Pakistan Journal of Law, Analysis and Wisdom
Volume No. 3, Issue No. 9, September 2024
e-ISSN: 2959-0825, p-ISSN: 2959-0817
http://pjlaw.com.pk

Impact of Enterprise Resource Planning on Inventory Management Practices in Healthcare Sector

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Abstract

Inventory Management Practice is defined as a business management practice concerned with planning and controlling inventories for availability of products or services. Pakistan is a developing nation and has not transitioned from manual processing and record-keeping to digitalized operations. Many of the country's industries, especially healthcare sector, operate at reduced efficiency and are prone to data loss and manipulation. The integration of Information Technology, like Enterprise Resource Planning (ERP), in organizations' infrastructure, and the digitization of inventories have been shown to reduce the processing time of required information and also to reduce the operational costs and wastage of resources and inventory items by means of enhanced demand prediction system, safety stock measurement and expiry management. Our study is aimed at the healthcare sector of Karachi where we conducted a survey using purposive sampling technique. A total of 162 participants completed the survey, evaluating impact of Demand Prediction (DP), Expiry Management (EP), Inventory Turnover Management (ITM) and Safety Stock Measurement (SSM) on Inventory Management Practices (IMP) using Likert Scale. The data was analyzed using PLS-Smart 4 Structural Equation Modelling and showed that DP, SSM, and EM have positive impact on IMP with implementation of ERP and are accepted at 5% ($p<0.001$, $p<0.002$ and $p<0.005$, respectively), except ITM which was significant at 10% level of significance only ($p<0.076$). Our study concludes that the implementation of ERP for inventory control positively impacts IMP and reduces organizational costs.

Keywords: *ERP, Inventory Management, Healthcare, Demand Prediction, Expiry Management*

1. Introduction

1.1. Background of Study

In the contemporary healthcare landscape, effective inventory management plays a pivotal role in ensuring the delivery of quality patient care. The healthcare sector is characterized by its dynamic and complex nature, with varying demands for medical supplies and stringent requirements for accuracy and efficiency. Enterprise Resource Planning (ERP) systems have emerged as comprehensive solutions to address these challenges by integrating various business processes for effective inventory management including forecasting, procuring, negotiating with supplier. Notably, the study conducted by Li and Zhang (2019) provides a foundational understanding of

the impact of ERP systems on inventory management in the healthcare sector, emphasizing the transformative potential of ERP adoption. To the best of our knowledge, no research has been conducted so far which would analyze the impact of integrating ERP in Inventory Management in a healthcare institution in Pakistan. Therefore, we formulate our hypotheses based on the results from studies that evaluated its impact on other sectors.

1.2.Research Problem

Despite the critical role of inventory management in various industries, many organizations face persistent challenges, including facing frequent suboptimal stock levels, inaccuracies in data, and difficulties due to lack of digitization and multitasking (Kittisak; 2023). Traditional inventory management systems often lack the necessary integration and real-time capabilities, contributing to these challenges and even increase the operational costs of the organization (Wynn et. al.; 2021). Many of the systems use the laborious and error-prone manual data-entry systems for logging and executive decision making. These systems not only take space in terms of data recording but also take up valuable time for processing. Moreover, the data could be inaccurate as it is being logged manually at each step. The tracing of data may also be difficult owing to manual system's laborious record keeping. Switching to basic spreadsheet software may help alleviate some of these problems, but sensitive auditing is still needing to reconcile any discrepancies (Chew et. al.; 2023). The Enterprise Resource Planning or ERP systems are a digital state-of-the-art software system that are purposefully designed to ensure seamless networking and data keeping enhancing the use experience (Hasan; 2018). The ERP systems keep the institutional departments well integrated (i.e. internal integration) and make executive decision-making very easy and informed (Sebayang et. al.; 2021). Therefore, the problem at hand is the need for a more advanced and integrated solution, prompting the exploration of how ERP systems can address these issues within the public and private healthcare sector in Karachi.

1.3.Research Gap:

The healthcare sector is one of the most important sectors that integrate Information Technology tools and services to ease the operational exercises especially in certain departments where the consumption and dispatching of products and items require smoothness and seamlessness in transactions (Dangi et. al.; 2023), (Saha et. al.; 2019). One such department is Inventory Management e.g. in Pharmacy, Warehouse etc. The supply-chain department is linked directly with various departments of varying capacities and operations that may be cumbersome in keeping track of all transaction. This difficulty can be related directly to the size of the organization. So, in institutions where large number of departments are running with large number of services and products, seamless running requires integration of information technology tools e.g. Enterprise Resource Planning (ERP) software for Inventory Management (Khokhar; 2023). To the best of our knowledge, no research has been conducted so far which would analyze the impact of integrating ERP in Inventory Management in a healthcare institution in Pakistan. Therefore, we formulate our hypotheses based on the results from studies that evaluated its impact on other sectors.

1.4.Research Questions

2. How does ERP contribute to process optimization in healthcare inventory management practices?
3. What is the influence of ERP implementation on data accuracy in healthcare inventory management practices?
4. In what ways does ERP implementation contribute to cost control in healthcare inventory management practices?

5. What impact does ERP implementation have on overall operational efficiency of inventory management practices in healthcare organizations?

1.5. Research Objectives

2. To assess the impact of ERP implementation on process optimization in healthcare inventory management practices.
3. To evaluate the influence of ERP implementation on data accuracy in healthcare inventory management Practices.
4. To examine the role of ERP implementation in cost control within healthcare inventory management practices.
5. To analyze the impact of ERP implementation on overall operational efficiency of inventory management practices in healthcare organizations.

1.6. Justification of Study

The present study aims to identify the impact of ERP implementation on inventory management practices in the healthcare sector in Karachi. This study is warranted to identify and present the opportunities and valuable resource salvaging that is evident with automation of inventory management. Since, the study will be conducted in the healthcare sector, its outcomes can be cited as executive data for future incorporations of ERP systems in interested institutions. Furthermore, this study will also provide a basis for further exploration in this avenue with special regard to the situation of Pakistan.

1.7. Research Significance

The significance of this research lies in its potential to contribute to the enhancement of inventory management practices in the healthcare sector. By understanding the impact of ERP systems, healthcare organizations can make informed decisions regarding technology adoption, leading to improved patient care, cost efficiency, and overall organizational performance by effective inventory management. The research aims to provide valuable insights for both academics and practitioners in the field of public and private healthcare organizations.

1.8. Limitations of Study

Firstly, this study involves a small sample size in a single city so generalization of results may not be appropriate. Secondly, the study only evaluates the impact of ERP implementation in the healthcare sector, whereas, it could be expanded to other related sectors, e.g. Education. Thirdly, the study uses a self-reported questionnaire which employs a Likert-scale method for response recording. The subjective reporting may or may not appropriately reflect the result of implementation, for which crude data like lead times, number of stock outs etc. are required for before and after implementation durations to make an objective assessment.

2. Literature Review

In a study designed by Chrwang-Jyh Ho (2006), it was put forward to use Total Related Cost Measurement, or TRC, to examine the cost reduction in an ERP-integrated Inventory Management system. Using quantitative, Analysis of Variance, or ANOVA, the system was analyzed for cost reduction by the lot-sizing ordering practices, wherein, the ERP system was simulated to raise purchase orders, instead of small sizes, in sizes of complete lots. The findings also reveal that lead time uncertainty negatively impacts the performance of ERP-based supply chain systems. Hence, we can assume that ERP implementation will positively enhance the inventory turnover rate by predicting the demand and putting safety stock measures in place and limiting near-expiry residues in the total inventory. This argument supports our Hypotheses H1, H2, H3 and H4.

The key finding emphasizing the negative impact of manual inventory control on production floor efficiency, causing delays and customer dissatisfaction are reported by Wei et al. (2017) in their

case-study on a multinational manufacturing company of Malaysia. The company was found to be having problems in maintaining inventory via manual paperwork for Material Requirement Planning, or MRP, extending the services to procurement of raw materials etc. The research, combining both quantitative and qualitative methods, highlights the challenges of poor inventory management due to manual control. The ERP system was supported by an additional software module which would cater all the MRP requirements digitally by maintaining automatic inventory, procurement and further dispatching to production floor. The study shows that by combining Supply-Chain with Inventory Management using ERP software reduces errors and operational costs and introduces streamline functionality for a large-scale manufacturing plant (H2). This is also highlighting the fact that large-sized operations, in today's era with quick scenarios of supply-and-demand that influence not only the market-standing of the company but also influence the profit generation, cannot rely on slow and outdated paperwork and manual labor for smooth workflow (as put in our Hypothesis H3 & H4). Hence, a requirement of automated intelligent systems that can execute commands within seconds is self-explanatory.

A Chinese study of a company conducted by Yi et al. (2015) which was a middle-sized manufacturer of Polysilicon sheets also emphasizes the integration of automated software systems for inventory management practices. The company could not keep a streamline process for all its workflow as each batch of polysilicon sheet order had a different method of manufacturing. The total manufacturing process was divided into three workshops, each with its own warehouses for receiving, storage and dispatching of goods to the next level of operation. At each point during the operational workflow, starting from the receiving of raw material to the final dispatch of the finished product, the company used manual labor and data entry into MS Excel spreadsheets for its inventory management. While it was quite laborious and costly, the magnitude of errors were also huge as multiple products, finished and semi-finished, were being stored and dispatched from these warehouses at the same time. So, an ERP system was enforced that employed a state-of-the-art Barcoding system to differentiate and distinguish the origin and specifications of each of the product at each of the operational stage with accuracy and precision without requiring multiple paperwork. This standardization of the operational practices also cut down on the times required for clearing and carrying out each step in the manufacturing, as now each step is performed automatically by the ERP system within seconds or minutes, rather than exhaustive and error-prone manual labor. This is in line with our Hypotheses H2 which is associated with optimized inventory turnover rate management

Pirmanta et al. (2021) explored the effect of ERP on the sustainability of the operational workflow in the manufacturing capacities on Indonesian industries during the COVID-19 pandemic. They argued that the pandemic had a varying effect of the industrial sector as many products fell out of manufacturing as their demands in the market dwindled, whereas many products became short in the market as their demands outgrew the supply, which, in turn, were affected in general by the embargos and restrictions posed globally to handle the spread of the deadly virus. The authors used Structural Equation Modeling technique to analyze the data that they had obtained from 285 participants using social media as a platform to gather data. The Structural Equation Modeling brings together and correlates a number of variables for a given observational system and identifies how they are linked with each other and how, by changing one variable, it affects the other variables and, ultimately the end result of the process. The study showed that using ERP systems during COVID-19 pandemic in Indonesia positively affected the internal and external integration of Supply Chain management. Internal integration refers to sharing of knowledge and hard-facts within the organization, while externally, it may mean linking up with suppliers and end-users so

that a proper sales forecast can be generated. Using ERP in such integration not only optimizes the internal working, in this case manufacturing of the products, of an organization but it also helps reduce the cost (of consumption as well as wastage) and marginalize profits by using intelligent predictive measurements regarding the quantitative need of the raw materials as per the demand and the keeping an open line of supply to the vendors and end-users. This study supports our Hypotheses H1, H2, H3 and H4 whereas intelligent demand forecast will cut down on unnecessary labor and cost, delivery time and mutual data sharing will enhance coordination and end-user trust on the company, reducing the existence of near-expiry items. Another study by Sebayang et al. (2021), which also incorporated 78 participants from the Indonesian manufacturing industries, but not during COVID-19 pandemic, reported positive findings of using ERP software on company performance and overall inventory management efficiency by improving the internal integration of Supply Chain department. They argued, using the Structural Equation Modeling analysis, that by providing access to all relevant and concerned departments of an institution, ERP provides an insight to the current inventory for necessary steps of manufacturing and thus streamlines the demand and supply of the product and reduces time taken for originating a decision, thus, supporting H1 of our study.

Lansink (2020) discussed the role of integrating ERP software into a company management system to effectively potentiate the inventory profiling. In his study, he presents the case of a Dutch company that produces pallet wrappers. In their case the company suffered from recurrent halts and errors in the system due to incorrect mapping and identification numbering of the items using verbal commands and experience rather than a systematic approach. This had been costing the company valuable time in taking decisions and management chaos with false or mistaken information relayed at certain steps of the operational workflow. The company was evaluated for its exercises on inventory management and a recommendation was made to use an ERP system designed for intelligent solutions of business management. By using such a system, the company was theorized to cut down on its resource wastage and enhance the operational capacities and efficiency. This is also in support of our Hypotheses H1, H2 and H4.

Li et al. (2021) highlighted a subset of ERP software solution that focuses on the logistical functions within an organization. Termed as Logistical Information Management System, or LIMS, such a software can be taken as a highly specialized and focused software system similar to ERP but only for the logistics of the product. They argue that while ERP manages effectively almost the entirety of a business operation at various steps, ranging from procurement of raw materials for production to listing of inventories for planning the production and bringing together internal and external stakeholders for proper decisions, the operations of company logistics also play an indispensable role as the transportation at each step described above could influence the outcome of a process positively as well as negatively. For such operations, a separate LIMS solution can be incorporated efficiently with the ERP system to further enhance and determine the step-by-step systematic operational step in manufacturing process. However, the integration of LIMS does not directly affect the productivity of the organization, it can surely smoothen up the already existing processes with optimum expiry management. This is in agreement with our Hypotheses H2 and H4.

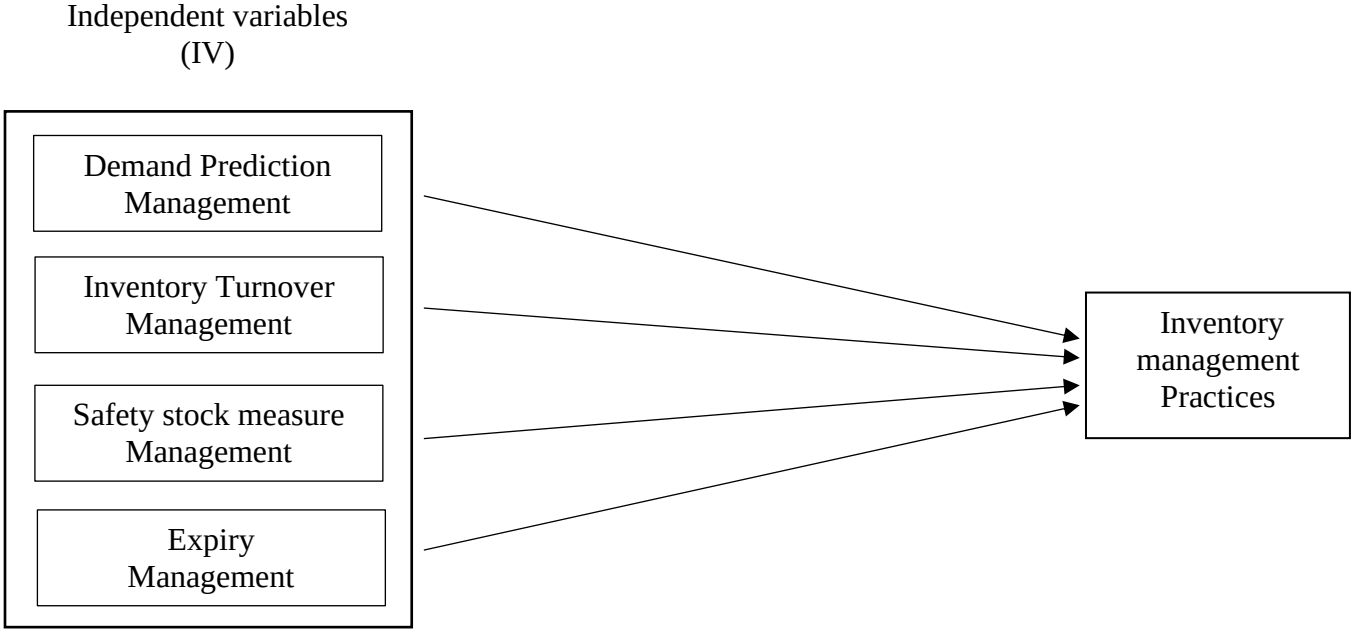
A study by Jamil and Qayyum (2015) is notable as it evaluated the challenges and success factors of ERP Implementation in Pakistani setting. They covered 60 industries from the textile, auto-industry, packaging, production and banking sectors as well as ERP consultants and used Liker-scale surveys as a research tool. They identified that the critical factors for success of ERP Implementation in Pakistani setting include teamwork management and facilitation, effective

communication and minding gaps for positive integration of the ERP software throughout the organization and proper project management to avoid post-implementation failure. So, in theory, all 4 of our Hypothesis can be supported indirectly by their findings.

3. Theoretical Frame Work:

Supply Chain Integration Theory by Chen et al. (2009) agrees with all of our research hypotheses by enhancement of intra- and inter-deparmental coordination. In their paper, Chen et al. argue that the supply chain management offers a key role in binding and coordinating different departments within the organization as well as outside, by engaging peers and clients alike. By using internal and external inetgration via common data sharing and access to facts and figures, the supply chain can improve overall productivity and cut down on costs (in terms of both expenses and wastage). By providing Supply Chain Integration (e.g. via implementation of ERP) to all the departments, a healthcare organization can optimize the receiving and delivery of products as per consumption trends (H1, H3 & H4) and by intelligent automated demand forecasting, stockout scenarios can be efficiently minimized with proper acknowedgement from vendor and end-user alike (H2, H3 & H4). Such practices will also improve stock consumption practices by actively visualizing the near-expiry stock which can worked on with priority (H4).

4. Conceptual Frame work



4.1.Hypothesis

H1: Demand prediction management has positive impact on inventory management practices with Implementation ERP.

H2: Inventory turnover management has positive impact on inventory management practices with implementation of ERP.

H3: Safety Stock Measures management has positive impact on inventory management practices with implementation ERP.

H4: Expiry management has positive impact on inventory management practices with implementation ERP

5. Methodology

This study will be adapting Positivism approach of researcher. An approach which reflects observation research of scientist credible knowledge is Positivism approach. This study will be evaluating ERP implementation impact on Inventory management so Deductive strategy approach will be adopted. This study is Survey based. A questionnaire will be designed and response will be taken on questionnaire on a Likert Scale from employees who will be using ERP system for Inventory management in healthcare sector. Research choice of method for this study is Mono method (Seuring et al. 2021). In mono method data collection and analyses is performed by single method. This study will be cross- sectional short-term study of time horizon. Cross-section study said when it is observational study and conducted at point of time from pre-defined sample population (Seuring et al. 2021). Data will be collected via Purposive Sampling Technique on questionnaire from ERP users working at inventory management in healthcare sector in Karachi in 2 tertiary care hospitals and 1 community pharmacy chain, and will be analyzed by using Smart PLS 4. Explanatory statistics will be used for data analysis. The impact of ERP implementation will be evaluated on Inventory Management Practices (IMP) through Likert-scale assessment of impact of Inventory Turnover Rate Management (ITM), Safety Stock Measures Management (SSM), Demand Prediction Management (DP) and Expiry Management (EM) over the range of 1 (completely disagree) to 5 (completely agree) using statements provided in the questionnaire.

6. Data Analysis

6.1.Demographic Analysis of Respondents

The study used a self-administered questionnaire to analyze the impact of independent variables of ERP implementation on inventory management practices. The questionnaire was filled by 162 participants who have been working in the healthcare sector in Karachi. Among the participants, 62 were males (38.27%) and 100 were females (61.73%). The largest demographic of age was 26 – 30 years of age group comprising of 50 participants (30.86%). A total of 124 participants (76.55%) had an average experience of 1 – 5 years of working with an ERP software and 84 (51.85%) had post-graduate education level. The data is laid out in Table 4.1 as follows;

Table 4.1

Demographic characteristics of the participants

Sample Characteristics	N	%
Gender		
Male	62	38.27
Female	100	61.73
Age		
20-25	14	8.64
26-30	50	30.86
31-35	42	25.93
36-40	34	20.99
41-45	14	8.64
46-50	6	3.71
51-55	2	1.23
Work Experience		
1-5 years	124	76.55
6-10 years	26	16.04

11-15 years	12	7.41
Education		
Ph. D	6	3.71
Masters	84	51.85
Graduate	66	40.74
Intermediate	6	3.71
Designation		
Senior Manager/HOD	8	4.94
Manager	26	16.05
Deputy/Assistant Manager	38	23.46
Pharmacist/Senior Pharmacist	56	34.57
Officer	34	20.98

6.2.Outer Loadings, Reliability and Average Variance Extracted

According to the PLS-SEM Glossary, the Outer Loadings are the bi-variable relationship between indicators and the construct which calculates how much does an indicator partakes for its construct. On the other hand, Average Variance Extracted (AVE) measures the extent of variation of indicator by its construct. Composite Reliability measures if the internal consistency of the constructs is reliable enough without assuming that indicator loadings are equal, as opposed to Cronbach's Alpha value. Cronbach's Alpha is used for internal validation of the constructs (Hair et al., 2022). Outer loadings with a value >.0.7, Cronbach's Alpha value >0.7, Composite Reliability values of >0.7, and AVE >0.5 are considered acceptable (Mohd Dzin et. al., 2021). Our data is laid out in Table 4.2 and 4.3 for Outer Loadings, Cronbach's alpha and AVE and can be seen to have values within the acceptable limit range.

Table 4.2

Outer Loadings

	Outer loadings
DP1 <- DP	0.759
DP2 <- DP	0.880
DP3 <- DP	0.886
DP4 <- DP	0.863
EM1 <- EM	0.835
EM2 <- EM	0.905
EM3 <- EM	0.924
EM4 <- EM	0.934
IMP1 <- IMP	0.820
IMP2 <- IMP	0.825
IMP3 <- IMP	0.762
IMP4 <- IMP	0.829
ITM1 <- ITM	0.758
ITM2 <- ITM	0.838
ITM3 <- ITM	0.895
ITM4 <- ITM	0.804

SSM1 <- SSM	0.812
SSM2 <- SSM	0.844
SSM3 <- SSM	0.831
SSM4 <- SSM	0.804

Table 4.3

Cronbach's alpha, Composite Reliability and AVE

	Cronbach's alpha	Composite reliability (rho_a)	Composite reliability (rho_c)	Average variance extracted (AVE)
DP	0.870	0.882	0.911	0.720
EM	0.921	0.923	0.945	0.810
IMP	0.825	0.834	0.884	0.655
ITM	0.842	0.850	0.895	0.681
SSM	0.841	0.843	0.894	0.677

6.3.Fornell-Larcker Criterion

Fornell-Larcker criterion is used to assess the discriminant validity of the constructs. As defined in the PLS-SEM Glossary, the Fornell Larcker Criterion is, "a measure of discriminant validity that compares the square root of each construct's average variance extracted with its correlations with all other constructs in the model" (Hair et. al., 2022). The Table 4.4 shows the values of our constructs as follows;

Table 4.4

Forner-Larcker Criterion

	DP	EM	IMP	ITM	SSM
DP	0.849				
EM	0.619	0.900			
IMP	0.695	0.690	0.809		
ITM	0.774	0.649	0.671	0.825	
SSM	0.649	0.742	0.701	0.670	0.823

6.4.Collinearity (VIF)

When two variables are correlated to each other, Collinearity is said to exist. The VIF or Variance Inflation Factor can measure how much collinearity exists between the indicators (Hair et. al., 2022). VIF values in between 5 – 10 are said to show collinearity and with higher degree when VIF exceeds 10 (Kim et al., 2019). The table shows the VIF values of the indicators with only Expiry Management 3 or EM3 having a value of 5.002.

Table 4.5

Collinearity (VIF)

	VIF
DP1	1.590
DP2	3.175
DP3	3.267
DP4	2.072
EM1	2.229
EM2	3.934
EM3	5.002
EM4	4.437

IMP1	1.693
IMP2	1.785
IMP3	1.699
IMP4	1.968
ITM1	1.908
ITM2	1.995
ITM3	3.036
ITM4	2.457
SSM1	1.761
SSM2	2.012
SSM3	1.892
SSM4	1.779

6.5.Coefficient of Determination – r^2 and the adjusted r^2 values

The coefficient of Determination, or the r^2 value, is used to show the power of explanation of a model with regards to its constructs and the adjusted value shows for the number of indicators of the model (Hair et. al., 2022). In other words, it can show the degree of variation among variables in a regression model. The more its value is closer to 1, the better is the explanation of the model by its indicators. Table 4.6 shows both values as follows;

	R-square	**R-square adjusted**
IMP	0.627	0.617

6.6.Hypothesis Testing

We tested the impact of ERP implementation on our dependent variable i.e. Inventory Management Practices using 2-tailed t-test at a 5% level of significance. Table 4.7 shows that 3 of our 4 hypotheses i.e. DP (H1), SSM (H3), and EM (H4) all have positive impact on inventory management practices with implementation of ERP and are accepted at 5% ($p<0.001$, $p<0.002$ and $p<0.005$, respectively), except H2 i.e. ITM which was significant at 10% level of significance only ($p<0.076$). This shows that 3 out of 4 of our Hypotheses are accepted.

Table 4.7 Hypothesis Testing

	Original sample (O)	**Sample mean (M)**	**Standard deviation (STDEV)**	**T statistics (|O/STDEV|)**	**P values**
DP -> IMP	0.283	0.278	0.086	3.278	0.001
EM -> IMP	0.250	0.248	0.086	2.916	0.002
ITM -> IMP	0.122	0.129	0.085	1.435	0.076
SSM -> IMP	0.250	0.255	0.097	2.581	0.005

Path Diagram

7. Discussion & Conclusion

7.1.Discussion

We conducted this study to identify the impact that the implementation of ERP would have on the Inventory Management Practices (IMP) in healthcare sector in Karachi, Pakistan. Using a questionnaire as a research instrument, we recorded the responses of 162 participants, comprising of 100 females and 62 males, that are working in hospitals and community pharmacies in Karachi. We evaluated the statistical impacts of our independent variables (Demand Prediction (DP), Expiry Management (EM), Inventory Turnover Management (ITM) and Safety Stock Management (SSM)) on our dependent variable Inventory Management Practices (IMP) using PLS-Smart 4 for Structural Equation Modelling.

The Cronbach's Alpha values were all >0.82, showing a good internal reliability of the constructs and the r^2 value is 0.62 showing satisfactory correlation of variables. The statistical impact was evaluated using two-tailed t-test which showed that 3 of our 4 hypotheses i.e. DP (H1), SSM (H3), and EM (H4) all have positive impact on inventory management practices with implementation of ERP and are accepted at 5% ($p<0.001$, $p<0.002$ and $p<0.005$, respectively), except H2 i.e. ITM which was significant at 10% only ($p<0.076$). This discrepancy may be explained with the fact that the ERP softwares can be of different types, efficiency and capabilities available in market and an organization can opt for all or some of the offered modules of services in a software package according to scope of services, and financial and operational capacities (Yoo et al., 2021; Ibrahim et al. 2024). While DP, EM and SSM may be most commonly opted for for proper IMP but ITM may not be opted for. Also, user interaction and facilitation by software package may not be as easy and smooth with ITM as with other variables, resulting in a slightly lesser user satisfaction with ITM in terms of ERP implementation.

A study by Jamil and Qayyum (2015) is notable as it evaluated the challenges and success factors of ERP Implementation in Pakistani setting. They covered 60 industries from the textile, auto-industry, packaging, production and banking sectors as well as ERP consultants and used Liker-scale surveys as a research tool. They identified that the critical factors for success of ERP Implementation in Pakistani setting include teamwork management and facilitation, effective communication and minding gaps for positive integration of the ERP software throughout the organization and proper project management to avoid post-implementation failure. So, in theory, all 4 of our Hypothesis can be supported indirectly by their findings. Another study by Djiantoro and Zeplin (2022) evaluated 85 companies using purposive sampling in East Java during COVID-19 and they also show that ERP implementation can improve and booster inventory management control and thus, indirectly, enhance the company's productivity and market standings. They contribute to the theory of Supply Chain Integration and argue that adoption of information technology utilities, like ERP Software, reduce the functional costs and dilapidation of precious resources and logistics. These findings are in line with those of our study and advocates the implementation of ERP software for further improvement of inventory management practices.

Our findings also support those in the study by Sebayang et al. (2021) who evaluated the impact of ERP implementation among 78 Indonesian companies. Using a structured questionnaire to record responses, they found that the internal integration, resulting from ERP implementation, enhances the inventory system management and indirectly enhances the performance of the organization with a coefficient value of 0.766. They argue that by using ERP, an organization can improve their IMP as through digitalization and internal integration, data can be made readily available for the organization for decision-making. Also, the ERP software can be used for adequate demand prediction as well as safety stock measurement and inventory turn-over rates,

thereby reducing the time required for procurement and deliveries as well as the cost associated with material wastage or overstocking.

7.2.Conclusion

The study concludes that ERP implementation in a healthcare organization has a positive impact on the inventory management practices and overall boosts performance and efficiency, reducing operational costs and precious stock wastage. We conducted a study using a questionnaire which evaluated 162 participants on their subjective experience with ERP use in healthcare sector on 1-5 Likert scale for response recording. The data was analyzed using PLS-Smart 4 Structural Equation Modeling and internal reliability of all constructs were verified by Cronbach's Alpha value. The resulting data showed that Demand Prediction, Safety Stock Measurement and Expiry Management significantly and positively improved Inventory Management Practices due to ERP implementation at 5% level of significance, while Inventory Turnover Management had the same effect but at 10% level of significance. This shows that ERP implementation at healthcare sector level is effective in improving the Inventory Management Practices and it can be made evident due to the fact that digitalization of practices and opting for appropriate software package, while at first may require a good investment sum from the organization, will provide a reduction in operational costs and wastage of precious resources in the long run, thus proving to be a good investment for the organization. The implementation of ERP in healthcare sector is recommended as a conclusion of our study, especially with respect to Pakistan where a large number of industries and healthcare sectors are still keeping manual data logs which are prone to destruction and manipulation.

7.3.Implications

This study concludes that the implementation of ERP has an overall significantly positive impact on the Inventory Management Practices in healthcare sector in Karachi. Our study shows that ERP implementation positively benefits the organization's IMP by improving Demand Prediction Management, Expiry Management and Safety Stock Measurement Management. This means that ERP implementation helps reducing operational costs and wastage of resources, and improves overall efficiency and productivity. We recommend implementing ERP software for improving inventory management in healthcare sector in Karachi.

7.4.Future Research Directions

We recommend to conduct a large scale multicentered study to increase the statistical power of the study and to involve more experiences. We also recommend investigating what elements of ERP software is an individual using and then identifying their impact on IMP to get a better and resolved picture of correlation and user experience.

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