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 reflects also true for the corporate and business world, that is always in search of the perfect paradigm to achieving balance in sustainability, function, network, and profit. The research is aimed at analyzing the parameters which lead to successful deployment of ERP across the pharmaceutical sector where use of ERP is prevalent and of high importance.

Keywords: ERP, Pharmaceutical sector

Introduction

In a world as dynamic as of 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 reflects also true for the corporate and business world, that is always in search of the perfect paradigm to 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 paper work, 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 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 the 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 database, and a network, was developed in the form of an 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, there were two modules developed for this very purpose: material requirements planning (MRP), and then 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 which allows different bodies and departments of an organization to securely store, transmit, monitor and manipulate data with great efficiency while maintaining integrity of the data. Overtime, tailored modules were added that could serve the needs of any industry. (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 the actual challenge towards achieving seamless data exchange, storage, analytics, and business resilience. Those organizations which 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 implementation of the ERP are successful and as such these can have severe negative impact upon the operations on 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 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 & Anciulescu, 2017)

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

Pharmaceutical industries of Pakistan have a vast and complex supply chain network. Acquisition of raw materials from the 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 is at its highest efficiency. (Vuksic & Spremic, 2005)

When implementing an ERP system in an organization, there exist a number of challenges. Shifting from a non-existent or inferior system of ERP, there is a good chance that the implantation of the system fails. The purpose of an ERP software is to make use of software applications 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 studies have generalized the organizational scope. Choosing to measure or document an event from a randomly selected or generalized organization and assessing the failure or success of 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 which lead to successful deployment of ERP across the pharmaceutical sector where use of ERP is prevalent and of high importance. The reason chosen to assess the successful implementation of ERP system 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 turns out successful. Documented cases have been brought forward which show that improper implementation of ERP systems can lead companies to losses, high turnover rates, departmental discourse, and bankruptcy, and many a 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 researches 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 use of the independent variables to give meaning of what effect these variables have on the dependent variable. (Bukamal & Abu Wadi, 2016)

1. What affect does Project Management have upon the successful ERP Implementation in the Pharmaceutical Sector?
2. This question focuses on the means by with the managerial and higher administrative levels deploy and sustain the changeover to ERP systems.
3. What affect does User Training have upon the successful ERP Implementation 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 affect does Vendor Support have upon the successful ERP Implementation in the Pharmaceutical Sector?
6. This question focuses on how much the vendors assist in allowing the success in understanding of the user to implement the ERP. This requires the vendor to
be assisting by ERP usage documentation and technical support so the organization can hone the modules to their needs.

**Research Hypotheses**

The hypotheses are to further clarify 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 regards 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 impact of factors on ERP implementation. The research aims to help improve the understanding behind successful ERP implementation within the pharmaceuticals industry in Pakistan as no such study has been conducted. The findings of this research will contribute and benefit the organizations, stakeholders, shareholders and system developers in designing and implementing future ERP projects. Hence this study will give future researchers better understanding about this subject. (Sondoss et al., 2008)

The greater objective behind this study is to study and compare the similarities the original study has with the duplicated study 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).

Population

Subordinate employees (working under managerial administration) of pharmaceutical companies based in Karachi will be approached to gather data through use of 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

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 but not all of them positively affects their business processes. This research is aimed at identifying the reasons and characteristics which allow the ERP implementation in an organization to be called successful. This is significant as simply implementing an ERP system which 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 the 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 better understanding about this subject.

**Limitations**

A major hinderance that could create problems in data collection is the nationwide lockdown that is imposed in Pakistan due to the ongoing Corona Virus (Covid19) 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 test through pure digital data collection.

Another limitation which arises is due to time management as the researcher is an active student as well as 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 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 good supply chain practices being adopted such as Enterprise Resource Planning implementation. (Journal & Sciences, 2009)

**Enterprise Resource Planning**

Short formed ERP, is an IT database system which aims to streamline and allow interconnectivity among all divisions of an organization. It allows access of
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 in an ERP package. (Rahman & Saha, 2018) The world of information technology has advanced with great leaps and bounds in the recent years and as such play a pivotal role in this age of globalization. The way IT accomplishes this through use of ERP systems in business organizations as these systems help increase efficiency of employees and business processes. (Fergal et al., 2008)

Variables for ERP Implementation Success

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

ERP Implementation Success

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

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

**Project Management:** This variable highlights the use of skills and techniques by the management to assure 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 is
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 systems functionality, its operational logics 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, the continuous support from the ERP system manufacturer is a huge factor and thus is directly responsible for the ERP system to be implemented successfully.

While selecting the vendor, a number of considerations must be made. These include vendors past experience, their portfolio, their commitment level, past success of ERP implementation and finally their after sales support. (Shah et al., 2011)
2. 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 which this study aims to fulfill is to target the pharmaceutical industry as in the previous researches the ERP implementation success is generalized to all of 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 researches. Furthermore, deductive approach was used, and convenience sampling was done.
which is non-random sampling technique, and after collecting data through online
google forms, the tests (reliability, regression and correlation) were applied on it
using IBM SPSS software to find out the results.

Research Design

Type of Approach used:

Deductive approach was used as we are working on the existing theory for
developing and checking hypothesis and not discovering anything new. As in this
approach the previous study is reproduced to see if the results produced are same
or not. This approach is less risky and is more scientific and quantitative in nature,
so it suits best while working with the quantitative data. Also, the previous
researchers have highly recommended this approach due to its less risky as
compared to the inductive approach as it is totally based on working upon the
existing theory. 140 respondents were asked to fill 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

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

Modes of Study

- Mixed Study Method: The term mixed methods are a relatively new technique
which 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 approaches of qualitative and
quantitative methods (Cresswell and Clark 2011).
- Explanatory Sequential: This method is used when a researcher would like to
follow-up 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 upon the nature of the research problems, and as such numerical and narrative form of data collection are used to give accurate and rational results.

- Interviews: During the course of 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 the 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 which is representative all across the organization.

**Questionnaire Development**

Questionnaire was developed on google forms and adopted from the original study. The measurement instrument was formed based upon 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 and respondents won’t get bored or frustrated while filling out the questionnaires as compared to other scales. The questionnaire comprised of 32 questions total. These questions comprised the responses towards the 3 Independent variables and towards 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 and saved as an excel worksheet. The Likert scale responses were recorded in a 1-5 range with 1 the lowest in agreeableness and 5 the highest, with 3 standing for neutral. Majority graphs were obtained from google forms in responses that would suit 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 Nominal and remained as string variables.

Software and Statistical tools

- Microsoft Office 2019 o Word - for processing and documenting research.
- Excel – 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 lay in a suitable range.
- 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 hypothesis to accept or discard impact probability.
- ANOVA – a test to understand variance and relationship between dependent and independent variables. It is a part of regression. And gives all required readings for P-Value, F-stat, and can be manipulated to give 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 study. The issue 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 the google forms that 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 that the results are same or not. The research is reliable if the results are not contradicting with the results in the previous studies. The reliability of instrument used can be checked by Cronbach alpha test.

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 be difficult to know if a questionnaire was filled properly or just skimmed over. The respondents were assured their data would remain private and the information is primarily for research study purposes, not any other ulterior purpose. Moreover, none of the respondent 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 excel worksheet then imported to IBM SPSS ver.25 software.

The questions were assigned nominal data type for non-string variables and organized under respective labels.
Table 1: List of Variables

<table>
<thead>
<tr>
<th>Factors</th>
<th>Variable</th>
<th>No. of Questions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Top Management Support &amp; Commitment</td>
<td>IV-1</td>
<td>6</td>
</tr>
<tr>
<td>Training Users</td>
<td>IV-2</td>
<td>7</td>
</tr>
<tr>
<td>Vendor Support</td>
<td>IV-3</td>
<td>5</td>
</tr>
<tr>
<td>Successful ERP Implementation</td>
<td>DV-1</td>
<td>14</td>
</tr>
</tbody>
</table>

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 f-Stat significance is below $\alpha = 0.05$, and F-stat is larger than 1 then data reliability is confirmed.

Table 2: Cronbach’s Alpha Analysis for Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Cronbach’s Alpha</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV-1</td>
<td>0.909</td>
</tr>
<tr>
<td>IV-2</td>
<td>0.871</td>
</tr>
<tr>
<td>IV-3</td>
<td>0.847</td>
</tr>
<tr>
<td>DV-1</td>
<td>0.902</td>
</tr>
<tr>
<td>All Variable Reliability</td>
<td>0.943</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Variables</th>
<th>Mean</th>
<th>Std. Dev</th>
<th>Skewness</th>
<th>Kurtosis</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV-1</td>
<td>3.897</td>
<td>0.878</td>
<td>-0.551</td>
<td>0.145</td>
</tr>
<tr>
<td>IV-2</td>
<td>3.906</td>
<td>0.853</td>
<td>-0.493</td>
<td>0.039</td>
</tr>
<tr>
<td>IV-3</td>
<td>3.894</td>
<td>0.851</td>
<td>-0.646</td>
<td>0.564</td>
</tr>
<tr>
<td>DV-1</td>
<td>3.819</td>
<td>0.827</td>
<td>-0.225</td>
<td>-0.510</td>
</tr>
</tbody>
</table>
Interpretation of Kurtosis

- (P-P plot as supplementary evidence)
- The dataset for IV-1 is a negative skewed distribution but 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 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 (left tail of distribution is flatter than the right tail), while the kurtosis denotes acceptable distribution range (0.564).
- The dataset for DV-1 denotes a negative skewness of (-.225) within acceptable range, the kurtosis indicates a significantly flatter distribution but within 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>
<thead>
<tr>
<th>Variables</th>
<th>Tolerance</th>
<th>VIF</th>
</tr>
</thead>
<tbody>
<tr>
<td>IV-1</td>
<td>0.528</td>
<td>1.895</td>
</tr>
<tr>
<td>IV-2</td>
<td>0.550</td>
<td>1.820</td>
</tr>
<tr>
<td>IV-3</td>
<td>0.598</td>
<td>1.673</td>
</tr>
</tbody>
</table>

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 confuse 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 Coefficients table (Standardized coefficients).
- This value is the number for the factor in a linear regression equation.
- The R-value is correlation between predicted and observed values.
- The Adjusted R-squared Value shows the fit of data to the model.

Hypotheses Tests

H_0 = Top management’s support and commitment had no such impact on the successful implementation of ERP in an organization.

<table>
<thead>
<tr>
<th>R</th>
<th>Beta</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>F Value</th>
<th>P Value</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.446</td>
<td>0.466</td>
<td>0.217</td>
<td>0.211</td>
<td>38.283</td>
<td>0.000</td>
<td>1.435</td>
</tr>
</tbody>
</table>

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

\( H_{a2} = \) No impact of training users to ensure successful ERP implementation.

<p>| Table 6: Statistical Analysis of variables |
|---|---|---|---|---|---|---|</p>
<table>
<thead>
<tr>
<th>R</th>
<th>Beta</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>F Value</th>
<th>P Value</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.554</td>
<td>0.554</td>
<td>0.307</td>
<td>0.302</td>
<td>61.195</td>
<td>0.000</td>
<td>1.850</td>
</tr>
</tbody>
</table>

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 user training on the successful ERP implementation in the sampled organizations. The beta value of 55.4% indicates a positive relational impact. Therefore, the 1 null hypothesis is confirmed rejected.

The Adjusted R Square improves the model by value 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).

\( H_{a3} = \) No impact of Vendor training to ensure successful ERP implementation.

<p>| Table 7: Statistical Analysis of variables |
|---|---|---|---|---|---|---|</p>
<table>
<thead>
<tr>
<th>R</th>
<th>Beta</th>
<th>R Square</th>
<th>Adjusted R Square</th>
<th>F Value</th>
<th>P Value</th>
<th>Durbin-Watson</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.581</td>
<td>0.581</td>
<td>0.337</td>
<td>0.332</td>
<td>70.149</td>
<td>0.000</td>
<td>1.738</td>
</tr>
</tbody>
</table>

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 vendor training on the successful ERP implementation in the sampled organizations. The beta value of 58.1% indicates a
positive relational impact. Therefore, the 2 null hypothesis is confirmed rejected. The Adjusted R Square improves the model by value 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).

\( H_{04} = \text{No impact of all variables on the successful ERP implementation.} \)

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

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 the p-value that is lower than the alpha value, that indicates significant impact of the independent variables on the dependent variables by 32.155% model fit. Therefore, the 3 null hypotheses are also rejected as all the variables show impact.

It is an interesting observation that the p-value for training from vendor, 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 impact of top management on the ERP implementation. Conclusively, all alternate hypotheses are accepted.
Finding & Discussions

<table>
<thead>
<tr>
<th>Name of Pharmaceuticals</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Nexus Pharmaceuticals</td>
<td>6</td>
</tr>
<tr>
<td>Indus Pharmaceuticals</td>
<td>8</td>
</tr>
<tr>
<td>Novartis Pharmaceuticals</td>
<td>13</td>
</tr>
<tr>
<td>Brookes Pharmaceuticals</td>
<td>16</td>
</tr>
<tr>
<td>Hilton Pharmaceuticals</td>
<td>16</td>
</tr>
<tr>
<td>Kaizen Pharmaceuticals</td>
<td>16</td>
</tr>
<tr>
<td>Platinum Pharmaceuticals</td>
<td>25</td>
</tr>
</tbody>
</table>

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 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 1 each from the latter. There were respondents who held intermediate education but majority respondents were Master’s level educated. This is indicative of the high comprehension curve of the respondents with regards to the questionnaire. Upon further deliberation, the educational stats of the sample reveal a balance between the Master and Bachelor level respondents. It is safe to assume that the sample is well balanced in its distribution of human educational quality with regards to the issue of Successful ERP implementation at hand.

<table>
<thead>
<tr>
<th>Level of Education</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Intermediate</td>
<td>8</td>
</tr>
<tr>
<td>Bachelor</td>
<td>44</td>
</tr>
<tr>
<td>Master</td>
<td>44</td>
</tr>
<tr>
<td>Doctorate</td>
<td>4</td>
</tr>
</tbody>
</table>

From the Data Descriptive

This section covers discussion on the nature of the responses to the questions themselves and how importantly they are ranked in the study.
Table 11: Descriptive Analysis for Top Management Support & Commitment

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>PM1</td>
<td>3.86</td>
<td>0.91</td>
</tr>
<tr>
<td>PM2</td>
<td>3.91</td>
<td>0.948</td>
</tr>
<tr>
<td>PM3</td>
<td>3.94</td>
<td>0.82</td>
</tr>
<tr>
<td>PM4</td>
<td>3.97</td>
<td>0.839</td>
</tr>
<tr>
<td>PM5</td>
<td>3.89</td>
<td>0.882</td>
</tr>
<tr>
<td>PM6</td>
<td>3.81</td>
<td>0.87</td>
</tr>
<tr>
<td>Total</td>
<td>3.90</td>
<td>0.88</td>
</tr>
</tbody>
</table>

The above table gives the descriptive for 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 (Permanent financial plan for ERP improvement has been set up by the management) scored low on the mean of responses indicative of a lower influence on overall efficacy of top management. While this finding does support the rejection of $H_0$, it does so only by a weak margin indicative of weakness in the top management.

Table 12: Descriptive Analysis for User Training

<table>
<thead>
<tr>
<th>Question</th>
<th>Mean</th>
<th>Std. Deviation</th>
</tr>
</thead>
<tbody>
<tr>
<td>U1</td>
<td>4.01</td>
<td>0.768</td>
</tr>
<tr>
<td>U2</td>
<td>3.67</td>
<td>1.007</td>
</tr>
<tr>
<td>U3</td>
<td>3.99</td>
<td>0.840</td>
</tr>
<tr>
<td>U4</td>
<td>3.88</td>
<td>0.877</td>
</tr>
<tr>
<td>U5</td>
<td>3.92</td>
<td>0.857</td>
</tr>
<tr>
<td>U6</td>
<td>3.94</td>
<td>0.812</td>
</tr>
<tr>
<td>U7</td>
<td>3.93</td>
<td>0.810</td>
</tr>
<tr>
<td>Total</td>
<td>3.91</td>
<td>0.85</td>
</tr>
</tbody>
</table>

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 user 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 are indicative of positive agreeableness among the Users regarding their trainings, their strategies, ERP usage, and the consultants hired to train them. These descriptives support the rejection of the $H_0$ hypothesis by a statistically significant margin.
The above table shows descriptive for the third independent variable ‘Vendor Support’, where V2 (The vendor provides adequate technical support for ERP implementation.) indicates high influence on the outcome of the variable in regression. This indicative of vendors being well involved in educating their clients in 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, and judging from the descriptive run on the first independent variable, the reason may be the lack of involvement of the top management. These descriptive support the rejection of the H0 hypothesis by a statistically significant margin.

The above table focusses on dependent factor descriptives, with ERP14 (Information from the ERP system is accurate.) scoring highest, and ERP4 (ERP
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 H03 hypothesis by a statistically significant margin.

**From Interviews**

Since the study is a mixed study with intents to use explanatory qualitative backups, as a part of the study, employees who had confirmed their participation in the responding to the questionnaire we also asked if they would consent to giving 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 phone. The social medium used was WhatsApp owing to its convenience. From the interviews a contextual map was developed citing the detriments and enablers to the Successful Implementation of and 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 had focused on the private companies had uncovered a profound effect of top management efforts on the successful implementation of ERP but 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 are somewhat lacking in an organized project hierarchy or structure to enable topdown change overs as is the norm in successful organizations. The original study essentially just proved that public company sectors (generalized) have a better top management when dealing with projects pertaining to data management using and 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 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 trainings and evolution.

Bukamal, O. M., & Abu Wadi, R. M. (2016), Users were receiving training in a most robust manner and oft 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 the data entry, manipulation, and department-centric tasks through the ERPs. Higher hierarchy officials did not provide much time to dealing 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 but 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.

**Recommendation**

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 ascension or decline of a company hence relationships much 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 has the ability to offer after-implementation services. These private companies should assemble internal teams to work in unison with the Vendor consultant team rather than just leave the vendor to decide the changes for themselves. This is highly unproductive and may result in failure of the
deployment. Internal teams should keep track of the vendor’s improvements and enhance their own knowledge. (Bukamal, O. M., & Abu Wadi, R. M. (2016))

Additionally, even though the study has shown positive impact of user training on the successful implementation of an ERP, it is still essential to maintain a balance on inhouse and outhouse trainings. 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 a second nature.

A major recommendation would be to expound upon the study in a longitudinal manner to accumulate further data on pharmaceuticals in the private sector. 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 provide 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 and ERP implementation optimal in the private sector.

Conflicts of interest

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

References


Pakistan Pharmaceutical sector: Successful implementation of Enterprise Resource Planning


