, the study considers two main types of enterprises: private enterprises and state-owned enterprises. In fact, state-owned enterprises will be governed and managed from many different angles, accordingly, enterprises need to aim for many purposes and related to the country, not just improving business performance, so the impact from HPHRM will face more obstacles when affecting the performance of enterprises. The same is true in the opposite direction in private enterprises.

Secondly, in terms of the reputation of enterprises, the study considers two main types: enterprises that have been ranked reputable and enterprises that have not been ranked prestigiously. Indeed, for reputable enterprises, improving the efficiency of HRM does not have much impact on business performance because these businesses have also invested in NNL at an average level –

quite to be able to be ranked reputable in the market. However, in enterprises that have not been ranked with prestige, the capacity is still young, there will be more motivation for them to improve business efficiency, find a foothold in the market, then HPHRM can build a strong competitive advantage for the company to be able to develop sustainably.

From there, the team hypothesized:

H9a hypothesis: *There is a difference in the impact of HPHRM on the performance of enterprises by type of business*

H9b hypothesis: *There is a difference in the impact of HPHRM on the performance of the business according to the business reputation*

Based on the hypotheses presented above, combined with the qualitative research process, the experimental research model is proposed as follows:

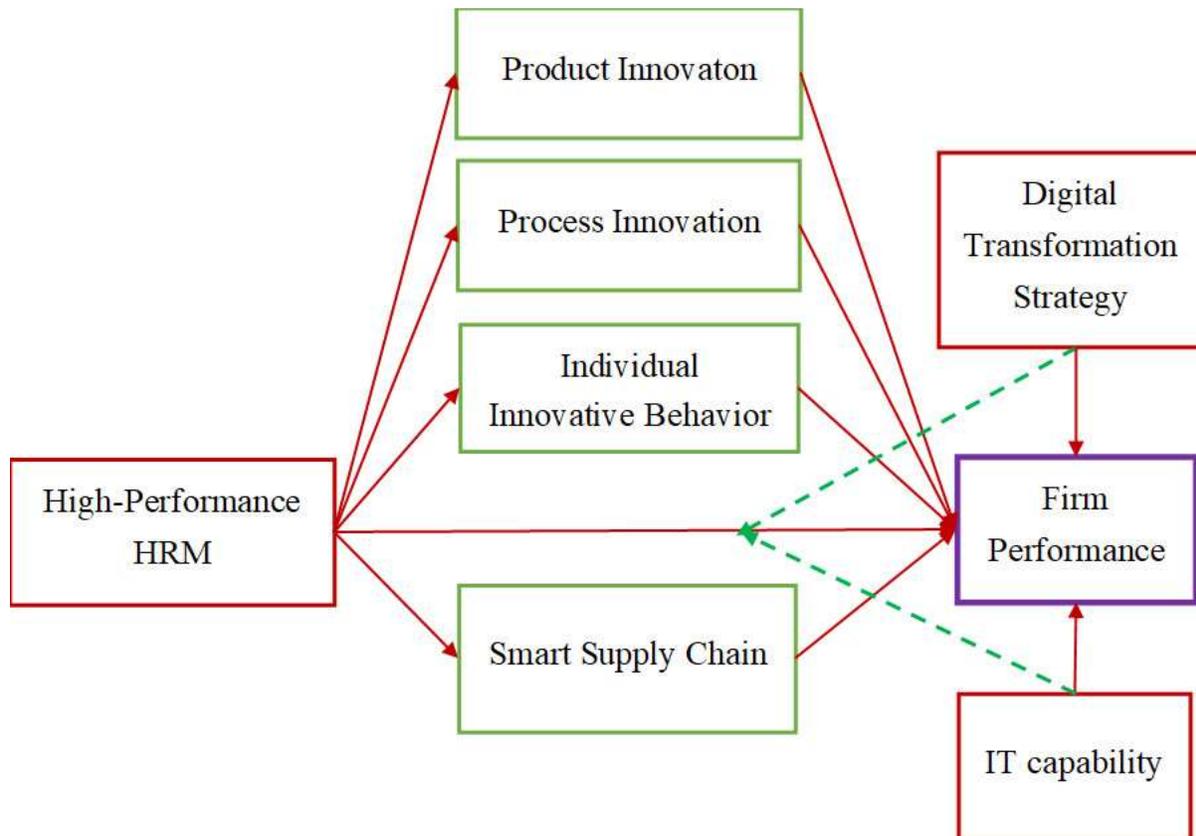


Figure 1. Research model

Source: Proposed research team

3. Method

Sample and data collection

In the context of Industry 4.0, there are long strides combined with the trend of globalization, which has created many opportunities and challenges for export activities of Vietnamese enterprises. Digital transformation is gradually becoming the main direction of the global economy such as cloud computing, internet of things, robot application in the field of production, virtual reality technology VR, ... This sets requirements for exporters to improve and transform their business models in line with the digital economy. CDS strategies were born, meeting the urgent needs of the market, especially Digital transformation in import and export activities is interested and invested by the state.

In addition to CDS, scientific and technological human resources and high-quality human resource development activities and IT capacity in Vietnam are also very focused by businesses. According to Vietnam's productivity report, labor productivity of the whole economy in 2020 will reach 117.9 million VND/labor (about 5,081 USD/labor). Compared to the previous year, this figure increased by 5.4%. On average, in the period of 2011 - 2015, labor productivity reached 4.35% / year, by the period of 2016 - 2020 increased to 5.78% / year. In the period of 2011 - 2020, the average labor productivity increased by 5.07% / year. In terms of IT, currently, the number of domestic exporters with IT application activities is constantly growing at different cost levels. As of January 1, 2020, 86.2% of businesses use computers with the figure of 450.6 thousand, up 6.3% compared to 2012; 85.1% of businesses connected to the internet with 450.6 thousand businesses, up 11.5%; websites are used at 134.6 thousand enterprises, growing by 13.1% and accounting for 25.8% of the total number of companies (Nguyen Manh Hung, 2021). The number of export enterprises in the two state-owned and foreign-invested sectors is almost 100% using computers and internet connections. Export enterprises have their own websites, in the foreign-invested enterprise sector is 40.2%; the state-owned enterprise sector is 56.6% and the non-state enterprise sector is 25.6%. Ranked by operation scale, 57.4% of large-scale exporters have their own websites, this rate in small, medium and micro export enterprises is 45.5% respectively; 33.2% and 24.5%. Therefore, the study set as an exporter is of great significance when considering the influence of high-quality human resource management on the operational efficiency of exporters in Vietnam and the regulatory role of digital transformation strategies and IT capacity.

Research is carried out at export enterprises. The duration of the study is specified in the following period: Qualitative research period: 15/19/2020 – 31/10/2020 with 63 managers from middle level and above from 48 export enterprises across the country selected according to the prestigious export enterprise ranking of the Ministry of Industry and Trade (2019) and 15 experts in the field of CDS and Science and Technology. Preliminary quantitative study period: From 01/11/2020 – 30/12/2021, with a study sample of 126 observations. Official quantitative study period: From 01/01/2021 – 30/05/2021 with 551 valid survey slips.

Official research: In order to collect large-scale data in a formal quantitative study, the author sent a survey questionnaire after checking validity and reliability assurance via Google form, directly and by email to obtain a lot of data on a large scale to middle or senior managers of

the business. As a result, the study sent out 774 survey votes and collected 612 survey votes. The resulting data will be re-examined and discarded invalid observations such as fill-in or incomplete, so only 551 valid observations were used by the study to analyze the official quantitative data.

Scale

The **variable HPHRM - TRAINING** developed based on the research of Lu et al. (2015) includes 4 scales, for example: "Employees of enterprises are trained periodically"; "Businesses provide employees with a formal training program for them to advance," etc. Cronbach's alpha coefficient of the variable is 0.880.

The **variable HPHRM - EMPLOYEE ENGAGEMENT** was developed based on research by Lu et al. (2015) consisting of 4 scales, for example: "Managers and employees are constantly communicating openly and honestly"; "Business employees have the opportunity to make recommendations on improving working methods", etc. Cronbach's alpha of variable is 0.815.

The **variable HPHRM - WORK ANALYSIS** developed based on the research of Lu et al. (2015) consists of 4 scales, for example: "There is a clear definition of employee work responsibilities"; "The employee accountability manual includes all employee responsibilities", etc. Cronbach's alpha of the variable is 0.843.

The **variable HPHRM - EFFICIENCY ASSESSMENT** developed based on the research of Lu et al. (2015) consists of 2 scales: "Efficiency is often measured as objective and quantifiable results in the enterprise"; "Evaluate employee performance based on objective and quantifiable results." Cronbach's alpha of the variable is 0.818.

The **variable HPHRM - EMPLOYEE DEVELOPMENT** was developed based on research by Lu et al. (2015) consisting of 4 scales, e.g. "Employees have a clear career path in the enterprise"; "Superiors directly find out the employee's intention to develop their careers," etc. Cronbach's alpha of variable is 0.863.

The **PRODUCT INNOVATION** variable was developed based on the research of Gunday et al. (2011) with 5 measurements, e.g. "Increasing production quality in the components and materials of current products"; "Reduce the cost of manufacturing components and materials of current products", etc. Cronbach's alpha of the variable is 0.849.

The **process innovation variable (PCI)** was developed based on the research of Gunday et al. (2011) with 5 scales, e.g. "Identifying and eliminating activities that do not add value in the manufacturing process"; "Reducing variable cost components in manufacturing, engineering, machinery and software processes", etc. Cronbach's alpha of the variable is 0.866.

The **Employee Innovation Behavior (IIB)** variable was developed based on research by Lu et al. (2015), Scott and Bruce (1994) consisting of 4 scales, e.g. "Employees can generate new ideas to improve their work"; "Employees are constantly looking for new ways of working, techniques or tools," etc. Cronbach's alpha of the variable is 0.857.

The **SMARTSUPPLY VARIABLE - TOOL (SSC_IS)** was developed based on the research of O. Khan et al. (2020), including 3 scales, e.g. "We have integrated technology in our

supply chain"; "Rapid technological changes are made possible by updating software and systems on a regular basis", etc. Cronbach's alpha of the variable is 0.714.

The INTELLIGENT SUPPLY CHAIN - CONNECTED (SSC_IC) variable was developed based on research by Gupta et al. (2019), consisting of 5 scales, e.g. "We have the ability to monitor the business in real time"; "We use standardized communication protocols," etc. Cronbach's alpha of the variable is 0.856.

The SMART-INTELLIGENT SUPPLY CHAIN VARIABLE (SSC_IT) was developed based on research by Gupta et al. (2019), including 3 scales, e.g. "We have adopted intelligent processes for planning, sourcing, manufacturing and distribution of goods"; "We use devices to actively monitor the proper handling conditions of goods," etc. Cronbach's alpha of the variable is 0.782.

The CDS Strategy Variable (DTS) was developed based on research by Wang et al. (2020), including 5 scales, e.g. "Enterprises are at the forefront of new digital innovation"; "Businesses are at the forefront of discovering and harnessing new digital technologies," etc. Cronbach's alpha of the variable is 0.885.

The IT-Management Capability Variable (ITC_MA) was developed based on research by Erkmen et al. (2020), consisting of 4 scales, e.g. "We know our functional requirements"; "We have the ability to leverage IT as a strategic core competency," etc. Cronbach's alpha of the variable is 0.875.

The IT-Technical Competency Variable (ITC_TE) was developed based on research by Erkmen et al. (2020), consisting of 5 scales, e.g. "We have technical knowledge and capabilities in IT"; "We understand the role of IT in improving business FP", etc. Cronbach's alpha of the variable is 0.914.

The IT Capability - Human Capital Assistance (ITC_HCS) variable was developed based on the research of Erkmen et al. (2020), including 4 scales, for example: "In the enterprise, employers must participate in training programs on new software and systems"; "In the enterprise, employers must participate in training programs on new equipment and tools," etc. Cronbach's alpha of variable is 0.836.

The variable FP - PROFITABILITY (FP_PR) was developed based on research by Santos and Brito (2012), Harrison and Wicks (2013), consisting of 5 scales, for example: "Profitability of assets (ROA)"; "Return on equity (ROE)", etc. Cronbach's alpha of the variable is 0.866.

The variable FP - GROWTH (FP_GR) was developed based on research by Santos and Brito (2012), Harrison and Wicks (2013), including 5 scales, for example: "Growth of assets"; "Growth of net sales", etc. Cronbach's alpha of the variable is 0.874.

The variables ITC, DTS, IIB, SSC, HPHRM are measured using a 5-point Likert scale from 1 - Strongly disagree to 5 - Strongly agree.

PDI, PCI variables are measured using a 5-point Likert scale from 1 - Unrealized to 5 - Very well done.

The FP variable is measured using a 5-point Likert scale from 1 - A lot lower to 5 - A lot higher.

SEM Data Analysis

The study builds questionnaires and conducts surveys and interviews across the country to collect primary data and uses quantitative analysis techniques based on SEM linear structure model analysis (PLS SEM) methods to analyze data under the help of SPSS.23 and Smart PLS 3.3 software. First of all, the study conducts descriptive statistics and tests the reliability of the scale. The reliability of the scale is tested through SPSS 23 software with the test standard being Cronbach's Alpha coefficient and total variable correlation coefficient. Cronbach's Alpha coefficients greater than 0.6 would be acceptable, however for better it would be greater than 0.7 and preferably 0.8 (Nunnally and Bernstein, 1994). Scales with a total variable correlation coefficient of less than 0.3 would be disqualified because they do not guarantee the composition of a reliable scale (Joseph F. Hair et al., 2014). In particular, the study conducted a measurement model evaluation to assess the suitability of the scale. The study then evaluates the structural model, examines, evaluates the mutual impact of the study variables, and examines the role of the intermediate variable. Finally, the study examined the role of the regulatory variable in the research model used.

4. Research results

4.1. Evaluate the measurement model

Reliability Testing

Aggregate reliability needs to be greater than 0.7 (Hulland, 1999), Cronbach's Alpha coefficient greater than 0.7 (Nunnally and Bernstein, 1994), and mean variance (AVE) needs to be greater than 0.5 (Hair et al., 2014) for the factor to achieve aggregate reliability. Table 1 indicates that the study variables are satisfied and ensure reliability for further inspections.

Table 1. Scale reliability summary table

	Cronbach's Alpha	Composite Reliability	Average Variance Extracted (AVE)
DTC	0.885	0.916	0.685
FP	0.933	0.944	0.626
HPHRM	0.964	0.967	0.623
IIB	0.861	0.906	0.706
ITC	0.958	0.957	0.630
PCI	0.866	0.903	0.652
PDI	0.848	0.892	0.624
SSC	0.929	0.940	0.586

Source: *Synthesis of research*

Convergence test

The scale achieves a convergence value when the outer loading coefficients of the scale are both greater than 0.7 (Henseler et al., 2009). The results show that all scales have a load factor greater than 0.7 that guarantees value convergence. Thus, the scales all achieve convergence values and ensure the continuation of research.

Table 2. Outer loading

	DTC	FP	HPHRM	IIB	ITC	PCI	PDI	SSC
DTS1	0.789							
DTS2	0.818							
DTS3	0.861							
DTS4	0.824							
DTS5	0.844							
FP_MP1		0.824						
FP_MP2		0.840						
FP_MP3		0.839						
FP_MP4		0.763						
FP_MP5		0.718						
FP_OP1		0.790						
FP_OP2		0.786						
FP_OP3		0.764						
FP_OP4		0.778						
FP_OP5		0.803						
HPHRM_ED1			0.806					
HPHRM_ED2			0.788					
HPHRM_ED3			0.810					
HPHRM_ED4			0.839					
HPHRM_EP1			0.863					
HPHRM_EP2			0.754					
HPHRM_EP3			0.723					

HPHRM_EP4			0.744				
HPHRM_JA1			0.793				
HPHRM_JA2			0.735				
HPHRM_JA3			0.776				
HPHRM_JA4			0.779				
HPHRM_PE1			0.825				
HPHRM_PE2			0.830				
HPHRM_TR1			0.752				
HPHRM_TR2			0.794				
HPHRM_TR3			0.732				
HPHRM_TR4			0.849				
IIB1				0.811			
IIB2				0.882			
IIB3				0.881			
IIB5				0.782			
ITC_HCS1					0.790		
ITC_HCS2					0.793		
ITC_HCS3					0.738		
ITC_HCS4					0.731		
ITC_MA1					0.768		
ITC_MA3					0.846		
ITC_MA4					0.772		
ITC_MA5					0.746		
ITC_TE1					0.875		
ITC_TE2					0.851		
ITC_TE3					0.843		
ITC_TE4					0.788		
ITC_TE5					0.766		

PCI1						0.788		
PCI2						0.821		
PCI3						0.778		
PCI4						0.797		
PCI5						0.851		
PDI1							0.727	
PDI2							0.789	
PDI3							0.745	
PDI4							0.799	
PDI5							0.880	
SSC_IC1								0.799
SSC_IC2								0.724
SSC_IC3								0.753
SSC_IC4								0.801
SSC_IC5								0.752
SSC_IS1								0.754
SSC_IS2								0.700
SSC_IS3								0.777
SSC_IT1								0.811
SSC_IT2								0.798
SSC_IT3								0.744

Source: Compiled by research

Differentiation test

The study used the Heterotrait-monotrait ratio (HTMT) criterion, where both HTMT values were less than 0.85, the two variables were considered distinct (Henseler et al., 2015). The results of Table 3 show that the values in the table are less than 0.85 satisfied to perform further tests.

Table 3. Heterotrait-monotrait Ratio table

	DTC	FP	HPHRM	IIB	ITC	PCI	PDI	SSC
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DTC								
FP	0.577							
HPHRM	0.230	0.766						
IIB	0.311	0.587	0.529					
ITC	0.191	0.054	0.394	0.052				
PCI	0.312	0.613	0.468	0.378	0.045			
PDI	0.255	0.445	0.328	0.130	0.081	0.256		
SSC	0.133	0.366	0.304	0.148	0.047	0.096	0.087	

Source: Synthesis of research

Multilinear phenomenon verification

Multilinear detection through the Variance Inflation Factor (VIF), the VIF factor should be less than 5 to avoid multilinear phenomena (Hair et al., 2019). However, when the VIF coefficient < 10, it is still acceptable (Mason and Perreault, 1991). The results in Table 4 show that the VIF coefficients are all less than 10 so it is still acceptable to carry out the next steps of the study.

Table 4. Variance magnification factor (VIF)

	VIF		VIF		VIF
DTS1	1.782	HPHRM_JA2	2.383	ITC_TE4	2.444
DTS2	2.189	HPHRM_JA3	2.524	ITC_TE5	2.532
DTS3	2.758	HPHRM_JA4	2.775	PCI1	1.891
DTS4	2.007	HPHRM_PE1	3.478	PCI2	2.103
DTS5	2.414	HPHRM_PE2	3.283	PCI3	1.732
FP_MP1	2.930	HPHRM_TR1	2.319	PCI4	1.808
FP_MP2	3.051	HPHRM_TR2	3.453	PCI5	2.375
FP_MP3	2.898	HPHRM_TR3	2.233	PDI1	1.534
FP_MP4	2.162	HPHRM_TR4	4.400	PDI2	1.918
FP_MP5	1.992	IIB1	1.920	PDI3	1.789
FP_OP1	2.469	IIB2	2.851	PDI4	1.788
FP_OP2	2.457	IIB3	2.803	PDI5	2.694
FP_OP3	2.465	IIB5	1.658	SSC_IC1	2.361

FP_OP4	2.399	ITC_HCS1	2.384	SSC_IC2	1.891
FP_OP5	2.402	ITC_HCS2	2.454	SSC_IC3	2.162
HPRM_ED1	3.062	ITC_HCS3	2.094	SSC_IC4	2.313
HPRM_ED2	3.539	ITC_HCS4	2.530	SSC_IC5	2.092
HPRM_ED3	3.501	ITC_MA1	2.126	SSC_IS1	2.287
HPRM_ED4	3.681	ITC_MA3	2.776	SSC_IS2	1.708
HPRM_EP1	5.034	ITC_MA4	4.474	SSC_IS3	2.412
HPRM_EP2	2.327	ITC_MA5	3.293	SSC_IT1	2.468
HPRM_EP3	2.167	ITC_TE1	4.805	SSC_IT2	2.373
HPRM_EP4	2.489	ITC_TE2	6.234	SSC_IT3	2.142
HPRM_JA1	2.714	ITC_TE3	4.012		

Source: Synthesis of research

4.2. Evaluation of the structural model

Assess the suitability of the research model

The suitability of the model is judged by the SRMR coefficient, when the SRMR coefficient < 0.08 then the model is considered suitable (Hu and Bentler, 1999). However, if the SRMR coefficient < 0.1, the model can still be accepted (Hu and Bentler, 1999). The results show that the model has an SRMR coefficient of both models < 0.08 indicating that the model is suitable.

Table 5. Results of the model's conformity with research data

	Saturated Model	Estimated Model
SRMR	0.046	0.061
d_ULS	5.446	9.533
d_G	2.129	2.196
Chi-Square	6006.201	6106.275
NFI	0.810	0.807

Source: Synthesis of research

Evaluation of the R-square coefficient

The R-square factor measures the model's relevance or the model's ability to interpret. Values of about 0.67 and above will correspond as strong values, about 0.33 as averages, and 0.19 as weak. (Hair et al., 2014). The results in Table 6 show that the model explains 78.6% of FP volatility - which is a very good result. However, the remaining variables are only explained in the medium – weak such as IIB with 24%, PCI with 19%, PDI with 9.2% and SSC with 8.7%. This happens because the study only considers the intermediate role of these variables and therefore only considers 1 independent factor affecting IIB, PCI, PDI and SSC, HPHRM, so the level of explanation is not high.

Table 6. Table of R-square coefficient values

	R Square	R Square Adjusted
FP	0.786	0.783
IIB	0.240	0.239
PCI	0.190	0.188
PDI	0.092	0.090
SSC	0.087	0.085

Source: Synthesis of research

Evaluation of the F-square coefficient

The F-square coefficient represents the degree of correlation of one variable with another, if the F-square coefficient is greater than 0.15 will show that the two variables are closely related to each other, and the F-square coefficient less than 0.02 will show that the two variables are almost unrelated to each other (Hair et al., 2014). The results in Table 7 indicate that F-square coefficients are all > 0.02 showing that the relationships are correlated, including that the relationship between HPHRM and IIB, HPHRM and PCI, HPHRM and FP, DTC and FP are relatively tight because f-square > 0.15 (Hair et al., 2014).

Table 7. Table of F-square coefficient values

	DTC	FP	HPHRM	IIB	ITC	PCI	PDI	SSC
DTC		0.243						
FP								
HPHRM		0.641		0.316		0.234	0.101	0.095
IIB		0.042						
ITC		0.132						

PCI		0.098						
PDI		0.045						
SSC		0.060						

Source: Synthesis of research

4.3. Evaluate the research model when there are no intermediate variables

Using Smart PLS software, the study identified the results of testing the research model in the absence of intermediate variables such as Figure 2. Thus, in the absence of intermediate variables, the impacts from HPHRM, DTS, ITC to FP are supported at a meaningful level of 1% due to p-value < 0.01. In addition, the positive impact factor shows that these are all positive effects.

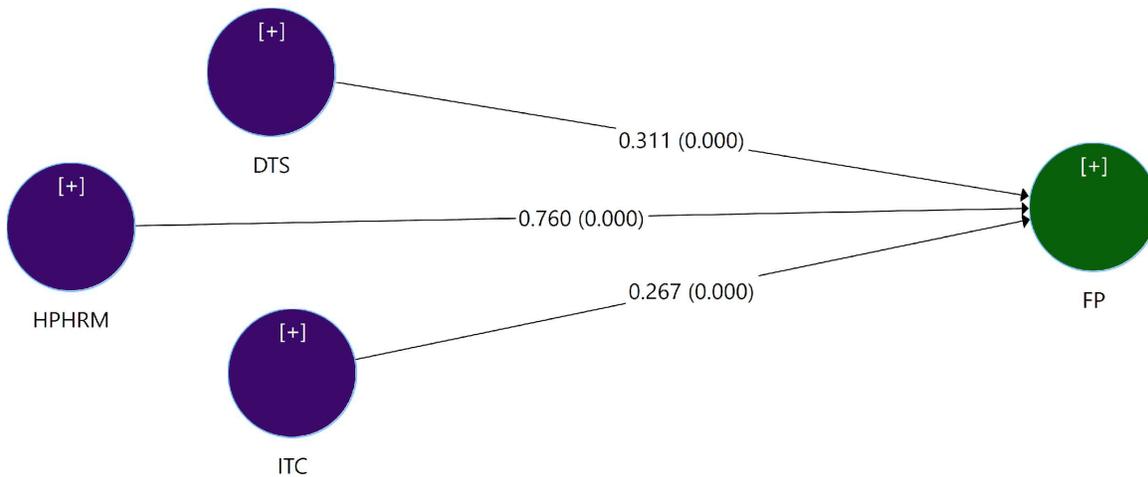


Figure 2. Model test results when there are no intermediate variables

Source: Synthesis of research

4.4. Evaluation of the research model when there is an intermediate variable

The study uses the Bootstrapping technique in Smart PLS software to test research hypotheses. The results in Figure 3 show that the H1-H7 hypotheses are supported at a 1% significance for the individual model of each industry as well as the model when all 3 sectors are combined. The impact factor is positive, indicating that the impact between the factors is a positive effect.

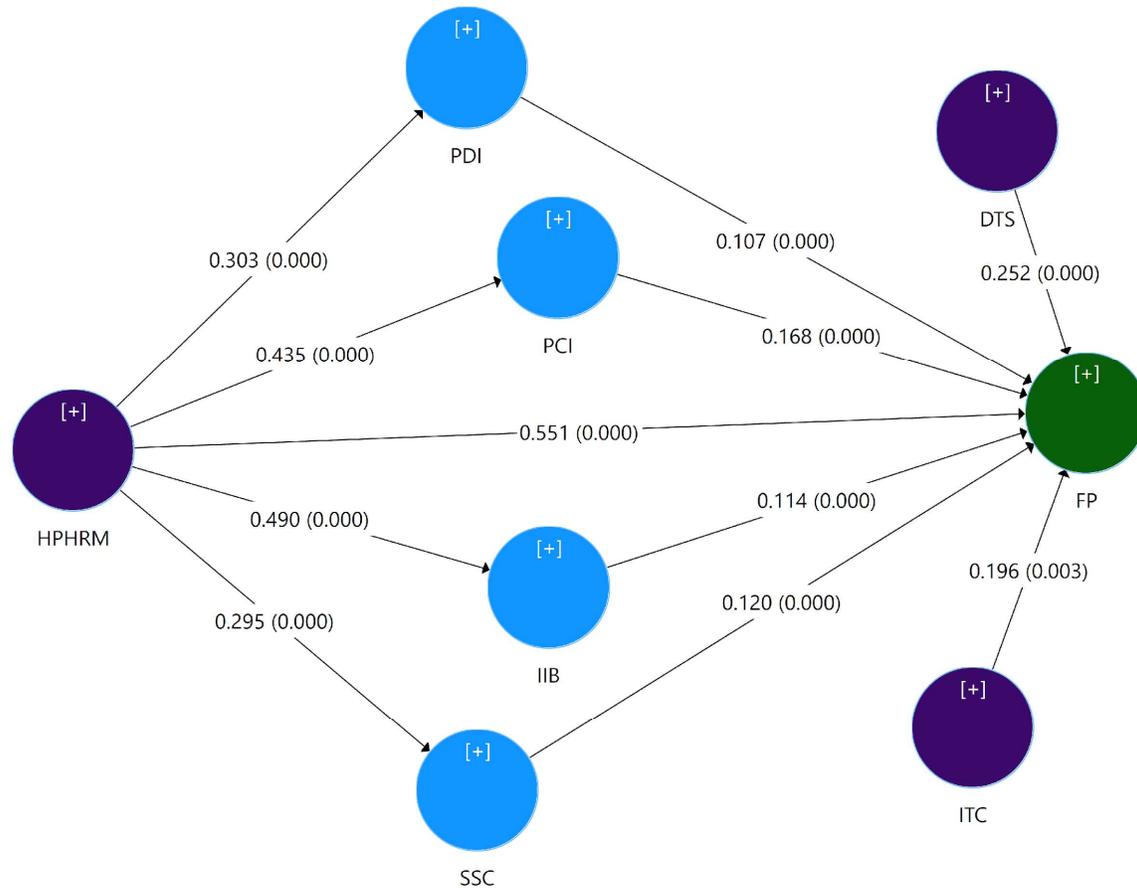


Figure 3. Model test results when intermediate variables are available

Source: Synthesis of research

The direct impact from HPHRM to FP still has a relatively large impact factor of 0.551, indicating that improving HPHRM can still directly or indirectly affect other factors not included in the model to improve FP. Considering the direct effects from HPHRM to intermediate variables, the impact of HPHRM on IIB is large. most with HSTD is 0.490. This shows that improving HPHRM makes it possible for individuals in the enterprise to improve their thinking and knowledge, and thereby can improve the innovation capacity of individuals and from which innovative behavior is formed. The impact from HPHRM to PCI is also relatively strong with an impact factor of 0.435 indicating that in addition to improving individual innovation behavior, HPHRM can also strongly improve process innovation in the enterprise. In addition, HPHRM also affects PDI and SSC at a good level with impact coefficients of 0.303 and 0.295 respectively, indicating that improving HPHRM also makes business product innovation enhanced as well as improved smart supply chain.

For impacts from intermediate variables to FP of enterprises, the impact from PCI is the largest with an impact factor of 0.168. This means that for these exporters, process innovation improves efficiency even more. In addition, the impact from the smart supply chain also causes FP to increase due to the impact factor from SSC to FP is 0.120. Although the impact is not equal

to process innovation, it also shows the relatively important role of smart supply chains because exporters need to manage their supply chains well to be able to cooperate with foreign businesses. Finally, product innovation and individual innovation behavior also increased FP but the increase was lower than SSC with HSTD of 0.103 and 0.114, respectively.

In general, the impact from HPHRM to FP is mainly direct. However, to better understand, the study performs detailed relationship testing to understand the intermediate role of intermediate variables.

Table 8. Detailed relationship audit results

	Original Sample (O)	Sample Mean (M)	Standard Deviation (STDEV)	T Statistics (O/STDEV)	P Values
HPHRM -> SSC -> FP	0.035	0.037	0.009	4.110	0.000
HPHRM -> IIB -> FP	0.056	0.058	0.013	4.303	0.000
HPHRM -> PCI -> FP	0.073	0.076	0.012	6.258	0.000
HPHRM -> PDI -> FP	0.032	0.034	0.009	3.567	0.000

Source: *Synthesis of research*

The results showed that PCI, PDI, IIB, SSC variables all played a partly intermediate role (due to the direct impact of not being statistically significant) for the impact from HPHRM to FP. More prominent was the impact of process innovation and individual innovation behavior.

4.5. Regulatory variable role verification

The results of the regulatory variable role test on Smart PLS are as follows:

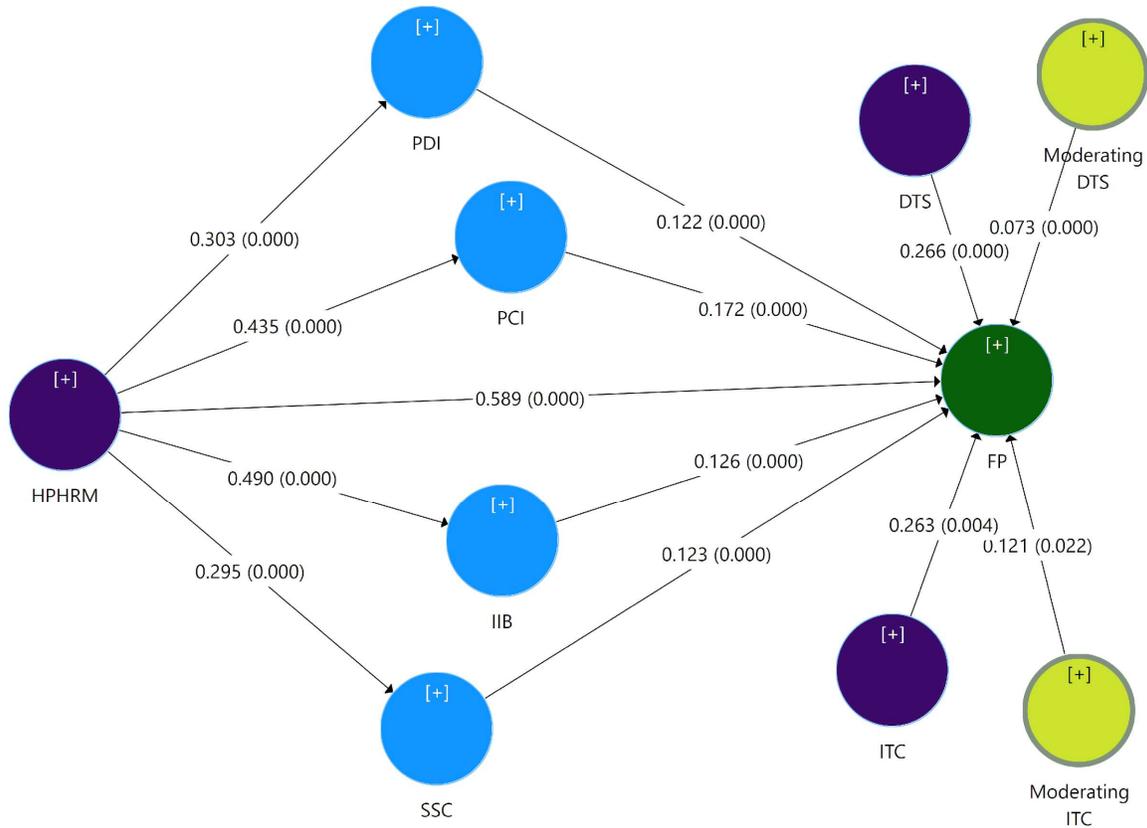


Figure 4. Regulatory role accreditation results

Source: Compiled by research

The results showed that DTS and ITC both had a role in regulating the impact from HPHRM at a meaningful level of 5% due to the P-value < 0.05. For the DTS regulatory variable, the results show that the better the enterprises with the CDS strategy, the more HPHRM is improved, the more the FP is advanced than those with the poorer CDS strategy. A better CDS strategy creates a better adaptable environment for businesses as well as for employees in the business. Thereby, in businesses with better CDS strategies, it will be a lever to improve FP through improving HPHRM. As such, the role of CDS, especially for HPHRM is clearly shown in this study.

For the ITC regulatory variable, the results show that for businesses with better IT capacity, improving HPHRM will increase FP more than businesses that do not have good IT capacity. Thus, not only the CDS strategy but also IT capacity plays a huge role in the HPHRM decision of the enterprise. IT capacity as well as a platform to promote the strengths of HPHRM, and thereby improve FP. Thus, businesses with high IT capacity need to confidently improve HPHRM to be able to achieve success in science and technology.

5. Discussion and conclusions

Following the global trend, Vietnam entered a new transformation. The transformation marks a breakthrough development of Vietnam's economy in the process of participating in Industry 4.0 and global economic integration, which is the process of digital transformation. Digital transformation opens up unprecedented opportunities for Vietnam, promoting its inherent potentials to become practical effects in national development. Early recognizing the importance and inevitability of the digital transformation process, our Government expressed the right vision as well as a clever strategy with the goal of bringing Vietnam to participate and catch up with the trend of the times, drastically in the process of developing the country's science and technology state, to meet CDS requirements. Currently, the science and technology system that meets the requirements of CDS in Vietnam has only entered the initial stage of development, lacking experts with high professional knowledge and deep understanding, the science and technology system has not more or less caught up with the progress, has not been invested on a large scale.

High-quality human resource development (HHRM) is increasingly becoming an important topic in the context of digital transformation. Research results have shown that HRM has made a great contribution to improving the operational efficiency of businesses, specifically:

Human resource management has a direct and positive impact on the performance of enterprises:

The investment in more comprehensive training of NNL is the driving force for the change and comprehensive development of employees, thereby further improving the operational efficiency of enterprises. Individual loyalty to enterprises, resulting in improved performance of enterprises. KQNC expresses views similar to previous studies such as (Subramony, 2009), (Barrick et al., 2013), (J. Bae, Chen, Wan, et al., 2003). It can be seen that the HRM factor plays an important role and determines the performance of Vietnamese enterprises. However, in Vietnamese enterprises, there is still a large part of people who often prefer to maintain traditional working methods and are reluctant to accept modern working methods. These employees may also be unaware or uncomfortable about science and technology devices and their application to their current jobs; In addition, the surrounding environment can also create barriers in the process of receiving and applying science and technology. Therefore, this result suggests the implications of NNL development management to create a solid foundation for enterprises to increase benefits in production and business.

Innovation has a direct impact on the performance of businesses:

The KQNC analysis shows the positive and direct influence of DMST on FP. DMST includes PDI, PCI, and individual innovation behavior. In fact, DMST creates the strengths of enterprises through breakthrough efforts, changing the status quo and improving products, receiving new processes and new knowledge. From there, it leads to the superior FP of enterprises. Research and analyze DMST on 3 aspects: PDI, process and DMST behavior of employees. Furthermore, KQNC showed a similar view to the study (Jiménez-Jiménez & Sanz-Valle, 2008)

when analyzing an observational sample of 173 Spanish companies and confirmed the PDIs and processes that led to FP. The study found that the impact of PCI was the strongest of the 3. This indicates the value of enterprises working to design products that depend on the ability to apply science and technology, PCI production towards digitalization for the long-term benefits and breakthroughs of enterprises, improving their competitive position.

The intermediary role of innovation in the relationship of high-quality human resource management to business performance:

DMST mediates in the positive relationship between HPHRM and FP. This intermediary role contributes to supporting the findings of past literature. KQNC bears a striking resemblance to Chowhan's (Chowhan, 2016) claim that PDI management and newly improved processes reinforce the desire for innovation within the organization. The results suggest that DMST (including PDI, employee innovation processes and behaviors) serves as an important resource for product and service development, providing a sustainable competitive advantage. The results of the study indicate that DMST interferes with the relationship between HP HRM and FP. This shows the importance of DMST. In addition, higher levels of DMST can spark innovative thoughts and knowledge that could eventually lead to an increase in PF. Therefore, in order to facilitate the linkage between HPHRM and PF, administrators first need to determine the role and importance of DMST. They should then apply HPHRM to promote DMST levels in a reasonable manner, which in turn will yield favorable and sustainable outcomes.

The intermediary role of the intelligent supply chain in the relationship of high-quality human resource management to business performance:

Through SSC, HPHRM activities are exponentially motivated to increase the operational efficiency of enterprises. As HPHRM grows to a certain threshold, SSC management activities become lighter, faster and more convenient. Therefore, businesses operate more efficiently, minimize risks, statistics and effectively analyze feedback from the market.

The positive impact of high-quality human resource management on smart supply chains:

When HPPRM, Vietnamese enterprises need to build digital and digital technology systems that meet the principles of smart management chain operation. By effectively applying science and technology advances, HRM CLC ensures smooth operation of the smart supply chain, avoiding the phenomenon of supply chain disruption, especially in the context of the current Covid-19 pandemic. Moreover, HPHRM contributes to establishing and building a digital supply chain, promoting effective and quality management. In another part, HPHRM practices help enhance SSC flexibility.

Smart supply chain positively impacts business performance:

The connection between SSC and FP of enterprises is necessary and mandatory. The effective application of SSC will help businesses achieve the best integration and lead to the desired results, namely achieving production and business efficiency. However, KQNC shows that the impact of SSC on FP is negligible. Indeed, the application of SSC in Vietnamese enterprises

has not been applied much due to cost difficulties, science and technology and especially HRM capacity have many differences compared to the requirements of SSC. In addition, the lame in HRM and FP capacity creates barriers that make the operation of enterprises more complex and complex in smart supply chain management. Therefore, the study contributes to suggesting the important role of SCC and encouraging businesses to apply appropriately to maximize benefits in production and business.

Thus, the research results have identified the correlation between HPHRM systems, innovation, smart supply chain and operational efficiency of enterprises in Vietnam. HRM is important in improving the operational efficiency of enterprises, so it is necessary to pay special attention and focus on developing scientific and technological human resources to meet the requirements of digital transformation with Vietnam. Science and technology development will be a springboard for the development of science and technology as well as gradually shifting the national agriculture structure from focusing on cheap labor to qualified science and technology enterprises, thereby improving operational efficiency for enterprises.

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