The impact of enterprise resource planning (ERP) on performance management of education sector in Sindh-Pakistan

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Abstract: The study aimed to analyze the impact of Enterprise Resource Planning (ERP) on the performance management of education sector and to study the various aspects of organizational structure, financial resource usability, personnel support and employee perception, effect of users' training and staff development, budget provision, time period and success indicators in ERP implementation on performance management in an organization, university or educational institution in Sindh, the province of Pakistan. The methodology and examining approach of this study was subjective and quantitative. The sample was comprised of the public and private degree awarding educational institutes and universities for data collection. The study revealed a positive impact on the organizational structure, personnel support, use ability of financial resource, the means of availability of human resources, annual implementation period and quantum of time line, the failure and success of management/ organization, and the staff development for its implementation in the higher educational institutes and universities in Sindh, province of Pakistan. The finding showed: ERP had negative impact on the role of head of organization. Employee's participation and the budgetary provision would affect positively on the yearly management's performance of education sector in Sindh. The social orders and the world over will need to consider how to take advantage of these new open doors and in this way guarantee, to remain aggressive in the worldwide commercial center and to deal with the monopoly at local, national, regional and international level. In this global world, the individuals, organizations and nations will enabled to make decisions, plans, strategy and practice the ERP system implementation in the institutions and universities. ERP related stakeholders would be able to make a strategy for the development as a forceful favorable position gadget by associations and mechanical affiliations and to focus on the future look of the ERP subjects. It will be helpful in conducting research in future and to write articles for its publicity and promotion, which will create valuable bits of knowledge on ERP subject areas.

Key words: Enterprise; Planning; Performance; Management

1. Introduction

E-learning is the need of the hour and to deliver this specific service, a highly integrated enterprise ERP application is mandatory to accomplish. This facility facilitates the university to explore knowledge and quality teaching (Watson and Schneider, 1999). The history of implementation of ERP systems is not old in educational sector of Pakistan. This initiative is first taken by Higher Education Commission, Pakistan (HEC). The HEC did a pact with Oracle to facilitate information system and technological support to increase the performance of Pakistani public sector educational institutes. The higher education institutions have completely changed their previous systems to ERP applications to accomplish the challenges of the hour (McCreddie and Updegrove, 1999). Due to ERP implementation, the old systems and softwares are changed or aligned with the modern ERP applications in most of the educational institutes across the globe to get the desired output and better result of key clients (Kvavik, 2002).

1.1. Purpose of the study

The main purpose of this research study would be to present the problem and the literature about the ERP systems, which is used as a software tool in the various educational institutions at international level but not used in the education sector at local level (Abernethy and Guthrie, 1994). As such, the data showed that a large number of industries are using ERP took to boost up their business and services by using the modern technology era. The ERP tool would minimize the cost of production and would result to provide the increased facility to user students followed by the increase in sale and even to mention the points of timely needs while correcting and making instant access to the new relevant information, necessary for and result in organizations, universities and educational institutions (Abugabah et al., 2013).

1.2. Research problem

In developed countries, ERP tool used in the higher education institutes and universities for quality education, cost benefits and instant
facilitation to the students/users/staff. It has many ways and means which involve the promotion and branding of the institutions or universities. In Sindh, province of Islamic Republic of Pakistan, neither are there giant/big educational organizations, institutes or universities at public and private level, nor there is the practice of ERP tool implementation in such higher educational places (Albadri and Abdallah, 2009), (AlQashami and Mohammad, 2015), (Aljohani et al., 2015). For example, the general universities, engineering and medical universities, degree-awarding institutions and some of the colleges in educational sector in Sindh are without modern technology and tools of quality education (Al-Mashari et al., 2006; Arnold et al., 2008; Beheshti and Beheshti, 2010; Berchet and Habchi, 2005; Bradley and Lee, 2007).

1.3. Research objective

The purpose of this research was to identify the impact of ERP on performance management.

1.4. Research question

1. What would be the impact of ERP on the organizational structure for performance management of higher education sector in Sindh?
2. What would be the impact of personal/personnel support on the performance management of higher education sector in Sindh?
3. Whether ERP would put an impact on usability of financial resources on performance management of higher education sector in Sindh?

1) Hypothesis 1: Organizational Structure

H1a: The ERP has no impact on the organizational structure of higher education sector in Sindh.

H1b: The ERP has an impact on the organizational structure of higher education sector in Sindh.

2) Hypothesis 2: Personnel Support

H2a: The ERP has no impact on the personnel support on performance management of higher education sector in Sindh.

H2b: The ERP has an impact on the personnel support on performance management of higher education sector in Sindh.

2. Review of the related literature

2.1. Information system

Information system has a primitive role in decision making and control of organization. It accesses the compulsory facts and figures which may be cooperative and thoughtful for the remedy of issues and problems emerging up day by day in the organization. This leads to the correct, accurate, authentic and quick decision, and complete control as a significant factor towards the progress and development of an industry (Achieng et al., 2014). This is required to face the challenges emerging up from different competitors. However, slightly inaccurate and weak decisions and steps may result in the harm of company’s progress and benefits or profitability. Sometimes a big blunder may bring about a complete demolish and destruction of company, says Livari (1991). This exploration centers at different obstacles and issues that are obstructing substantial scale application and usage of Information System. Livari (1991) has specified the obstacles and difficulties to be experienced in the way of advancement of Information System as opposed to suitable techniques and methodology. There are four reasons which connote the need of executing research, out of them first two are especially appropriate for this examination exposition (Akkermans et al. 2003). Lost and harmed vital open doors, duplication and endeavors, contradictory frameworks and squandered assets can be the unmistakable and reasonable outcomes on the off chance that the effective execution in an association’s key IS plan meets the disappointment, this is the main component or reason that closes. Assurance of the goals and results that IS plan has wanted to meet by usage is the second reason (Alan, 2017).

![Fig. 1: Architectures of Information System (Abernethy and Guthrie, 1994)](image)

2.2. Building up the target information system (Data and application)

Architecture, delineating how the attempt of Information Systems Architecture will engage the Business Architecture and the Architecture Vision, in a way that addresses the Request for Architecture Work and address concerns regarding distinguished contender Architecture Roadmap parts based upon openings between the Baseline and Target Information Systems (Data and Application) Architectures (Alessandro et al., 2009). Genuine applications structures - for instance, those for ERP, Customer Relationship Management (CRM), etcetera - much of the time give a mixture of development establishment and business application method of
reasoning, and a couple of affiliations receive an application-driven technique, whereby they see certain key applications as molding the inside supporting of the mission-fundamental business methodology, and take the execution and coordination of those middle applications as to the basic convergence of outline effort (the combination issues regularly constitute a noteworthy test) (Al-Mashari, 2002).

2.3. ERP

An ERP framework controls the whole association, consequently, frequently called venture frameworks. "ERP frameworks are incorporated and venture wide frameworks, which mechanize center corporate activities" (Gibson et al., 1999). Holland and Light (1999) guarantee that this mechanization is ordinarily executed and performed by the joining of best institutions to simply snappy basic leadership, cost diminishment, and more noteworthy administrative control. Some ERP frameworks were created out of managerial (monetary and HR) sides of the business (e.g. SAP and PeopleSoft), and others developed from materials, asset arranging and assembling (e.g. Baan) (Markus and Tanis, 2000). Markus and Tanis (2000) said that a legitimate research assumed that the ERP market would touch $66.6 billion by 2003.

2.4. ERP evolution

The application and implementation of ERP has been modified and developed gradually in accordance with the needs and demands of the business community, the manufacturing and synthesizing industries were specifically concerned with inventory control in 1960s which was a spontaneous need for them to persuade and satisfy their customers (Alok and Deepti, 2011). That is the only reason to a large number of software packages were designed to control the quantitative inventory control system.

In 1970s it was presumed firmly that the large quantity of inventory was an overload for them and was not profitable for the business. This content led them to Material Requirements Planning (MRP), which played an important role in material planning process (Alavi and Carlson, 1992). With the cooperation of MRP it was easy to demand raw material, "scheduled to the arrival of material, bills of material, order time, delivery time, available stocks etc. for production of goods" (Odenet et al., 1993).

3. Research methodology

Quantitative research was as often as possible alluded in the theory testing process. Quantitative approach has been used in this research due to the type of issue/ problem and the identified best possible ways for the data collection to address the research question. After detailed study, survey method has been selected to do. For this purpose questionnaire has been designed on likert scale. The likert scale aligned question generated numeric/ numbers as data for analyses through different statistical technique or tool.

Two sorts of information were gathered i.e. essential and optional. The essential information was perceived as information gathered and gathered especially as polls by utilizing overview strategy through email and individual visits. While, auxiliary/optional information was gathered from different sources, for example, archives, books, periodicals, and web seek on Internet, which is known to be amassed quicker than essential wellspring of information accumulation.

The essential information accumulation source was the examination survey, which was appropriated by this analyst and sent by electronic mail to choose educational institute and universities of Sindh.

The population of the study consisted of 48 educational degree awarding institutions and university of Sindh as per list of Higher Education Commission (HEC).

<table>
<thead>
<tr>
<th>S.No</th>
<th>No of Institutions</th>
<th>No of Departments</th>
<th>No of Respondents</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Public Sector Institution</td>
<td>11</td>
<td>06</td>
<td>02</td>
<td>132</td>
</tr>
<tr>
<td>Private Sector Institution</td>
<td>18</td>
<td>06</td>
<td>02</td>
<td>216</td>
</tr>
<tr>
<td>Total</td>
<td>29</td>
<td>12</td>
<td>04</td>
<td>348</td>
</tr>
</tbody>
</table>

Fig. 2: Enterprise resource planning ERP (Alok and Deepti, 2011)
Table 2: Reliability test, reliability statistics
<table>
<thead>
<tr>
<th>Cronbach’s Alpha</th>
<th>N of Items</th>
</tr>
</thead>
<tbody>
<tr>
<td>0.851</td>
<td>33</td>
</tr>
</tbody>
</table>

Table 3: Validity test, case processing summary

<table>
<thead>
<tr>
<th>Cases</th>
<th>N</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Valid</td>
<td>20</td>
<td>100.0</td>
</tr>
<tr>
<td>Excluded</td>
<td>0</td>
<td>0.0</td>
</tr>
<tr>
<td>Total</td>
<td>20</td>
<td>100.0</td>
</tr>
</tbody>
</table>

Table 4: Sector, institution, department and number of respondents' wise data

<table>
<thead>
<tr>
<th>S.No</th>
<th>No. of Institutions/Universities</th>
<th>No. of Departments</th>
<th>No. of Respondents</th>
<th>Total</th>
<th>Percentage %</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Public Sector Institution/ university</td>
<td>11</td>
<td>06</td>
<td>02</td>
<td>132</td>
</tr>
<tr>
<td></td>
<td>Private Sector Institution/ University</td>
<td>18</td>
<td>06</td>
<td>02</td>
<td>216</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>29</td>
<td>12</td>
<td>04</td>
<td>348</td>
</tr>
</tbody>
</table>

4. Item by item analysis of data

4.1. Research hypotheses

Each item defines that the factors have been identified from the literature review and relevant hypotheses drawn up which can be tested. Each factor is predicted to be associated with the independent variables in this study.

3.1. Data analysis

Table 4 shows that there were 132 (37.9%) public sector institutions and universities and 216 (62.1%) private sector institutions and universities were included in the sample of this study.

1) Hypothesis 1: Organizational/Organization’s Structure

H1.: The ERP has no impact on the organizational structure of higher education sector in Sindh.

H1.: The ERP has an impact on the organizational structure of higher education sector in Sindh.

![ERP and Organization's Structure](image.png)

Fig. 3: ERP and organization structure

Fig. 3 is showing a division in bar chart as how many of the respondents agree with the statement that ERP has a positive impact on Organization’s Structure. The graph indicates that 42% of the respondents, the majority as ‘Strongly Agreed’ that ERP does effect Organization’s Structure positively, 25% of the respondents ‘Agreed’ and 17% showed ‘Neutral’ response that if a firm was using or implementing ERP, it would be neutral effect but on the other side 9% and 7% were those who ‘Strongly Disagreed’ and ‘Disagree’ that ERP implementation or its usage were not compulsory. There are many firms up-till now which are not using such a system but still they are making profit. So, working with or without ERP doesn’t make any difference to some. This indicates the importance of ERP implementations within organizations, firms are seeking to improve or maintain their competitiveness in the increasingly challenging global marketplace.

The results show that Organization’s Structure effects the performance management around 48%.
Result-1: The result as per graph analysis is around of data 67% responded agree the alternate hypothesis which was analyzed for the variable i.e. Organization’s Structure showed the level of significance was high (sig. 0.000 with 95% level of Confidence) that H1a was accepted hence upheld. Therefore, it is concluded that ERP has positive impact on the organization’s structure of education sector in Sindh. This also indicates that ERP encourages a larger and more positive impact internally within any organization/ institute through our current research.

2) Hypothesis 2: Personnel Support
H2a: The ERP has no impact on the personnel support on performance management of higher education sector in Sindh.

H2a: The ERP has an impact on the personnel support on performance management of higher education sector in Sindh.

The graphical presentation shows that 40% strongly agree and 24% agree that makes a total of 64% out of total respondents reach a decision that implementation of ERP increases Personnel Support cause if a newcomer is using ERP for the very first after his/her training so the subordinates or the co-workers will help that newcomer with the system. As the graph illustrates that 24% of the respondents disagree and strongly disagree with the current statement that ERP is quite tough to learn and only specialized people can operate, not a newcomer plus personnel support is also less.

The result shows that Personnel Support effects the performance management around 43%.
Result-2: The result as per graph analysis is around of data 64% responded agree the alternate hypothesis which was analyzed for the variable i.e. Personnel Support showed the level of significance was high (sig. 0.004 with 95% level of Confidence) that H2a was accepted hence upheld. Therefore, it is concluded that The ERP has some impact on the personnel support on performance management of higher education sector in Sindh. This enables us to understand that ERP implementations creates a positive impact on organizational personnel and provides a better overview towards positive growth in organizations internally.

4.2. Statistical analysis-regression test analysis

The analysis of data on the basis of Regression Test duly analyzed through software of Statistical Package for the Social Sciences (SPSS) tool is given, as under:

<table>
<thead>
<tr>
<th>Table 7: Model summary</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model</td>
</tr>
<tr>
<td>-------</td>
</tr>
<tr>
<td>1</td>
</tr>
</tbody>
</table>


Regression analysis will help to determine the causal effects of one variable on another. In this research the survey was fed into SPSS 17 software, as the “Reliability” is strong in table 3 so, the Regression is also showing a positive fitness. Table 4.1 shows Model Summary, In model summary of this research, Staff Development, Time Period, Organization Structure,
Budget Provision, Availability Of Human Resource, Personnel Support, Employee Participation, Financial Resource Use ability, Role of Head of Organization, Success Indication considered as independent variable (IV) while performance management level is taken as dependent variable (DV). where R shows a strong relationship between Independent and dependent variables 0.862 or 86.2%, in addition, R square indicates the fitness of Regression. In this case of multiple linear regression, it is important to report and discuss the value of adjusted R square to interpret it for result. Adjusted R square measures the proportion of total variability in the DV explains by IV. Here the value of adjusted R square is reported 0.719 which is about 72% percent, so researcher is able to say that 72% of the total variability in the performance management level (DV) is explained by the Staff Development, Time Period, Organization Structure, Budget Provision, Availability Of Human Resource, Personnel Support, Employee Participation, Financial Resource Use ability, Role of Head of Organization, and Success Indication (IV) so it indicates that the variables are accurately describing the model.

4.3. General regression equation

\[ \alpha = \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \epsilon \]  

\[ \alpha = \text{Regression containing all Intercepts.} \]  
\[ \beta_1 = \text{Degree of Dependency.} \]

4.4. Specific regression equation

Performance Management Level = \alpha + \beta_1 (Organizational Structure) + \beta_2 (Personnel Support) + \beta_3 (Financial Resource Use ability) + \beta_4 (Availability of Human Resource) + \beta_5 (Role of Head of Organization) + \beta_6 (Employee Participation) + \beta_7 (Budget Provision) + \beta_8 (Time Period) + \beta_9 (Success Indication) + \beta_10 (Staff Development)

\[ \epsilon = \text{Regression containing all the Errors in the Model.} \]

4.5. Expected regression equation

Performance Management Level = 3.270 + 1.850 (Organizational Structure) + 0.228 (Personnel Support) + 0.513 (Financial Resource Use ability) + 0.010 (Availability of Human Resource) + 0.131 (Role of Head of Organization) + 0.003 (Employee's Participation) + 0.480 (Budget Provision) + 0.110 (Time Period) + 1.808 (Success Indication) + 0.672 (Staff Development)

4.6. Hypotheses assessment summary

Table 10 summarizes the results that there are positive and negative impacts of ERP system in Higher Education sector.

5. Conclusion

This reasonable structure is produced in the wake of surveying of writing on the current quality systems and existing models. The basic achievement considered for ERP executions are likewise considered. As I started assembling and assessing the writing for this dissertation in 2017, I immediately perceived a requirement for a review on the impacts of big business frameworks usage in

Table 8: ANOVA

<table>
<thead>
<tr>
<th>Model</th>
<th>Sum of Squares</th>
<th>Df</th>
<th>Mean Square</th>
<th>F</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regression</td>
<td>250.804</td>
<td>10</td>
<td>25.080</td>
<td>31.418</td>
<td>0.000*</td>
</tr>
<tr>
<td>Residual</td>
<td>87.014</td>
<td>109</td>
<td>0.798</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>337.819</td>
<td>119</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

b. Dependent Variable: Performance Management Level
higher education. Almost less exploration had been directed in this examination region. As appeared in my writing audit, just a modest bunch of studies have inspected the impacts of ERP usage in higher education.

### Table 9: Coefficientsa

<table>
<thead>
<tr>
<th>Model</th>
<th>Un standardized Coefficients</th>
<th>Standardized Coefficients</th>
<th>T</th>
<th>Sig.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>B</td>
<td>Std. Error</td>
<td>Beta</td>
<td></td>
</tr>
<tr>
<td>(Constant)</td>
<td>3.270</td>
<td>0.660</td>
<td>4.955</td>
<td>0.000</td>
</tr>
<tr>
<td>1. Organization Structure</td>
<td>1.850</td>
<td>0.303</td>
<td>2.144</td>
<td>6.101</td>
</tr>
<tr>
<td>2. Personnel Support</td>
<td>0.228</td>
<td>0.078</td>
<td>0.297</td>
<td>2.938</td>
</tr>
<tr>
<td>3. Financial Resource Use ability</td>
<td>0.513</td>
<td>0.121</td>
<td>0.610</td>
<td>4.250</td>
</tr>
<tr>
<td>4. Availability of Human Resource</td>
<td>0.110</td>
<td>0.089</td>
<td>0.128</td>
<td>0.480</td>
</tr>
<tr>
<td>5. Role of Head of Organization</td>
<td>0.131</td>
<td>0.273</td>
<td>0.128</td>
<td>0.480</td>
</tr>
<tr>
<td>6. Employee Participation</td>
<td>0.003</td>
<td>0.115</td>
<td>0.004</td>
<td>0.027</td>
</tr>
<tr>
<td>7. Budget Provision</td>
<td>0.480</td>
<td>0.121</td>
<td>0.546</td>
<td>3.964</td>
</tr>
<tr>
<td>8. Time Period</td>
<td>0.110</td>
<td>0.092</td>
<td>0.109</td>
<td>1.192</td>
</tr>
<tr>
<td>9. Success Indication</td>
<td>1.808</td>
<td>0.317</td>
<td>2.217</td>
<td>5.700</td>
</tr>
<tr>
<td>10. Staff Development</td>
<td>0.672</td>
<td>0.134</td>
<td>0.828</td>
<td>4.996</td>
</tr>
</tbody>
</table>

a. Dependent Variable: Performance Management Level

### Table 10: Hypotheses assessment summary

<table>
<thead>
<tr>
<th>Sr. No.</th>
<th>Hypotheses</th>
<th>Testing Specification</th>
<th>Empirical Conclusion</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>H1 a The ERP has an impact on the organizational structure of higher education sector in Sindh.</td>
<td>0.000</td>
<td>Alternate HypothesisAccepted</td>
</tr>
<tr>
<td>2</td>
<td>H2 a The ERP has an impact on the personnel support on performance management of higher education sector in Sindh</td>
<td>0.004</td>
<td>Alternate HypothesisAccepted</td>
</tr>
</tbody>
</table>

I perceived that the merchant based data frameworks and outsider programming arrangements had swarmed colleges, as the need to catch, investigate, and provide details regarding understudy information had developed with an expansion across the country concentrate on enlistment administration. I perceived that it was essential to recognize how the executions of these new frameworks were changing the scene of higher education. As a specialist in higher instruction, I trust that the discoveries of my review recount a chronicle with which instructive pioneers can recognize about the unpredictable connections among the system of useful specialists, institutional pioneers, overseeing specialists, merchant experts, and programming parts that make up a venture framework execution.

**References**


