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PAKISTAN PHARMACEUTICAL SECTOR: SUCCESSFUL IMPLEMENTATION OF ENTERPRISE RESOURCE PLANNING

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Abstract

Adaptation and resilience form basic themes for the survival and evolution of society, traditions, economy, technology, and nature. Inherently, humans continue to adapt themselves to live better lives on this earth with well-meant consequences. However, not all factors are containable unless they can be gauged. This is also true for the corporate and business world, which is always in search of the perfect paradigm for achieving balance in sustainability, function, network, and profit. The research is aimed at analyzing the parameters that lead to the successful deployment of ERP across the pharmaceutical sector, where the use of ERP is prevalent and of high importance. The study's statistical inference leads to the conclusion that private pharmaceutical companies lack a project hierarchy or structure that is well-organized enough to facilitate top-down changeovers, which are typical of successful organizations. The original study effectively demonstrated that, in general, public firm sectors have superior top management when it comes to managing ERP-based data management initiatives.

Keywords: ERP, Pharmaceutical Sector, Adaptation, Resilience

Introduction

In a world as dynamic as today, adaptation and resilience form basic themes for the survival and evolution of society, traditions, economy, technology, and nature. Inherently, humans continue to adapt themselves to live better lives on this earth with well-meant consequences. However, not all factors are containable unless they can be gauged. This is also true for the corporate and business world, which is always in search of the perfect paradigm for achieving balance in sustainability, function, network, and profit. The business environment is an ever-evolving field requiring iterations and fine-tuning of essential human and management processes that must be measured and honed based on subtle global shifts on the macro and micro scales. Before the 1940s, businesses relied on paperwork, auditors, interviews, and manual statistics to evaluate and recommend organizational upgrades. Then, in the 1950s came the computing era, and with it came the development of databases and networking: a database of sorts to align the business goals with transactions, finances, human capital, marketing etc. This database and computing ability gave rise to the business goal of competency and a unique edge, which is yet again an essential factor for business organizations to stay competitive in the market and last a dynasty. There were still issues with a seamless flow of data between departments and organizations. Various functions arose from digital data keeping, and one of the key functions was where all organizations should master the exchange of data outside and inside an organization: a capable intranet. As Humans do, the solution to this disunity between a database and a network was

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developed in the form of enterprise resource planning software (ERP), but it was not until the 1990s that the term was coined. (Thomson, 2020)

Initially, the ERPs were used to manage inventory and quality control back in the 1960s. In association with IBM, two modules were developed for this very purpose: material requirements planning (MRP) and manufacturing resource planning (MRP II). Over time, these modules expanded to include non-manufacturing and non-procuring functions. By the 1990s, the ERP had been developed into a fully loaded software suite that allows different bodies and departments of an organization to securely store, transmit, monitor and manipulate data with great efficiency while maintaining the integrity of the data. Over time, tailored modules that could serve the needs of any industry were added. (Thomson, 2020) SAP, JD Edwards & Co., The BAAN Company, and Oracle are some famous ERP developers contemporarily. But despite all the glamour of such sophisticated software, this software is only as good as the humans who use it to its full potential, which is why a successful implementation is an actual challenge to achieving seamless data exchange, storage, analytics, and business resilience. Those organizations that have successfully implemented an ERP system within their business framework have primarily the dedication, intelligence, and training of their staff and employees to thank, as well as the leadership of the top management. It is worth noting that not all implementations of the ERP are successful, and as such, these can have severe negative impacts on the operations of the organization effective immediately. (Rahman & Saha, 2018)

Implementing an Enterprise Resource Planning (ERP) system project is a difficult and costly proposition as it places tremendous demands on the organization's time and resources. The ERP implementation literature contains many case studies of organizations that have implemented ERP systems successfully. However, many organizations do not achieve success in their ERP implementation projects. (Habib & Ănciulescu, 2017)

This research endeavor is aimed at analyzing the analytical techniques used to assess whether ERP implementation is successfully carried out in the organization.

Pakistan's pharmaceutical industries have a vast and complex supply chain network. Acquisition of raw materials from international sources is just the first part; it still has to be transported to the country and then to the premises for manufacturing. A robust and useful ERP system is crucial so that data transference and inter-department communication are at their highest efficiency. (Vuksic & Spremic, 2005)

When implementing an ERP system in an organization, a number of challenges exist. Shifting from a non-existent or inferior system of ERP, there is a good chance that the implantation of the system will fail. The purpose of ERP software is to make use of software applications to streamline the transmission of data across the organization to improve planning, production, distribution and other business activities. (Sondoss et al., 2008).

Research Problem

In the past, a lot of research and studies have analyzed ERP implementation in an organization, but mostly by assessing longitudinal and case-to-case scenarios. Most

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studies have generalized the organizational scope. Choosing to measure or document an event from a randomly selected or generalized organization and evaluate the failure or success of the process yields inconclusive results. (Abdulaziz, 2018)

In this manner, the primary goal is to assess which predetermined factors within a pharmaceutical environment allow an optimal implementation of an ERP.

The research is aimed at analyzing the parameters that lead to the successful deployment of ERP across the pharmaceutical sector, where the use of ERP is prevalent and of high importance. The reason chosen to assess the successful implementation of ERP systems in the pharmaceutical industry is that just launching an ERP system within an organization doesn't automatically make it a success. (Khaparde, 2012) If the system does not add value to the organization, then it cannot be called a successful implementation. Not all implementation of ERP suites is successful. Documented cases have been brought forward that show that improper implementation of ERP systems can lead companies to losses, high turnover rates, departmental discourse, and bankruptcy, and many times, companies abandon the entire project to salvage themselves. Researching such cases, a number of questions pose themselves, such as what factors lead to failure in implementing the ERP software. Based on studying previous research, these factors have been analyzed and presented in the research questions. (Shah et al., 2011)

Research Questions

The current study attempts to answer a sector-specific question regarding what factors measure or influence the successful Implementation of an ERP System in the pharmaceutical sector. These factors will be compiled into differentiated variables for statistical analysis later on. In this way, the study will make use of the independent variables to give meaning to what effect these variables have on the dependent variable. (Bukamal & Abu Wadi, 2016)

1. What effect does project management have on the successful implementation of ERP in the pharmaceutical sector?

2. This question focuses on the means by which the managerial and higher administrative levels deploy and sustain the changeover to ERP systems.

3. What effect does user training have on the successful implementation of ERP in the pharmaceutical sector?

4. This question is focused on the level of training afforded to the employees who have clearance to record, manipulate, transfer, and manage data and information in an ERP or its modules. The level of employee training and understanding is crucial to an ERP adoption project.

5. What effect does vendor support have on the successful implementation of ERP in the pharmaceutical sector?

6. This question focuses on how much the vendors assist in allowing the success in understanding the user to implement the ERP. This requires the vendor to be

assisted by ERP usage documentation and technical support so the organization can hone the modules to their needs.

Research Hypotheses

The hypotheses are to clarify further the intentions of the researcher in statistical terms for use in the analysis stage. Here, the independent and dependent variables will be given due recognition with regard to their region of application.

H_{o1} = Top management's support and commitment had no such impact on the successful implementation of ERP in an organization.

H_{o2} = No impact of training users to ensure successful ERP implementation.

H_{o3} = No impact of Vendor training to ensure successful ERP implementation.

H_{o4} = No impact of all variables on the successful ERP implementation.

The first three null hypotheses are intended to measure the individual effect of the factors on the dependent variable. The last hypothesis is intended to measure the combined impact of the variables on the dependent variable. All hypotheses will be tested by regression.

Research Objectives

The study is a replication of a former study conducted in Bahrain regarding the impact of factors on ERP implementation. The research aims to help improve the understanding of successful ERP implementation within the pharmaceutical industry in Pakistan, as no such study has been conducted. The findings of this research will contribute to and benefit the organizations, stakeholders, shareholders and system developers in designing and implementing future ERP projects. Hence, this study will give future researchers a better understanding of this subject. (Sondoss et al., 2008)

The greater objective behind this study is to study and compare the similarities the original research has with the duplicated survey in order to gauge the applicability of the duplicate study for further valid research in the field of successful ERP implementation. This would benefit organization-wide leadership and ERP deployment strategies in Pakistani pharmaceutical companies.

Scope of Study

In the original study, the research was generalized to public business organizations with multiple independent factors. In this study, the scope is confined to three independent factors: vendor support, user training, and top management. The sample scope is limited to the privately held pharmaceutical companies located in the immediate city of Karachi, Pakistan. A further scope parameter is the data collection from pharmaceuticals that use the ERP and not any other form of data management systems (Microsoft Access and Spreadsheets).

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Population

Subordinate employees (working under managerial administration) of pharmaceutical companies based in Karachi will be approached to gather data through the use of a questionnaire. Care is to be taken to obtain viable responses from employees who have dealings with ERP usage on a regular basis; hence, they are aware of the nature of the study. Further screening is to ensure the employees are from the pharmaceutical sector only. Employees shall be made aware of the purpose of the study.

Sample Size

The intended data collection size is 150-200 responses from the intended population. Responses will be screened for detecting duplicates and will be followed up with the respondents to ensure they did consent to the questionnaire.

Significance of Research

During the initial research for this research project, it was identified that in the Pakistani pharmaceutical sector, many companies regularly implement ERP systems in their organizations. Still, not all of them positively affect their business processes. This research is aimed at identifying the reasons and characteristics that allow the ERP implementation in an organization to be called successful. This is significant as simply implementing an ERP system that does not integrate well with an organization's business processes can cause more harm than good.

The goal of this study is to identify which factors have an effect on ERP implementation and what measures need to be taken into consideration to maximize the likelihood of successful implementation. Hence, this study will give future researchers a better understanding of this subject.

Limitations

A major hindrance that could create problems in data collection is the nationwide lockdown that is imposed in Pakistan due to the ongoing coronavirus (COVID-19) pandemic. This means there is no physical collection of data from the employees or interaction with the pharmaceutical administration; hence, the employees will have to be approached in an insensitive manner through online channels and word of mouth. The researcher's social aptitude will be put to the test through pure digital data collection.

Another limitation that arises is time management, as the researcher is an active student and is employed as a full-time procurement officer in a pharmaceutical company located in Karachi. Further issues are the time constraints of the semester duration that can affect the sample size of the data collected, the possibility that the researcher is seeking higher occupation opportunities, and the post-care required that comes with the departure of a COVID-19 infection.

Literature Review

In accordance with the theme of the study, the following literature has been acquired to support the impact of the independent variables on the dependent variable.

Pharmaceutical Sector of Pakistan:

The pharmaceutical sector of Pakistan consists of nearly 400 companies which include local as well as international companies. Roughly 30 companies make up 50 percent of the business. Competition with international companies has promoted healthy competition among companies, which has led to the adoption of good supply chain practices, such as enterprise resource planning implementation. (Journal & Sciences, 2009)

Enterprise Resource Planning

Short-formed ERP is an IT database system that aims to streamline and allow interconnectivity among all divisions of an organization. It provides access to information throughout the company to increase efficiency. Allowing shared access to a database is the most valuable functionality of an ERP system. Business functions such as Human Resource Management, Inventory Control, Warehousing, Customer Relation Management and Supply Chain Management are integrated into an ERP package. (Rahman & Saha, 2018) The world of information technology has advanced with great leaps and bounds in recent years and, as such, plays a pivotal role in this age of globalization. The way IT accomplishes this is through the use of ERP systems in business organizations, as these systems help increase the efficiency of employees and business processes. (Fergal et al., 2008)

Variables for ERP Implementation Success

In past research, it has been brought to light that ERP implementation procedures are often lacking in research by organizations, which is why the implementation of ERP is not always a success. Despite having big budgets and good products available in the market, many variables become impediments to successful ERP implementation within an organization.

ERP Implementation Success

During the past years, many researchers have published articles and research that highlight the factors that lead to successful ERP implementation. These factors are both internal and external to an organization as they are comprised of the organization's resources, both financial and human resources, and also the vendor's resources, which include their technical knowledge and hands-on experience. (*Csr @ Onlinelibrary.Wiley.Com*, n.d.)

An ERP system can be declared a success when an organization has a clear identification of vision, goals and business plan, which leads to the achievement of the organization's strategy and business objectives by emphasizing advantages, costs, risks and resources used. These articles need to be assessed before the implementation of an ERP system. (Bukamal & Abu Wadi, 2016)

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Project Management: This variable highlights the use of skills and techniques by the management to ensure the smooth operations of a project. The strategy and planning of a project involves creating an implementation plan in which project activities, personnel, responsibilities and organizational support are defined. This applies similarly to ERP implementation as it is also an organizational project but on a much larger scale with stakeholders throughout the organization. (Kumar et al., 2013)

Having a sound project execution strategy increases the likelihood of the project being completed successfully. Likewise, support from the top management motivates employees and allows smooth operations through which success is anticipated. (Bukamal & Abu Wadi, 2016)

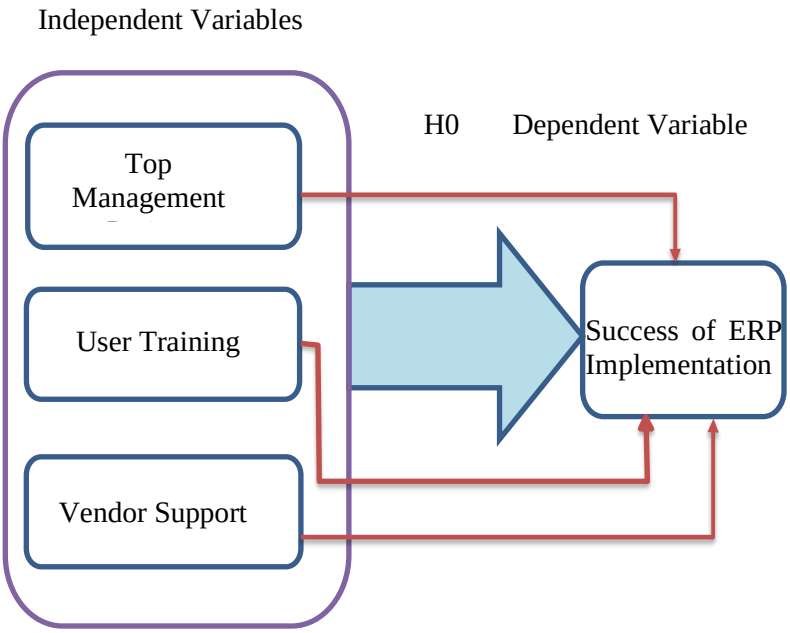
User Training: To effectively use the ERP system, an organization's employees must be relatively trained to do so. A certain level of skill set regarding computer use must be present with the employees so that they may make use of the system. (Shah et al., 2011)

Employees must be aware of the ERP system's functionality, its operational logic and its technicalities. With this respect, the Vendor or in-house staff who are responsible for implementing the ERP system should appropriately train the users. (Bukamal & Abu Wadi, 2016)

Vendor Support: The last independent variable is the vendor support of the respective ERP system implemented. Whether the ERP system is implemented by an in-house team or through an external development team, continuous support from the ERP system manufacturer is a huge factor. Thus, it is directly responsible for the ERP system being implemented successfully.

While selecting the vendor, a number of considerations must be made. These include vendors' experience, their portfolio, their commitment level, the past success of ERP implementation and finally, their after-sales support. (Shah et al., 2011)

Conceptual Framework



Research Gap

This research is based on a total of 4 variables: 3 independent variables, namely Project management, User training and Vendor Support. The Dependent variable in this study is the ERP implementation success. The gap that this study aims to fill is to target the pharmaceutical industry. As in the previous research, the success of ERP implementation is generalized to all types of organizations.

Methodology overview

This research has been conducted quantitatively in order to find out and analyze the impact of three independent variables (I.e., project management, user training, and vendor support) on a dependent variable (I.e., ERP implementation success). Primary Dara collection was done as the data was collected for the very first time from 140 individuals working in the pharmaceutical companies of Karachi. Moreover, the questionnaires were designed based on the highly recommended 5-point Likert scale adopted from the previous research. Furthermore, a deductive approach was used, and convenience sampling, which is a non-random sampling technique, was done. After collecting data through online Google Forms, the tests (reliability, regression, and correlation) were applied to it using IBM SPSS software to find the results.

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Research Design

Research Approach

The deductive approach was used as we are working on the existing theory for developing and checking hypotheses and not discovering anything new. As in this approach, the previous study is reproduced to see if the results produced out the forms, and after applying results through SPSS software, the results were interpreted, so it is best while working with quantitative data. Also, previous researchers have highly recommended this approach due to its lower risk as compared to the inductive approach, as it is totally based on working upon the existing theory. One hundred forty respondents were asked to fill out the forms, and after applying results through SPSS software, the results were interpreted, and the impact between the variables was found. The purpose of the approach is to measure impact and prepare a model for predictability.

Research strategy

The base strategy involves a thorough literature study, sample data collection, screening of the responses and coding them for required statistical purposes. This required the development of a suitable mode of data collection to record the reactions of the employees as well as the mode of deploying the questionnaires.

Modes of Study

- Mixed Study Method: The term mixed methods is a relatively new technique that incorporates both the usage of qualitative data and quantitative data to explain a single research problem or even a series of detailed research inquiries. The rationale for using such a method is that it allows a more harmonious use of data collection and analysis from both qualitative and quantitative approaches (Cresswell and Clark 2011).

- Explanatory Sequential: This method is used when a researcher would like to follow up on their quantitative results with qualitative data. In this way, the results from the quantitative analysis are interpreted and clarified using qualitative data. Both techniques are based on the nature of the research problems, and as such, numerical and narrative forms of data collection are used to give accurate and rational results.

- Interviews: During the research project, as the data was being collected and the research problem was being analyzed, I came to the understanding that in order to represent the data, we needed to take input from the employees at Platinum Pharmaceuticals in a more informal and less structured method. To accomplish this task, I conducted interviews with many of the organization's employees of different designations and departments in order to gather feedback that is representative all across the organization.

Questionnaire Development

The questionnaire was developed on Google Forms and adapted from the original study. The measurement instrument was formed based on the 5-point Likert scale to gather the primary data. This scale is highly reliable and recommended by the original literature as it gives more accurate responses. Respondents won't get bored or frustrated while filling out the questionnaires as compared to other scales. The questionnaire comprised 32 questions in total. These questions comprised the responses towards the 3 Independent variables and the single dependent variable.

Data Collection

The questionnaire was spread in a snowball technique. Social media platforms like Facebook, WhatsApp, and Telegram were used to gather responses and respondents were asked to spread the questionnaire to their places of employment. A prior screening was to tell respondents to attempt the questionnaire if they were employed in a pharmaceutical. This was made to accommodate respondents who had had job experience but were also active in ERP procedures. A total of 140 responses were recorded.

Data Coding

The responses were downloaded from Google Forms as a .csv file extension and saved as an Excel worksheet. The Likert scale responses were recorded in a 1-5 range, with one being the lowest in agreeableness and five being the highest, with three standing for neutral. The majority of graphs were obtained from Google Forms in responses that would suit the data representation stage. To prepare data for regression and correlations, using the Excel worksheet, the Likert responses were summed for every variable separately for each response.

The prepared data was imported to IBM SPSS ver.25 software. The questions were coded as Name, Occupation, and Education. The Likert scale questions were categorized as IV-1 (Top Management Support & Commitment), IV-2 (Training Users), IV-3 (Vendor Support), and DV-1 (Successful ERP Implementation). The Likert scale sums were categorized as scale data types, which is the norm for converted Likert data. The remaining data types were categorized as Nominal and remained as string variables.

Software and Statistical tools

- Microsoft Office 2019 or Word - for processing and documenting research.
- Excel is used for data coding and organizing.
- IBM SPSS Statistics Data Editor for carrying out statistical tests.
- Reliability test – to determine the Cronbach alpha for goodness of data collected.
- Test for Skewness & Kurtosis – to determine the shape of the distribution of data collected, which should lie in a suitable range.

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- Multicollinearity – a test to ensure the independent variables are not correlated to each other, as this would affect the study. Correlations levels should be minimal.

- Regression – for testing the hypothesis to accept or discard impact probability.

- ANOVA is a test to understand the variance and relationship between dependent and independent variables. It is a part of regression. It gives all required readings for P-Value and F-stat and can be manipulated to provide results for the test of autocorrelation.

Credibility and reliability

The biggest possible sale size is to be taken to ensure the credibility of the results as it gives more accurate results. The bigger the sample size, the better the results. However, it must be remembered that instrumentation validity is not an issue in this study since the questionnaire has been adopted from the original research. The problem is the credibility of the data collected, which was ensured by manual follow-up with the respondents (a verification that they did, in fact, fill their forms as they consented to). Additional credibility was ensured through a manual viewing of the response statistics on Google Forms, which gave a layout of the authenticity of the responses. Moreover, a thorough literature review was done, and their results were also studied thoroughly in order to check whether the results were the same or not. The research is reliable if the results do not contradict the results of previous studies. The Cronbach alpha test can check the reliability of the instrument used.

Ethical considerations

The respondents were given a choice to report their names for follow-up purposes to ensure they gave the original responses, as in the time constraints, it would not be easy to know if a questionnaire was filled properly or just skimmed over. The respondents were assured their data would remain private and the information was primarily for research study purposes, not any other ulterior purpose. Moreover, none of the respondents was forced to fill out the questionnaire without their consent, and they were given ample time to read the form thoroughly and to fill it according to their ease and availability. All of the respondents were above 18 years of age and employed.

Data Analysis

Data Preparation

The data from questionnaires was downloaded as a .csv file, converted to an Excel worksheet, and then imported to IBM SPSS ver.25 software.

The questions were assigned nominal data types for non-string variables and organized under respective labels.

Table 1: List of Variables		
Factors	Variable	No. of Questions
Top Management Support & Commitment	IV-1	6
Training Users	IV-2	7
Vendor Support	IV-3	5
Successful ERP Implementation	DV-1	14
		32

Reliability analysis

- This was carried out on each variable separately. The data was found to be statistically reliable.
- Analyze > Scale > Reliability Analysis > Statistics > F-test o If Cronbach's Alpha is greater than 60%, then data is a good fit for the model.
- Above 90% is considered excellent.
- If the f-stat significance is below $\alpha = 0.05$, and the F-stat is larger than 1, then data reliability is confirmed.

Table 2: Cronbach's Alpha Analysis for Variables	
Variable	Cronbach's Alpha
IV-1	0.909
IV-2	0.871
IV-3	0.847
DV-1	0.902
All Variable Reliability	0.943

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Skewness & Kurtosis

To ensure the data was distributed normally, the **skewness and kurtosis of factors** for variables were tested and averaged.

Table 3: Descriptive Analysis for Variables

Variables	Mean	Std. Dev	Skewness	Kurtosis
IV-1	3.897	0.878	-0.551	0.145
IV-2	3.906	0.853	-0.493	0.039
IV-3	3.894	0.851	-0.646	0.564
DV-1	3.819	0.827	-0.225	-0.510

Interpretation of Kurtosis

- (P-P plot as supplementary evidence)
- The dataset for IV-1 has a negatively skewed distribution but is significantly symmetrical within the acceptable range (-0.5 – 0.5). The kurtosis of the variable (0.145) is greater than equal to zero, denoting a distribution that is significantly normal in the range (-3 - +3) but leptokurtic (heavy tail).
- The dataset for IV-2 is yet again a statistically significant negative skew within an acceptable range with a kurtosis that is almost normally distributed (Mesokurtic).
- The data set for IV-3 shows a skewness >-0.5, denoting moderate negative skewness (the left tail of the distribution is flatter than the right tail). In contrast, the kurtosis denotes an acceptable distribution range (0.564).
- The dataset for DV-1 denotes a negative skewness of (-.225) within an acceptable range; the kurtosis indicates a significantly flatter distribution but within an acceptable statistical range.
- All four variables exhibit statistically significant data.

Multicollinearity

This refers to when predictor variables are highly correlated with each other within a regression. To eliminate this risk, collinearity diagnostics were carried out to find variance inflation factors on the variables.

Table 4: Analysis of Multicollinearity among the variables		
Variables	Tolerance	VIF
IV-1	0.528	1.895
IV-2	0.550	1.820
IV-3	0.598	1.673

The accepted tolerance values for multicollinearity should be greater than 0.20, and the VIF should be less than 10. Within these parameters, the model has been replicated with minimal to low correlation between independent variables.

Regression

Since the data was collected on a 5-point Likert scale, it needed to be converted into scale data type instead of the ordinal nature of Likert scale data. The ordinal values for each factor were summed for the 140 entries and tabulated for each variable (not confused with factor as each variable has a number of factors). For regression, each predictor variable was tested against the dependent variable to evaluate the hypothesis of the original study.

Simple regression was carried out for dependent and independent variables.

- Analyze > Regression > Linear > Statistics > R-squared Change and Durbin Watson.
- The F-stat and P-value are taken from ANOVA (test of variance).
- The Beta value is taken from the Coefficients table (Standardized coefficients).
- This value is the number for the factor in a linear regression equation. The R-value is a correlation between predicted and observed values.
- The Adjusted R-squared Value shows the fit of data to the model.

Hypotheses Tests

H_{01} = Top management's support and commitment had no such impact on the successful implementation of ERP in an organization.

Table 5: Statistical Analysis of Variables						
R	Beta	R Square	Adjusted R Square	F Value	P Value	Durbin-Watson
0.446[a]	0.466	0.217	0.211	38.283	0.000	1.435

The P-value of 0.000 immediately qualifies the rejection of the null hypothesis as it is lower than the assigned 0.005 significance value. The F-stat at 38.238% explains

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the significant impact of the model of the IV-1 to DV-1, with its corresponding significance <0.005, indicating a statistically significant effect of top management's commitment and support on the successful ERP implementation in the sampled organizations. The beta value of 46.6% suggests positive relational implications. Therefore, the 0 null hypotheses are confirmed and rejected. The Adjusted R Square improves the model by a value of 21.1%.

The Durbin-Watson stat stands as a further reassurance of no autocorrelation between variables as it is within the acceptable statistical range (1.5 < d < 2.5).

H_{o2} = No impact of training users to ensure successful ERP implementation.

Table 6: Statistical Analysis of Variables

R	Beta	R Square	Adjusted R Square	F Value	P Value	Durbin-Watson
0.554[a]	0.554	0.307	0.302	61.195	0.000	1.850

The P-value of 0.000 immediately qualifies the rejection of the null hypothesis as it is lower than the assigned 0.005 significance value. The F-stat of 61.195% improvement to the model with its corresponding significance <0.005 indicates a statistically significant impact of user training on the successful ERP implementation in the sampled organizations. The beta value of 55.4% suggests positive relational implications. Therefore, the one null hypothesis is confirmed and rejected.

The Adjusted R Square improves the model by a value of 30.2%. The Durbin-Watson stat stands as a further reassurance of no autocorrelation between variables as it is within the acceptable statistical range (1.5 < d < 2.5).

H_{o3} = No impact of Vendor training to ensure successful ERP implementation.

Table 7: Statistical Analysis of Variables

R	Beta	R Square	Adjusted R Square	F Value	P Value	Durbin-Watson
0.581[a]	0.581	0.337	0.332	70.149	0.000	1.738

The P-value of 0.000 immediately qualifies the rejection of the null hypothesis as it is lower than the assigned 0.005 significance value. The F-stat of 70.149% improvement to the model with its corresponding significance <0.005 indicates a statistically significant impact of vendor training on the successful ERP implementation in the sampled organizations. The beta value of 58.1% suggests positive relational implications. Therefore, the two null hypotheses are confirmed and rejected. The Adjusted R Square improves the model by a value of 33.2%.

The Durbin-Watson stat stands as a further reassurance of no autocorrelation between variables as it is within the acceptable statistical range (1.5 < d < 2.5).

H_{o4} = No impact of all variables on the successful ERP implementation.

Table 8: Multiple Regression Analysis of Variables

Variables	B	Std. Error	Beta	T	P-Value
IV-1	0.090	0.161	0.051	0.561	0.576
IV-2	0.540	0.153	0.312	3.524	0.001
IV-3	0.875	0.197	0.376	4.437	0.000
R Square			0.415		
Adjusted R Squared			0.402		
F-Value			32.155		
P-Value			0.00		
Durbin-Watson			1.864		

The results of the multiple regression analysis show an adjusted r-squares stat of 0.402 (which is the variance of the independent variables) along with a p-value that is lower than the alpha value, which indicates a significant impact of the independent variables on the dependent variables by 32.155% model fit. Therefore, the three null hypotheses are also rejected as all the variables show impact.

It is an interesting observation that the p-value for training from vendors and training of users shows statistically higher significance in terms of impact on the successful implementation of ERP in the sampled organizations. This may indicate the weak effect of top management on the ERP implementation. Conclusively, all alternate hypotheses are accepted.

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Finding & Discussions

Table 9: Respondents by Organization(n 140)	
Name of Pharmaceuticals	Percentage
Nexus Pharmaceuticals	6
Indus Pharmaceuticals	8
Novartis Pharmaceuticals	13
Brookes Pharmaceuticals	16
Hilton Pharmaceuticals	16
Kaizen Pharmaceuticals	16
Platinum Pharmaceuticals	25

Using the pivot table in Excel, the following observations were made as to the nature of the sample. The collected sample was composed of a majority of 25% of Platinum Pharma employees, of which none of the respondents held a doctorate. The respondents from Brookes, Kaizen, and Nexus held doctorates: 3 from Brookes and one each from the latter. Some respondents held intermediate education, but the majority of respondents were Master's level educated. This is indicative of the high comprehension curve of the respondents with regard to the questionnaire. Upon further deliberation, the educational stats of the sample reveal a balance between the Master's and Bachelor's level respondents. It is safe to assume that the sample is well balanced in its distribution of human educational quality with regard to the issue of Successful ERP implementation at hand.

Table 10: Level of Education of Respondent	
Level of Education	Percentage
Intermediate	8
Bachelor	44
Master	44
Doctorate	4

Data Descriptives

This section covers a discussion on the nature of the responses to the questions themselves and how important they are ranked in the study.

Table 11: Descriptive Analysis for Top Management Support & Commitment		
Question	Mean	Std. Deviation
PM1	3.86	0.91
PM2	3.91	0.948
PM3	3.94	0.82
PM4	3.97	0.839
PM5	3.89	0.882
PM6	3.81	0.87
Total	3.90	0.88

The above table describes the first independent variable. The factor for PM4 (The management is committed to the implementation of ERP.) scored high on the mean for responses, indicating high influence in top management strategy. However, PM6 (A permanent financial plan for ERP improvement that the management has set up) scored low on the mean of responses, indicative of a lower influence on the overall efficacy of top management. While this finding does support the rejection of the H_{o1} hypothesis, it does so only by a weak margin indicative of weakness in the top management.

Table 12: Descriptive Analysis for User Training		
Question	Mean	Std. Deviation
U1	4.01	0.768
U2	3.67	1.007
U3	3.99	0.840
U4	3.88	0.877
U5	3.92	0.857
U6	3.94	0.812
U7	3.93	0.810
Total	3.91	0.85

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In the above table, the descriptive for the factors of the independent variable 'User Training' deem factor U1 (Training programs are well-designed for the users.) as a high-ranking factor with major influence on the outcome of the variable. The factor U2 (Training programs for users are in-house.) ranks medium and may be indicative of training either being conducted outhouse or not conducted at all. However, the high ranking of the remaining factors is indicative of positive agreeableness among the Users regarding their training, their strategies, ERP usage, and the consultants hired to train them. These descriptives support the rejection of the $H0_1$ hypothesis by a statistically significant margin.

Table 13: Descriptive Analysis for Vendor Support

Question	Mean	Std. Deviation
V1	3.87	0.794
V2	3.98	0.835
V3	3.89	0.849
V4	3.87	0.912
V5	3.86	0.867
Total	3.89	0.85

The above table shows descriptive for the third independent variable, 'Vendor Support,' where V2 (The vendor provides adequate technical support for ERP implementation.) indicates a strong influence on the outcome of the variable in the regression. This is indicative of vendors being well involved in educating their clients about ERP usage. The V5 (The vendor has an effective relationship with all parties involved with the ERP implementation.) factor ranks lower, which may be indicative of respondents feeling there was some discord between the parties involved. Judging from the descriptive run on the first independent variable, the reason may be the lack of involvement of the top management. These statistics support the rejection of the $H0_2$ hypothesis by a statistically significant margin.

Table 14: Descriptive Analysis for Successful ERP Implementation		
Question	Mean	Sd. Deviation
ERP1	3.81	0.856
ERP2	3.88	0.800
ERP3	3.22	1.106
ERP4	3.16	1.221
ERP5	3.94	0.761
ERP6	3.95	0.771
ERP7	4.06	0.654
ERO8	3.31	1.151
ERP9	3.82	0.752
ERP10	3.96	0.714
ERP11	4.08	0.690
ERP12	4.03	0.749
ERP13	4.08	0.710
ERP14	4.17	0.645
	3.82	0.83

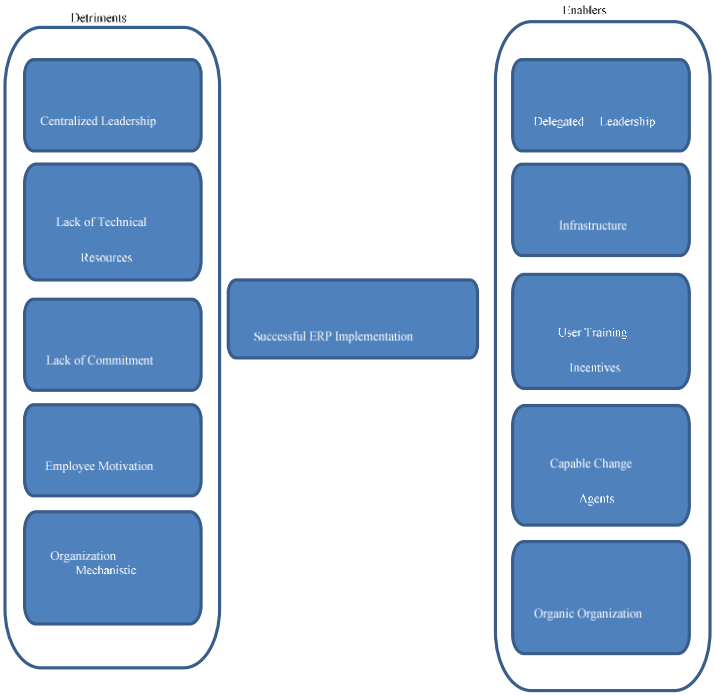
The above table focuses on dependent factor descriptives, with ERP14 (Information from the ERP system is accurate.) scoring highest and ERP4 (ERP system allows customization scoring lowest). This is indicative of the limited customizations of the versions of ERP the sample companies may have. However, these descriptives support the rejection of the $H0_3$ hypothesis by a statistically significant margin.

Interviews

Since the study is a mixed study with the intent to use explanatory qualitative backups, as a part of the study, employees who had confirmed their participation in responding to the questionnaire were also asked if they would consent to give an interview. However, owing to the ongoing pandemic, this method proved difficult to employ with premises visitation to accumulate recorded interviews for contextual analysis. Therefore, consenting respondents agreed to give brief phone interviews. This resulted in 10 interviews on the premises of the researcher's place of occupation, and 15 interviews were conducted on the phone. The social medium used was WhatsApp, owing to its convenience. From the interviews, a contextual map was developed, citing

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the detriments and enablers of the Successful Implementation of an ERP in an organization.



Conclusion

Based on the extensive study in the previous sections, one may reach a certain number of conclusions. It can be argued that the top management in the pharma sector from the sampled companies have tried to effectively provide the means to adapt to proper implementation processes of the ERP processes but with little success in terms of leading the organization-wide change. This is evident in the statistics obtained from the regression tests on singling out the variable and then again during multiple regression. The original study focused on private companies and uncovered a profound effect of top management efforts on the successful implementation of ERP; still, in this study, the results are somewhat different despite clearing the data through numerous tests to validate it.

It can be concluded from this statistical inference that pharma companies of the private sector lack an organized project hierarchy or structure to enable top-down changeovers, which is the norm in successful organizations. The original study essentially just proved that public company sectors (generalized) have better top management when dealing with projects pertaining to data management using ERP. This is also indicative of a top management layer that is not exemplary of leading an example. Chances are the management and administrative staff are not that well versed in computers.

Arvidsson, J., & Kojic, D. (2017), An interesting observation came in the form of the inference pertaining to user training and vendor support. Vendor support has a

profound effect on the rate of success in business reengineering processes as it is the transparency with which the vendor is imparting their proprietary knowledge that makes it easier for the users to adapt to the new systems. The vendor support was immense in the pharma private sector. One may state that the vendor of the proprietary ERP software seems more concerned regarding the seamless adoption of the software organization-wide rather than the top management staff that should be establishing sustainable ERP training and evolution.

Bukamal, O. M., & Abu Wadi, R. M. (2016), Users were receiving training most robustly and often consulted well-detailed user manuals to boost their knowledge of the ERPs. In the private sector, it is the subordinate staff that mostly deals with data entry, manipulation, and department-centric tasks through the ERPs. Higher hierarchy officials did not provide much time to deal with the software, preferring the low-level staff to deal with the IT and technical aspects of the ERPs that they so dearly paid to deploy.

Shah, S. I. H., Bokhari, R. H., Hassan, S., Shah, M. H., & Shah, M. A. (2011), Users and vendors showed true dedication to the sharing of knowledge on the functions of the ERPs deployed in their companies. Still, the top management has not provided a conducive environment for successful implementation. Where the user or the vendor may have been lacking in providing support to the change, either would still balance out the positivity in contributing to the deployment success of an ERP in their organization.

Recommendations

In view of the disturbing reality of the state of the sampled private pharma companies, the researcher would like to take a leaf out of the original study's book and implore the administrative and managerial staff of the sampled companies to define a lean hierarchy where training is not limited to the departmental staff but involves constant attention and example-led leadership on behalf of the top management. Department leaders, executives, board members and CEOs should prepare accordingly to execute the changeover to a new ERP system and be proactive in its implementation, showing involvement, learning, ownership and financial support through employee motivation. (Ahmed, N., A., A., & Sarim, M. (2017))

On the subject of vendor support, the best plan of action is to give the vendor priority and act accordingly. A vendor has information on their proprietary software that can make the difference between the ascension or decline of a company; hence, relationships must not be tainted by arrogance. Vendor support is essential as a learning tool for all individuals in a client organization. Organizations should give priority to a vendor who can offer after-implementation services. These private companies should assemble internal teams to work in unison with the Vendor consultant team rather than leave the vendor to decide the changes for themselves. This is highly unproductive and may fail the deployment. Internal teams should keep track of the vendor's improvements and enhance their knowledge. (Bukamal, O. M., & Abu Wadi, R. M. (2016))

Additionally, even though the study has shown the positive impact of user training on the successful implementation of an ERP, it is still essential to maintain a

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balance between in-house and outhouse training. To save on costs, a certified trainer should be appointed in these companies to impart contemporary knowledge of customizing and operations and ERP as per the organization's needs. This would ensure smooth communications channels and a staff that is up to date on molding software to their jobs like second nature.

A major recommendation would be to expound upon the study longitudinally to accumulate further data on pharmaceuticals in the private sector. The addition of factors measuring business process reengineering and matching of an ERP to the purpose of the organization would provide a deeper view into critical factors for ERP deployment success. This would be a better mode of focusing on project management and would give correlational insight into the role of the top management in their level of commitment.

Lastly, even though this study has provided a credible view into the administration of the private pharma sector, it would do much better with a qualitative approach. This is because a company is only as good as the commitment and driven nature of its employees, and from a contextual, analytical perspective, along with the quantitative data, would allow greater depth of understanding as to the WHY of the WHAT required to make an ERP implementation optimal in the private sector.

Conflicts of interest

The author cites no conflicts of interest or breaches of ethical codes of conduct.

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