Transforming the Pharmaceutical Supply Chain: The Role of Supply Chain Integration in Connecting Standards Related to Hospital Performance

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Abstracts: While integrative care has become standard practice worldwide, a better understanding of the factors driving behaviour, decision-making, collaboration, and governance in care networks is needed to move towards integrative care. The role of supply chain internal and external integration, and its effects on pharmaceutical supply chain performance, has not been studied extensively in the hospital management literature. Supply chain integration adds value to the hospital, demonstrating its efficiency in the pharmaceutical supply chain. This paper proposes a link-oriented model of supply chain integration and performance in the pharmaceutical supply chain. The cross-sectional survey was conducted with 411 pharmacy staff working in Vietnam's Ho Chi Minh City hospitals. The results indicate that hospital supply chain integration with factors (Human resource management, quality management system, product supply, and information technology) is directly and significantly related to pharmaceutical supply chain performance. The study's main contribution is the discovery of supply chain integration that links pharmaceutical supply chain performance to disease management paradigm transitions. Theoretical and managerial implications, the scope of future research and the study's limitations are also discussed.

Keywords: Pharmaceutical, Supply Chain Performance, Hospital Pharmacy, Drug Delivery Systems, Integrated Care.

1. INTRODUCTION

Hospitals in developing countries must pay attention to the international standards for improving system-based health care. Standards define best practices for doing work. Work standardization adds discipline to the culture, which is necessary for lean management to take root. That's how a hospital ensures a clean, intuitive, and safe working environment. The health systems of countries that follow the right standards will prevent healthcare errors and establish procedures to prevent other medication errors that can affect healthcare (MÍkva, Prajová et al., 2016).

The International Pharmaceutical Federation (FIP) has updated the practice standards used by hospital pharmacists worldwide. The standards, known as "Basel Statements," there are a total of 65 Basel Statements covering the six primary domains of hospital pharmacy: (i) Procurement; (ii) Influences on prescribing; (iii) Medication preparation and delivery; (iv) Medication administration; (v) Medication monitoring; (vi) Human resources and training (Gilchrist, 2015). Pharmacists are strongly encouraged to evaluate the American Society of Health-System Pharmacy guidance documents cited throughout these guidelines for more detailed descriptions. A hospital relies on pharmacy services to use medications safely, effectively, and cost-effectively. Pharmacists are in charge of delivering and achieving the outcomes of these services: (1) practice management; (2) medication-use policy development; (3) optimizing medication therapy; (4) drug product procurement and inventory management; (5) preparing, packaging, and labeling medications; (6) medication delivery; (7) monitoring medication use; (8) evaluating the effectiveness of the medication-use system; and (9) research. These services are essential for the quality of patient care. Depending on the patient’s needs, the scope of pharmacy services varies across places because hospitals have limited resources (ASHP, 2013).

The Vietnamese health system must address these challenges by approaching new systems management models to improve people's health. Vietnam is undergoing a dramatic demographic transition leading to an aging population. The number of people aged 65 and over is estimated to increase from 10% of the population in 2015 to

28% in 2050. Population aging, industrialization, and lifestyle changes have created a dual disease burden, shifting from infectious to noncommunicable diseases (Dang, Nguyen et al., 2021). Vietnam's domestic and local businesses have a lot of competition in the supply chain sector. The pharmaceutical supply chain is a complicated system with many intermediaries between manufacturers and consumers (Quan, 2020). The health care system in Vietnam consists of four levels: central, provincial, district, and commune. Primary health care services are concentrated at the grassroots level (district and commune levels). Healthcare activities at the grassroots level are limited and inefficient, which is still an unsolved problem leading to overcrowding of upper-level hospitals (Quyen, Ha et al., 2021). Public hospitals in big cities are often overloaded with patients. The quality of health services at the commune level is still limited, leading to a decrease in patients' trust in the grassroots health care level. An example of overcrowding in senior health facilities is associated with medication errors (Dang et al., 2021). Standards in many developed countries well established clinical pharmacy services in hospitals, but these practice roles can vary considerably depending on policy and resources. Healthcare in different countries (Dong, Trinh et al., 2022). In Vietnam, with a high-pressure healthcare system and a low percentage of medical staff per capita, the level of clinical pharmacy development in healthcare facilities is still underdeveloped (Al-Shaqha & Zairi, 2001).

Several authors have taken a holistic view of the healthcare sector on issues related to hospital supply chains. Medicines in a healthcare facility include prescribing, analysing and validating prescriptions, dispensing, dispensing, and administering drugs, and pharmacy orders to end-users represented by mobile lines move with the operation of human resources operating according to the quality standards contained in the pharmaceutical supply chain (Mezouar, El Afia et al., 2016). This paper aims to examine the importance of integrating supply chains connecting activities that support the value development of hospitals, helping to connect standards of professional practice in pharmacy services in hospitals.

2. THEORETICAL FRAMEWORK ANG HYPOTHESIS DEVELOPMENT

The human element of human resource management (HRM) in the drug movement also has the potential for significant risk of error. These risks are increased in the hospital setting (Mezouar et al., 2016). Studies show that human competence can create a competitive advantage, as it is a complex, inimitable, and rare resource for companies. The healthcare supply chain can gain a competitive advantage from deploying the right people capabilities as a valuable, complex, and inimitable resource in evolving supply chain performance. People competence denotes specialized skills, knowledge and expertise specific to hospitals. Furthermore, specialist knowledge related to treatment procedures meets hospital pharmacy service performance standards. Therefore, human capacity is an important determinant of pharmaceutical supply chain performance (SCP) (Mandal & Marketing, 2018). Human resource management is an integral part of the overall hospital management. Human resource management ensures that the best-skilled people are matched with the jobs available in a healthcare facility. Managing diverse human resources is a unique challenge for human resource managers in the healthcare sector. Hospital pharmacy staff is also a major concern of hospital human resource managers (Rogers, Jiang et al., 2016). Hospital pharmacists are integral to pharmaceutical supply chain initiatives in high-performance hospitals. They provide input on contract and supplier selection strategies, including their financial impact; they advocate compliance with contractual terms; they manage the use of pharmaceuticals; and they help ensure that the supply chain's ability to meet patient and consumer expectations is changing as technology drives changes to healthcare delivery (Mandal & Marketing, 2018). The following hypothesis is established as the hospital human resource management relationship is consolidated into the supply chain, which affects hospital performance in the pharmaceutical supply chain.

H1a: There is a relationship between human resources management and pharmaceutical supply chain performance in hospitals.

H1b: There is a relationship between human resource management and the integration of the pharmaceutical supply chain at hospitals.

Consistent product quality standards and safe care quality are the primary approaches to business process improvement used in hospitals (Mezouar et al., 2016). Total Quality Management (TQM) is a holistic approach to management that aims to improve quality in every aspect of an organization, including infrastructure. As indicated by countless studies, total quality management has become an important tool for improving organizational performance in the healthcare sector. Total Quality Management can be defined as an organizational culture that commits resources to customer satisfaction through continually improving the products/services provided. This culture varies across countries and industries (Turkyilmaz, Bulak et al., 2015). Hospitals are complex entity that has distinct characteristics from other industries. The healthcare industry has many challenges to innovation, including higher quality of care and services by promoting efficient operations and innovative workflow (Lee, 2015). The following hypothesis is established as the relationship of the hospital quality management system is consolidated into the supply chain, which affects the hospital's performance in the pharmaceutical supply chain.

H2a: There is a relationship between quality management systems and hospital pharmaceutical supply chain performance.

H2b: There is a relationship between quality management systems and the integration of pharmaceutical supply chain at hospitals.

The so-called "physical" flow of drug product movement includes dispensing, receiving, repackaging, preparing, and transporting the drug (Mezouar et al., 2016). Hospital supply chains, sometimes referred to as Pharmaceutical Supply Chains (PSCs), are complex and include many organizations performing different but sometimes stacked roles in narrowing and drug distribution, price differences between different types of users is considered a frequent phenomenon due to its complexity. Inefficient hospital pharmaceutical supply chains are associated with product shortages, product disruptions, reduced patient safety, poor performance, distribution errors, and technology failures leading to out-of-hospital shortages. The lack of proper distribution systems creates a significant bottleneck, often making access to the above mentioned products and supplies very difficult (Abu Zwaida, Pham et al., 2021). Hospital pharmacy services play an important role in patient care. It focuses on ensuring that prescribed medication is dispensed accurately and on time to the intended patient. Hospital pharmacies must purchase, store and dispense drugs. These activities are referred to as pharmaceutical logistics processes, which are the responsibility of dedicated staff as drugs must be administered under specific conditions and standards. The pharmaceutical supply chain in the hospital, pharmaceutic ally, is the supply of drugs to the patient, which is important in ensuring a high standard of care (Romero, 2013). As the relationship of the hospital pharmaceutical product supply stakeholders is consolidated into the supply chain, this affects the hospital's performance in the pharmaceutical supply chain, and the following hypothesis is set.

H3a: There is a relationship between the process of supplying products and the performance of the pharmaceutical supply chain at hospitals

H3b: There is a relationship between the process of supplying products and the integration of pharmaceutical supply chains at hospitals

The flow of movement is called "information" about administering drugs, which influences the ordering and transmission of drug information between healthcare team members (Mezouar et al., 2016). Hospitals are under increasing pressure to reduce costs while improving patient care across all departments and clinics. Hospitals must be patient-oriented and lean on lean and agile principles to ensure they properly realign and integrate healthcare processes, helping to reconcile efficiency requirements with demand. of the patient and the mission of the hospital. One of the key success factors is ensuring that internal logistics and external SCM are fully integrated, as both must adjust to patient needs and events. unexpected risk events (agile), while continuously improving quality and controlling costs (lean). SCM has been recognized as a potentially major impact on hospitals. SCM is one of the key areas where information technology has delivered tangible value and improvement. However, it is essential to integrate information technology into pharmaceutical SCM with lean and agile principles, seeking to eliminate non-value-adding activities to improve the pharmaceutical supply chain, hospital products: transportation, movement,

inventory, waiting, defects, overproduction, and underutilized personnel (Nabelsi & Gagnon, 2017). Information technology (IT) plays an important role in the process implementation of the hospitals need to develop information technology to improve the quality of care, reduce medical errors, control spending, and comply with government regulations. Overall, the implementation of IT in hospitals has not been particularly successful mainly due to the complexity of healthcare organizations, mismatched organizational structures, and conflicting roles of the stakeholder's main body. In other words, the main obstacles seem more related to environmental and organizational issues than technology issues (Nabelsi & Gagnon, 2017). The following hypothesis is established as IT applied in hospitals is consolidated into the supply chain, which affects hospital performance in the pharmaceutical supply chain.

H4a: There is a relationship between information technology applications and pharmaceuticals supply chain performance in hospitals

H4b: There is a relationship between information technology applications and the integration of the pharmaceutical supply chain at the hospital

The supply chain concept allows hospitals to see the web of inter-organizational relationships around their operations and how they fit into that network. In healthcare, the value should be a priority goal in the healthcare system because it is of ultimate importance to the customer (patient) and unifies the interests of all actors in the healthcare system. Values include many other goals already applied in healthcare, such as quality, safety, patient-centeredness, cost containment, and integration (Porter, 2010). Supply chain integration in hospitals is essential to standardizing, streamlining, and automating healthcare processes. This depth of integration and automation helps reduce costs, track supplies across the organization, maintain caregiver and patient safety, and ultimately improve outcomes (Duque-Uribe, Sarache et al., 2019). An organization needs a strong upstream and downstream integration of its complex network of business relationships. With the organization's growth, supply chain integration activities began to focus more on customer demand for goods and services that do not harm the environment (Meyer, Jekowsky et al., 2007). The following hypothesis is established when relationships integrated into the supply chain are supported from hospital value platforms, which affects hospital performance in the pharmaceutical supply chain.

H5: Test the mediating effect between integration and performance of pharmaceutical supply chains in hospitals.

The pharmaceutical supply chain involves the flow of many different types of products and the involvement of a number of stakeholders. The main purpose of the pharmaceutical supply chain is to deliver products on time to meet the suppliers' needs. Consolidating service offerings will greatly improve visibility into the pharmaceutical supply chain costs, improve product pricing through standardization, reduce inventory, reduce distribution, and reduce costs. transportation costs. Hospitals must always look for new sources of competitive advantage, and Pharmaceutical Supply Chain Management solutions must ensure complete end-to-end information visibility between suppliers, manufacturers, distributors, and customers (Mathew, John et al., 2013). This study systematically attempts to study hospital operations in the pharmaceutical supply chain. The hospital relationship is the starting node of the study's conceptual model shown in Figure 1. It impacts the efficiency of the pharmaceutical supply chain in the hospital and also affects the supply chain integration process. Supply chain integration (SCI) plays a central role in transforming the pharmaceutical supply chain (Nguyen Huu Khanh Quan & Rajagopal, 2021). The transformation structure of the hospital's pharmaceutical supply chain model includes six data collection tools, including HRM, quality management system, product supply, IT, SCI and pharmaceutical SCP in hospitals.

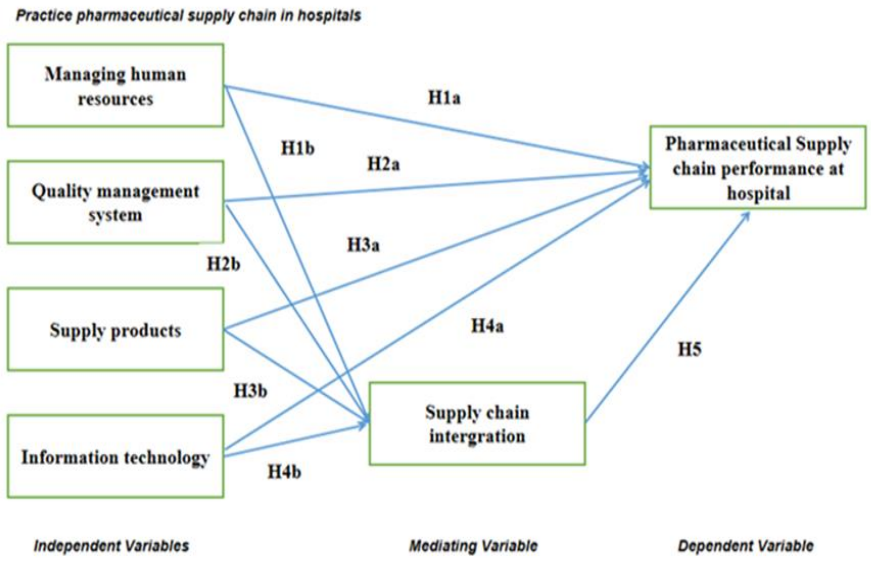

Figure 1: The Research Framework Model Specification of The Study

Source: Author, 2023

3. RESEARCH METHODOLOGY

A survey questionnaire was developed consisting of two parts. The first part of the questionnaire looked for the respondents' demographic information. In the second part, the questionnaire includes scale items that were applied from the previous pilot study and then adapted to the main study (P. R. Nguyen Huu Khanh Quan, 2022). The questions and items provided in the main analysis included six constructs and a total of 45 items were selected and measured using a five-point Likert scale with "1 = Very Poor, 2 = Poor, 3 = Fair; 4 = Good, 5 = Excellent": human resource management (8 items), quality management system (7 items), product supply (7 items), information technology (7 items), integration supply chain (8 items) and pharmaceutical supply chain performance in hospitals (8 items) (P. R. Nguyen Huu Khanh Quan, 2022).

This study is quantitative, and the survey design used a cross-sectional method. This study surveyed pharmacy staff working in hospitals in Ho Chi Minh City. The questionnaire is shared with the Google form link to the pharmacist community on Zalo and Facebook application platforms. In addition, the study also conducted a direct survey by paper file to pharmacy staff at the hospital. This study has a data set collected from March to December 2021 consisting of 411 valid questionnaires that achieved an appropriate sample size for statistical analysis. SEM requires at least 100 data entries to provide accurate and reliable estimates (Rehman Khan, Yu et al., 2022). Could roughly use the following scale to decide if the sample size is correct: good is 300 (Comrey & Lee, 2013).

In this study, a number of analytical methods are selected to test the validity, reliability and hypothesis testing by structural equation modelling (SEM) (Rehman Khan et al., 2022). The research model is tested with the latest statistical methods, namely structural equation modelling. In a two-step approach, the researcher first evaluates the measurement model and then estimates the structural model. The measurement model evaluates the reliability and validity of the structure. SPPS and AMOS software were used (Rahi, Khan et al., 2021).

4. RESULTS AND DISCUSSION

The results of the demographic details of the sample of pharmacy staff working in hospitals are 65.7% more female than male, the age group from 30 to 40 has the largest percentage at 57.7% and the bachelor's degree in pharmacy training has the largest rate of 57.4%. Participants answered the questionnaire working in a public

hospital under the management of the city with a rate of 40.4%, the rate of working experience from 5 to 10 years was 25.3%. Besides the hospital's history, the establishment time of 5-10 years is 34.5%. Results of cases for multiple-choice questions: experience through working positions in hospitals, clinical pharmacy positions in 98/448 cases, followed by pharmacy management in 92/448 cases; Finally, the participants' understanding of the accreditation standards related to hospital pharmacy services 346/616 is a domestic agency/organization. After synthesizing the respondent's demographic information, reliability, convergence value, and discriminant value of the survey tool, perform model test measurement.

This study used structural equation modelling to verify the hypothesis because of its many advantages. Before testing the hypothesis, the reliability and validity of the measured variables were tested. Cronbach's alpha determines whether identical measurements can be obtained by repeating measurements for the same concept. Reliability is considered guaranteed when Cronbach's alpha is above 0.7. Since all questions from the survey had Cronbach's alpha values above 0.7, the study was considered reliable. Next, confirmatory factor analysis was carried out to check the convergence value and consider the completeness of the structural equation model, including the positive factor. Measured goodness of fit indicators for the model are presented, and the research model is determined to be acceptable based on how satisfied these indicators are with the recommended levels: CMIN/DF=1,980, GFI=0,850, CFI=0,936, TLI=0,932 và RMSEA=0,049 (Hair, Page et al., 2019). Next, extract the mean-variance (AVE) and construct the calculated confidence values (CR) to obtain the convergent value (Hanafiah, 2020; Purwanto & Sudargini, 2021). All AVE values are above 0.5 and CR values are above 0.7, indicating statistical significance (Changjoon & Soohyo, 2021). Table 1 presents the results of the convergence validity test.

Table 1: Convergent Validity Test Results

	Items	Cronbach's Alpha	CR	AVE
Human Resource Management (HRM)	8	.930	0.929	0.686
Quality Management System (QMP)	7	.930	0.926	0.610
Supply Products (PPP)	6	.928	0.922	0.627
Information Technology (ITP)	7	.921	0.931	0.659
Supply Chain Integration (IPS)	7	.915	0.930	0.625
Pharmaceutical Supply Chain Performance in Hospital (PPS)	8	.926	0.916	0.612

Source: Author, 2023

Finally, the AVE for each variable was used to analyse the discriminant value and the correlation coefficient between the variables was calculated. The discriminant value is guaranteed since each variable's AVE is greater than the square root of the correlation between the variables (Hanafiah, 2020). Table 2 presents the discriminant analysis results.

Table 2: Analysis of the Mean, Standard Deviation, and Correlation of the Variables

Factor	Mean	SD	PPP	IPS	ITP	QMP	HRM	PPS
PPP	3.63	0.935	0.828					
IPS	3.87	0.735	0.622	0.781				
ITP	3.49	0.825	0.463	0.488	0.792			
QMP	3.49	0.921	0.285	0.413	0.443	0.812		
HRM	2.77	1.011	0.238	0.310	0.301	0.252	0.791	
PPS	2.88	0.947	0.401	0.454	0.420	0.460	0.354	0.782

Source: Author, 2023

The structural equation model indexes for hypothesis tests are CMIN/DF=1,979, GFI=0.850, CFI=0.936, TLI=0.932 and RMSEA=0.049, and most of them satisfy the criteria for degree of severity. fit suggested by Hair et al. (2019). Accordingly, the hypothesis is tested based on the path analysis model. Hypothesis test results show

that hospital supply chain integration significantly affects pharmaceutical supply chain performance (Changjoon & Soohyo, 2021). Table 3 presents the results of hypothesis testing. This result indicates that it is important for effective hospital supply chain integration to improve supply chain performance.

Table 3: Hypothesis Testing Results

Relationships between variable			Estimate	C.R.	P	Hypothesis test
IPS	<---	PPP	0.378	9.051	***	H3b: Accept
IPS	<---	HRM	0.067	2.402	0.016	H1b: Accept
IPS	<---	QMP	0.128	3.882	***	H2b: Accept
IPS	<---	ITP	0.133	3.019	0.003	H4b: Accept
PPS	<---	ITP	0.129	1.994	0.046	H4a: Accept
PPS	<---	QMP	0.249	5.002	***	H2a: Accept
PPS	<---	HRM	0.149	3.611	***	H1a: Accept
PPS	<---	PPP	0.148	2.275	0.023	H3a: Accept
PPS	<---	IPS	0.201	2.317	0.021	H5: Accept
*** p-value of 0.000 < 0.05						

Source: Author, 2023

As healthcare organizations strive to improve the quality of care, they should focus on safety and quality of service. As a result, healthcare providers invest a lot of resources to drive innovation in the pharmaceutical supply chain (Lee, 2015):

Pharmacists and pharmacy staff review medication orders every day of the week to ensure proper drug selection, dosage, route of administration, and frequency; and check for drug-drug interactions. Pharmacists also optimize treatment management and safety through other interdisciplinary collaborative actions to develop procedures that ensure safe use of medications, optimize patient care services, to support medication supply chain management (Chapuis, Albaladejo et al., 2019; Wernli, Hischier et al., 2023). In Australia, pharmacy technicians can improve hospital pharmacy team efficiency in terms of practical measures, including the average number of medication management plans completed daily and the time it takes to complete key tasks (Nguyen, Ziser et al., 2019).

Research conducted by Okoth Tobias Ondiek (2021) has confirmed the significance of supply chain quality management in resolving all issues that contribute to the enhancement of the performance of PSC. According to research by Carmen Guadalupe Rodrguez-González et al. (2020), the European Foundation for Quality Management excellence model to enhance the performance of hospital pharmacies is the most prevalent method in Europe. This study also recommends the quality management model approach to the International Organization for Standardization (ISO) 9001 (Okoth, 2021; Rodríguez-González, Sarobe-González et al., 2020).

In the hospital supply process, to minimize drug shortages, the rationale for the variety and quantity of product choices must be clear to all stakeholders to meet the requirements. requirements for storage, space, ordering, and transportation. Hospitals have budgets and contingency plans that adapt to unpredictable situations such as epidemics, allowing fair and equal access to essential medicines. Hospitals procure through multi-stakeholder collaboration that promotes age-sustainable patient care (Duong, Moles et al., 2019).

Digital transformation as a smart hospital trend in the pharmaceutical supply chain is suitable for building and developing a Smart City. Those solutions require hospital leaders to start from the long-term and short-term vision, strategy, and goals in line with the hospital's digital transformation process (Quan, Singh et al., 2023). Pharmacists have a key leadership role in healthcare, driving the implementation, use, and development of information technology services for e-prescribing, dispensing and delivering prescriptions. Advances in Information Technology combined with AI are opening up new areas in telemedicine and telemedicine. Telemedicine is driven by such developments and healthcare governance and policy decisions based on the relative accountability and cost-effectiveness of various professionals (Atkinson, 2022). One example is the development of electronic prescriptions.

This ensures greater reliability and safety in repetitive prescriptions in chronic illness and improves the sharing of dispensing information between community pharmacists and hospitals and between pharmacists and physicians.

Hospitals aim to provide patients and staff the best products and services, reduce transportation and maintenance costs, improve operational efficiency, and adopt advanced technologies for internal (e.g., departmental) and external (e.g., customer) functions. On the other hand, patients want high-quality care through the best products and services available and qualified pharmacy staff.

According to Carrión et al. (2017), direct effects are "effects that are not cancelled out by any other variable in the model." In contrast, indirect effects are "mediated by at least one intervening variable." As shown in Table 4, the total effects are the sum of the direct and indirect effects.

Table 4: Direct, Indirect, and Total Effects as Measure Performance

Variable and Relationships	Direct effects	Indirect effects	Total effects
HRM --->PPS	.149	.009	.162
QMP --->PPS	.249	.013	.274
PPP--->PPS	.148	.038	.224
ITP--->PPS	.129	.020	.156
IPS --->PPS	.201	0	.201
HRM --->IPS	.067	0	.067
QMP --->IPS	.128	0	.128
PPP--->IPS	.378	0	.378
ITP--->IPS	.133	0	.133

Source: Author, 2023

The competitive partial mediation hypothesis says the intermediate variable will weaken the link between the two main variables. But it's possible that the intermediate variable could make the relationship between the two main variables even stronger. VAF is used to determine how the mediation process can explain why the dependent variable changes. Based on the values of VAF is define the proportion of mediation for a simple mediation as follows and describes the following mediation conditions : $0 < VAF < 0.20$, then-No Mediation; $0.20 < VAF < 0.80$, then Partial Mediation; $VAF > 0.80$, then Full Mediation (Carrión, Nitzl et al., 2017).

A mediating effect, called indirect or mediation, is when a third variable links the independent and dependent variables (Carrión et al., 2017). Table 5 demonstrates how the independent variable influences the trajectories of the mediating and dependent variables. If the coefficient for the path between the independent variable and the dependent variable is less than the coefficient for the direct path, or if the path coefficient is no longer significant, then mediation (either partial or full) is definitive (Hazen, Overstreet et al., 2015).

A The role of supply chain integration and how it affects supply chain operations is written about in the supply chain operations management literature (Sundram, Rajagopal et al., 2018). SCI adds value, which shows how efficient it is. So, the success of the supply chain depends on how well the people in the chain can balance the needs of everyone involved. When everyone in the supply chain works together, it makes the chain more flexible and improves its performance. Integration can only be done by building relationships with upstream and downstream supply chain members. To create value for the end consumer, it is important to look at both suppliers (the "upper players") and customers (the "end players") as a whole. With the help of a third explanatory mediator variable, a mediation analysis looks at the cause-and-effect relationship between an exogenous variable and an endogenous variable (Dhaigude & Kapoor, 2017).

Table 5: The results of mediating effect analysis

Independent variable	Mediator variable	Dependent variable	Path					VAF	Mediation
ITP	IPS	PPS	PPS	<-	IPS	<-	ITP	0.6	Partial Mediation
QMP	IPS	PPS	PPS	<-	IPS	<-	QMP	0.3	Partial Mediation
HRM	IPS	PPS	PPS	<-	IPS	<-	HRM	0.3	Partial Mediation
PPP	IPS	PPS	PPS	<-	IPS	<-	PPP	0.9	Full Mediation

Source: Author, 2023

CONCLUSION

This study determines the relationship between human resource management assignment, quality management system, product supply and information technology application implementation of supply chain integration in hospitals, and supply chain performance. medicine. Research results demonstrate that the role of supply chain integration in hospitals positively impacts pharmaceutical supply chain performance. Therefore, hospital pharmacy leaders and staff in the supply chain need to centralize the continuous improvement quality management system and human resources that will enable the formation of supply chain integration relationships in the hospital to be long-lasting and user-friendly, improving the performance of the pharmaceutical supply chain (Changjoon & Soohyo, 2021). Although this study provides some implications, it has limitations. Supply chain integration is an intermediary in pharmaceutical supply chain hospital collaboration. This is one of the variables representing supply chain collaboration, and related studies can explore it more. Therefore, future research should be conducted more holistically, including other elements of supply chain cooperation. The sample used in this study only included pharmacy staff from hospitals in Ho Chi Minh City. In future research, collecting data from another province of Vietnam is necessary. Big data in hospitals, information sharing, and pharmaceutical supply chain performance could lead to clearer implications (Benzidia, Makaoui et al., 2021).

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