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THE EFFECT OF INVENTORY MANAGEMENT PRACTICES ON SUPPLY CHAIN PERFORMANCE: EVIDENCE FROM PRIVATE HOSPITALS OF SINDH PAKISTAN

Kinza Yousfani[1], Syed Safdar Ali Shah[2], Riaz Ahmed Shaikh[3], Ikramuddin Junejo[4]

[1]Assistant Professor, Department of Management Sciences, Isra University, Hyderabad, Pakistan, kinzayousfani@gmail.com

[2]Lecturer, Department of Management Sciences, Isra University Hyderabad, Pakistan, safdar.shah@isra.edu.pk

[3]Visting Faculty, Department of Management Sciences, Isra University Hyderabad, Pakistan, riaz.shaikh156@gmail.com

[4]Assitant Professor, Department of Management Sciences, SZABIST Hyderabad campus, Pakistan, ikramuddin8022@yahoo.com

Abstract

Supply chain management in the healthcare sector is considered to be more complex than any other sector. Therefore this study aims to investigate the impact of inventory management techniques which are inventory control system, inventory level, and warehouse operation on the supply chain performance of private hospitals, in Hyderabad, Pakistan. The primary data collection time was 04 months from 04 private hospitals in Hyderabad and the targeted population was store department and purchase department employees, a total of 200 questionnaires were distributed among them. The techniques applied to analyze data were Principal component analysis and multiple regression. The findings of the study and hypotheses analysis proven that the inventory control system, inventory level, and warehouse operation have a significant and positive impact on the supply chain performance in the private hospital of Hyderabad, Sindh Pakistan. The recommended work is beneficial for hospital consultants and academicians as this study sum-up the main factors for each supply chain uprising. In addition, this study suggests a variety of research questions that may be used as a tool guide for the future route of the field.

Keywords: Inventory Management, supply chain, warehouse, performance, private hospitals.

Introduction

In the contemporary world of enterprise, the advanced inventory management system in business practices is classified as one of the most insightful ways of taking into consideration the objective that improves the efficiency of the business and imparts extensive information about the product and its accessibility once it's finishing the stock (Zelbst et al.,

2019).Moreover, several entities crashed because of the lack of inadequate planning and degeneracy which cause organizations to shut down their operations and activities. Besides, three key issues were found referring to inventory management practices' lack of IT support, overstock, and unjustified forecasting technique (Rachmania &Basri, 2013). Further, this problem can be fixed if the correct inventory management system is adept and modern techniques are systematically employed which benefit the firm. Similarly, (Panagiotidou & Tagaras, 2010) stated that inventory management has a vital role in the supply chain. Amid numerous supply chain management issues, inventory management is found to be relevant to a greater extent to the entire supply chain. Therefore, inventory management is recognized as an important function that has an enormous effect on total performance.

According to Mwangi (2013) e-procurement, just-in-time, and inventory management techniques also need to be promoted to achieve high supply chain performances. In addition, supply chain performance is the method by what manner business operations or activities are formed to satisfy the end users' requirements (Abdel-Bassetet al., 2018).Likewise, Mondol (2021) mentioned the quick incorporating process of inventory and offering an analytical approach to the management competence in which organizations or business industries build the relationship between the available and remove stock. Therefore, it is important to have an advanced inventory management system to fulfill the demand at an appropriate time. Besides, (Rana et al., 2018) stated that the performance of the supply chain is vastly reliant on the advanced inventory system.

On the other hand, an advanced inventory system facilitated retailers to manage their inventory. If the inventory is not administered sufficiently, the firm will be unable to meet the demand efficiently. Hence, it will represent the supply chain performance isn't assisting the firm to attain a competitive advantage in the market. Likewise, Mondol (2021), states that the performance of the supply chain is constantly assessed by the factors of consumer satisfaction that is only merely achievable once they get the product on affianced time and date. In addition, (Rana & Osama, 2018), implies that inventory management, the supplier's role, the usage of IT, and the management of transport and its coordination are significant causes of supply chain performance.

Therefore, in this study, we have debated the impact of inventory management techniques on the inclusive performance of supply chain management in a private hospital in Hyderabad and suggest how managers can practice the use of inventory management to drive supply chain performance. Likewise, inventory management is identified as one of the essential functions which have an enormous influence on the overall performance of the supply chain (Nenes, 2010).

According to Lambert, (2008) inventory management techniques are fundamental for the prime skills of an industry at the ground level that

their success and declining cost of the organization's usage require raised generation and arrange execution and data to the delegates. It is mentioned by Carter & Price, (1995), information is the soul of all organizations and inventory managers need computerized information for success in their work. Besides, computers can help in controlling the inventory by calculating the best possible amount of stocks to dispatch and hold to satisfy the consumer's requirements. Also, the computer can do that by contrasting the inventory variables like delivery dates, demand, and stock levels. Then, an electronic data interchange (EDI) system enables direct correspondence among the organizations excluding human interference. Therefore, technology has transformed inventory management.

Furthermore, EDI allows the computers of suppliers and customers to cross-examine one another regarding their stock level, plan of production, and same information so the activities are properly harmonized, which causes the possible advantages in the shape of any paperwork, better precision, less cost of the staff and less time arises for prompt communication. Hence, the electronic point of sale is additional technology used in inventory management. In addition, just in time speaks about the considerable amount of practices that eradicate waste. The components in just in time incorporate product design with customers and suppliers, movement to the single source close supplier, less machine set-up times, and total prevention sustenance. Therefore, organizations' comprehensive practices include the entire supply chain.

The tool used by organizations to attain supply chain management is inventory management techniques. Lyons and Gillingham, (1981), state that the number of raw materials, work in progress, and finished goods that are saved for use as the need arise is called inventory and this raw material is input goods that the company needs to manufacture the product that is commodities such as plastics, steel, minerals, and lumber to convert into the finished product. The supplies which include repairs and operating and maintenance inventory which do not come in the final product. Whereas, work in progress is a material that is partially made up but not completed and finished goods are the ready item for shipment (Kothari, 1992).In addition, nowadays supply chains are taking a major step toward the aim of becoming digitized, automatic, and quick in their operations, and supply chain management is a new vision that engages with the control of materials and planning and the information from suppliers to final customers (G Cesarelli et al., 2020). According to Ghadge et al., (2020), in today's time, digital supply change networks use various diverse technologies to evolve efficient, transparent, strong, and adaptive systems in numerous phases of the supply chain which includes manufacturing, planning, logistics, and marketing, new product development, and procurement. However, Chopra and Meindi (2001), mentioned that stocks are the real drivers of a store network attributed to

the solid influence on the supply. Also, the distributors, providers, and producers presume the main part of the production network and detailed connections in viably giving the abnormal amount of client assistance while having the least levels of stock (William, 2008). Therefore, every organization needs to supply the customer at the right place, time, and a right number of units.

Therefore, it is important for the managers of an organization to deal with the inventories and to keep in mind that the goal is to keep the inventory cost at the minimum level and satisfy the customer's need. Drury (2004), states that the inventory cost includes ordering, holding, and shortage costs. The holding cost is related to the costs of physical items of the stocks, including obsolescence costs, insurance, and opportunity costs, which are associated with the funds that could be elsewhere but are tied up in the inventory. The ordering cost is the cost of placing and receiving the inventory which includes defining how much there is a need, making invoices, transportation costs, and the cost examining the good costs develop when the demand exceeds the demand that goes above the inventory supply on hand. However, the opportunity cost is the cost that includes the cost of making the sale, customer benevolence loss, previous charges, and associated costs.

Thus, supply chain management needs shall be vastly improved in the contemporary world as organizations are engaging one another with an upper level of competition. Silver (2007), harmonized that the firm's needs must competitively support its supply chain so that supply chain performance and inventory management can be accomplished with efficacy and cost-effectiveness. The objective of the study is to determine the impact of inventory management techniques on the supply chain performance of private hospitals in Hyderabad.

Following the indications, this paper represents the following structure: section 1 a brief introduction to the inventory and supply chain management section; section 2; provides a literature review, and section 3; highlights inventory management practices, whereas section 4; discusses the relationship between supply chain and inventory management. Section 5 debates the results on the impact of inventory management practices on supply chain management section 6 provides suggestions for managers and general understanding and section 7 concludes the study.

Theoretical Framework:

Constraint Theory:

Constraint theory was devised by Goldratt in 1984 and it aims to increase the level of competency of manufacturing firms overall. The theory also specifies that the organization is determined to increase the efficiency of the processes and procedures, but firstly, it will classify the features that act as constraints to the manufacturing systems (Cheng, 2017). In

addition, the constraint theory, claims that firms in order to be able to execute several restraints which include the request of the wrong material. Besides, several constraints that limit firms from achieving goals are categorized into internal and external constraints. The internal constraints include reasons like demand surpassing what the firm delivers. Whereas, external constraints in when a firm produces more than the market consumes (Disney et al., 2016). Therefore, this theory emphasizes how well an organization deals with these challenges and issues to increase efficiency. Therefore, this may be feasible only when the firm executes appropriate inventory management practices.

Transaction Cost Theory

Transaction and cost theory was originated by Ferris in 1981 and Williamson in 1975. This theory is used to explain different outcomes and behaviors and specifies a few types of costs that are incurred by people except their knowledge so that our costs. So, these costs are obtained when people negotiate or transact contrarily. Therefore, this cost theory acts on the ground of thinking and economic reasoning between economic agents. In addition to that, higher management of a firm can decrease the transaction, particularly that one correlated to inventories through diverse strategies which include bill payment policies, demand forecasting, order quantities, and safety stock policies. As an example, an organization can negotiate the payment obligation of suppliers and pay them back frequently such as frequent or monthly grounds against those paying on daily basis. Due to this, organizations are in a position to split the payment cycle from the schedule or date of delivery. Therefore, building a smooth and efficient operations organization may have a sufficient level of credit. Hence, it is the accountability of the firm's administration to approach the right strategy that curtails these cost and produce more profit (Khalid & Ali, et al., 2017).

An organization's inventory is significant and its management is crucial for its success. Moreover, proper implementation of inventory management activities and functions that are used by organizations to manage stocks of semi-finished, finished goods and raw materials is also necessary (Zer & Wei, 2006). Besides, appropriately executing activities allows firms to decrease costs and waste and increase revenue.According to Brigham et al., (2013), companies must design and build an inventory management system that balances demand and supply. Because this intends to reduce inventory costs, reduce time and improve share of information. Then and coordinate the supply chain system effectively supply chain system, leading to improved performance.

In contrast, too little inventory every so often interrupts business operations and increases the possibility of poor customer service, as stated by Koumanakos (2008). On the other hand, Rajeev (2008) claims that business enterprises must include effective inventory management practices to improve their competitiveness. Also, Rana (2018), assessed

that the smart inventory system has enriched the supply chain management performance level. In addition, managing inventory is one of the most significant tools for business which helps in running the whole business's inventories into one unit. Further, the author adds that in the absence of inventory management, no business can function appropriately also it will be problematic to handle massive data without it.

In addition, (Jessop,1999) cited that inventory management is an art and science for preserving the stock level of a given group of items acquiring the minimum cost coherent with other related targets and goals set by the administration. Moreover, organization managers must deal with the inventory to have in mind the goals of a substantial customer need(s) and keep inventory costs at the least level. Durry (2004) states that inventory costs comprise ordering, holding, and shortage costs. Further, holding cost relates to the cost of having a physical item in stock. This includes opportunity and obsolescence cost and insurance, which is allied with having funds that could be elsewhere but are tied up in inventory. Magad and Amos (1989) emphasize that the primary goal of inventory management is to enhance customer service. The authors also argue that the main concern to be considered in articulating the inventory policy is minimizing the cost. One of the possible methods to lessen expenses, build inventory effectiveness, and update forms that arise from organizations' hard work is to set up the supply chain and inventory management together. According to (Hollosi et al., 2017) the main purpose is to reassure customers by minimizing the cost. Similarly, an effective inventory management system enables organizations to decrease functioning costs.Also, Kothari (1992) states that inventory management aims to upsurge production efficiency. Therefore, the goal of inventory management is to reduce inventory investment. But one of the advantages of good inventory control is better administrative competence in all practical areas of management.

Hypotheses Development

Warehouse operation

According to Attaran (2020), robotic warehouses are characteristically vastly mechanized environments using some type of material handling automation. Also, this can convert supply chains and produce a logistic supply that is securer, quicker, and more industrious. In addition, automation machines are being put into practice in warehousing which is very helpful in supply chain management to attain higher productivity and cost reduction. Besides, the progressive warehouse management system is prepared with software planning to track inventory movement and progress orders with a large proportion of precision. Therefore, warehouse capacity accessibility, carriage, and information allocation on stock level, in real-time to many supply chain partners can lead to obtaining a competitive edge (Nowicka, 2018). Furthermore, the hospital

decision-makers should count various components like a storage room, costs, level of service, product availability, and the end time for the purpose of controlling stocking levels at all times both in the central warehouse and point of delivery locations which are operating wards and rooms (Moons et al., 2019). However, hospital supply chain management mostly faces selecting warehouse locations and capabilities for the purpose of increasing production, inventory cost, and carriage (Chandra & Kachhal, 2004). Likewise, supply chain coordination can be attained by various components such as inventory management, warehouse management system, joint planning processes, information sharing, information technology, synchronized forecasting, and management styles between all the agents. Hence, coordinated supply chain planning will minimize the over costs of the supply chain which result in an integrated hospital supply chain management (Power, 2005).Warehousing comprises numerous key functions such as inspection, loading, and unloading of the product, proper storage, and scrutiny. Therefore, warehousing is the core domain of logistics. Besides, the warehouse management system contains the warehouse infrastructure, communication, and tracking system amid the product stations. The most maintainable tendency in a storage solution is just in time method which means that the product supply from the supplier to the producer except through warehousing. Apart from this system has an entirely insufficient application in that the distance between intermediaries is increasing with the internationalization progression of the world economy. Hence, contemporary logistics be unable to last without the service of warehousing, nevertheless, diverse sustainable alterations of the infrastructure of warehousing can be introduced (Oluwaseyi, et al., 2017).
H1: Warehouse operation is positively dependent on supply chain performance.

Inventory level

According to Mahyadin et al., (2013) inventory management is a component of the supply chain, and Oballah et al., (2015), mentioned that inventory management and performance refer to Kenyan public health institutes and formed a positive relationship. Also, the inventory management procedure in the healthcare section is more complicated if we compare it with other industries because of patients' basic needs and careful service mainly the adequate medical supplies (Hani, et al., 2013). Besides, inventory management throughout the supply chain is a major challenge for enhancing the cooperation between the adding value in the organization (Mahyadin et al., 2013). In addition, the supply chainapproach defines how the supply chain has to implement with effectiveness and responsiveness. To attain this strategic fit, the company must first understand the indecisions and competencies of the supply chain in the context of effectiveness and responsiveness, which lead to achieving the strategic fit (George et al., 2019). In contrast, the

performance of the supply chain is affected by numerous components. A few of the key factors are the supply chain structure, consumer demand, exchange of information, inventory control policy, method of predicting, review period length, and lead time.

H2: Inventory level is positively dependent on supply chain performance.

Inventory control system

According to Oluwaseyi et al., (2017), the management cost of the supply chain is an important aspect of firms, and to attain the firms have to engage competent and skilled experts or professionals who grasp inventory management techniques. Moreover, the main purpose of inventory management is to curtail the total relevant cost to make sure profitable operations and expand the customer service level. In particular, the purpose of inventory control is to ensure the adequate supply of merchandise to customers, evade scarcities as long as possible, and ensure that financial investment in inventories is less. Also, effectual procuring, consumption, and accounting for material is a significant objective, to make sure of timely action for replacement, and to give the scientific base for long and short-term scheming of the materials. Further, the American production and inventory control society (James, 1998), describes inventory management as the main part and concern of business management which is connected to controlling inventories and planning. In addition to that, the main purpose of the healthcare supply chain and hospital inventory management study is to decrease the cost of healthcare without surrendering the service quality of the patient by enriching the productivity and effectiveness of the healthcare system Manuel (2008).

Likewise, it stated by Laeiddee, C, (2010), that hospitals are complicated organizations by providing services to patients in masses, staff, and physicians. Also, the service they include is the surgery, pharmacy, laboratory, dietary, housekeeping and administration, and many others. In addition, each field has its detailed and unique supply and material need. Besides, the product line of the hospital consists of low and high-cost items including durable and consumable goods that are consumed in large or in small amounts.

H3: Inventory control system is positively dependent on supply chain performance.

Methodology

The present study is explanatory research in nature because a relationship is developed among variables (Saunders, et al., 2009). In this regard, the variables were warehouse operations, inventory level, and inventory control system impact on supply chain performance. In addition, the survey research approach is considered and data is collected on google form from store department and purchase department employees, who are working in private hospitals in Sindh, Pakistan.

The data was gathered through a self-administration questionnaire based on the previous study conducted by Fredrick, (2018). All research variables consisted of four items based on five Likert scales ranging from strongly disagree (1) to strongly agree (5). Warehouse operations research items are "Receiving and issuing are done under respective documents, damaged, scrap, and waste are well identified and reported, store department staffs understand and perform inventory activities in effective manner and store department provide protective initiatives to ensure the safety of his staff".

Inventory level research items are "taking appropriate inventory control methods has help to increase overall service level,our hospital has improved its average replenishment cycle through making an appropriate decision such as lead time management, through demand and planning decisions, our hospital has the ability to maintain and sustainable inventory level and needs and our hospital has minimized logistics costs due to proper planning of inventory level".

Inventory control system "Warehouse systems such as Epicor, enhance the efficiency of the supply chain process, the current inventory control system is the ease use and has consistency in documentation, the current inventory system enhances the effectiveness of the supply chain process and our hospital has improved accuracy rate using inventory control methods such as batch control and stock review".

Lastly, the supply chain performance items are "Our hospital demand planning quality has improved, ourhospital operational cost has improved, ourhospital inventory cost has improved and our hospital supply chain has the ability to minimize waste".

The present study's convenient sampling technique and snowball sampling techniques were selected in order to collect data from respondents. These techniques were used because it is suggested that the willingness to respond toa questionnaire cannot be ignored for better and biased-free results (Saunders et al., 2009). A total of 250 questionnaires were disturbed among the target population out of only 200 that were finalized for data analysis after data cleaning and missing data. Therefore, the response rate was 80%, which is good and acceptable in the field of social sciences. For the data analysis structural equation modeling (SEM), is used in SmartPLS version 3 for both reliability and validity of data and hypothesis testing.

Results and Discussion

Common Method Bias

It is suggested that when your data is gathered from human being there are chances of biases. In order to check this biasness, the common method bias is suggested because the idea or opinion of an individual can be changed from person to person (Fuller et al., 2016). Therefore, in this study common method bias is verified with help of Harman's single factor.

The decision value for this is the value should be less than 0.50% (Podsakoff et al., 2003). Table 1 represents the findings of Harman's single factor which showed 46.121%, which is less than the suggested value (0.50 %). In this regard, it is concluded that there is no issue of common method bias.

Table 1: Common Method Bias

Total Variance Explained						
	Initial Eigenvalues			Extraction Sums of Squared Loadings		
Component	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	7.379	46.121	46.121	7.379	46.121	46.121
2	1.925	12.028	58.149			
3	1.197	7.483	65.631			
Extraction Method: Principal Component Analysis.						

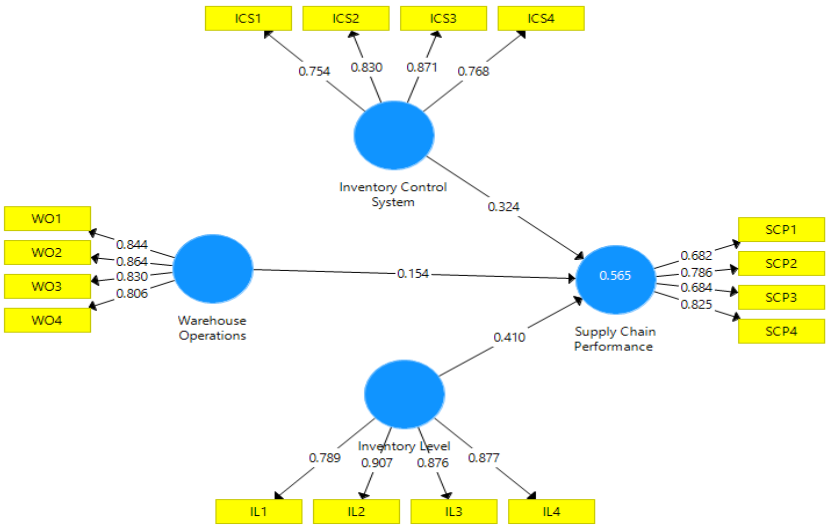
Convergent validity and Reliability

It is important to test the validity and reliability of the questionnaire before testing suggested hypotheses. Table 2 showed the item loading is more than the recommended value of 0.50 (Hair et al., 2010). Furthermore, the value of average variance extraction is also more than the decision value of 0.50. Similarly, the value of composite reliability and Cronbach alpha are greater than 0.70. Based on these values both validity and reliability of the adopted questionnaire are achieved and now hypothesis testing can be done in the present study.

Table 2: Convergent Validity and Reliability

Construct	**Research Items Coding**	**Items loading**	**Cronbach alpha value**	**Composite Reliability**	**AVE**
Warehouse Operations	WO1	0.844	0.857	0.903	0.699
	WO2	0.864			
	WO3	0.830			
	WO4	0.806			
Inventory Level	IL1	0.789	0.887	0.921	0.745
	IL2	0.907			
	IL3	0.876			
	IL4	0.877			
Inventory Control System	ICS1	0.754	0.824	0.882	0.652
	ICS2	0.830			
	ICS3	0.871			
	ICS4	0.768			
Supply Chain Performance	SCP1	0.682	0.734	0.834	0.558
	SCP2	0.786			
	SCP3	0.684			
	SCP4	0.825			

Figure 1: Model Fitness



Hypothesis Testing

Warehouse operations and Supply Chain Performance

In the present study, the warehouse operations impact on the supply chain performance of the private hospital in Sindh, Pakistan is checked. The findings of this study revealed that there is a positive and significant impact of warehouse operations on supply chain performance based on two values β= 0.153 and t-value= 2.098. In this regard, the suggested alternative hypothesis 1 is accepted and the results are shown in below Table 2.

Inventory level and Supply Chain Performance

In the present study, the inventory level impact on the supply chain performance of the private hospital in Sindh, Pakistan is checked. The findings of this study revealed that there is a positive and significant impact of inventory level on supply chain performance based on two values β= 0.411 and t-value= 5.242. In this regard, the suggested alternative hypothesis 2 is accepted and the results are shown in below Table 2.

Inventory Control System and Supply Chain Performance

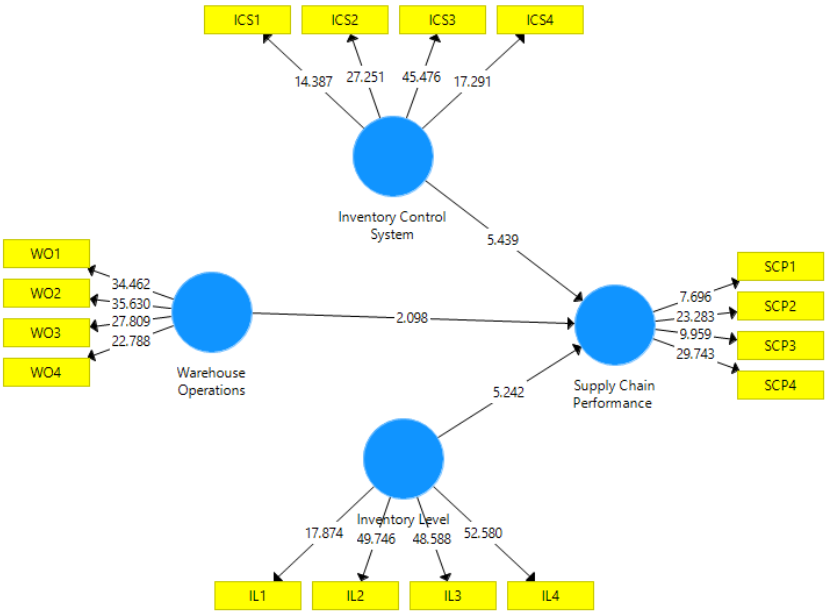
In the present study, the inventory control system'simpact on the supply chain performance of a private hospital in Sindh, Pakistan is checked. The findings of this study revealed that there is a positive and significant impact of the inventory control system on supply chain performance based on two values β= 0.324 and t-value= 5.439. In this regard, the suggested alternative hypothesis 3 is accepted and the results are shown in below Table 3.

Table 3: Multiple Regression analysis

Path effects	Path beta value	T-value	Remarks
Warehouse Operations and Supply Chain Performance	0.153	2.098	Accepted
Inventory Level and Supply Chain Performance	0.411	5.242	Accepted
Inventory Control System and Supply Chain Performance	0.324	5.439	Accepted

Source: Author's estimations

Figure 2: Regression Analysis



Discussion on Results

The effective supply chain strategy leads to better supply chain performance (Rana et al., 2015). There are various types of supply chain performance inventory management is also one in pharmaceutical supply chain performance (Aramyan et al., 2007; Moazzam et al., 2016). In the hospital sector inventory management are key factors for overall supply chain performance because it is critical due to higher cost or budget in nature (Zepeda et al., 2016). A study revealed that the hospital or pharma sector faces many challenges in order to manage the inventory as compared to other sectors such as the retail or industrial sector in developing countries particularly (Stanger et al., 2012). The key performance indicator of inventory management is the balanced stock with respect to better customer service level and higher return on investment (Salam et al., 2016). The supply chain performance can be measured through the better management of inventory (Martin and Patterson, 2009). The inventory has also important in hospital care health and pharmaceutical context because they are the concern of all

stakeholders due to their life-saving nature (Kelle, et al., 2012; Ghibu et al., 2021).

Yusuf, (2003), suggested that the inventory control system has a positive and significant impact on supply chain performance, and a number of benefits can be achieved such as reduced cost of slow-moving items and avoiding the pilferage of inventory,and so on. This inventory control system can help us to achieve retail industry along with other service sector-related areas such as hospitals (Salam et al., 2016). There is a role of demand for the level of inventory to be kept or not (Salam et al., 2016). The management of the firm should ensure the stock to fill as per demand by the customer in order to enjoy the maximum return on investment. This is how can be achieved through a control system (Yusuf, 2003). The company's performance is directly related to the management of inventory (Chebet & Kitheka, 2019). Lastly, the role of inventory control plays a vital role for the better performance of supply chain firms (Martin and Patterson, 2009; Ogbo & Ukpere, 2014).

Conclusion

This study is the empirical researchon the effect of inventory management techniques and the supply chain performance of the private hospitals of Hyderabad Sindh Pakistan is an essential need of the contemporary era. This present study proposes the influence of inventory management techniques on supply chain performancein the hospital sector. The finding suggests that there is a positive and significant impact of warehouse operation over supply chain management. Likewise,

a positive and significant impact oninventory level on the supply chain performance and inventory control system also had a positive and significant impact on the supply chain performance of private hospitals.

Furthermore, the hospital management and consultants might acquire new insight into inventory management practices and the performance of the supply chain while noticing its benefits in the hospital sector. In addition, adopting various inventory management practices helps hospitals and many other sectors in rising optimistic and constructive methods for their decision-making and business operation to archive the inventories, therefore, improving the supply chain performance. According to Bialas, et al., (2020) usage of a conventional software feature set in addition to the target data division attempts to progress the inventory cost performance and cost reductions of the hospital and pharmaceutical sectors.

Limitation of the Study

The present study is limited to only one sector for inventory management practices and supply chain performance. Various other businesses or industries such as telecommunication and information technology could

be recommended to emphasizeon future research areas with a thorough investigation of other variables.

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