



**ORIGINAL RESEARCH PAPER**

**Management**

**ENTERPRISE RESOURCE PLANNING SYSTEM: PROTOTYPE FOR PRIVATE HIGHER EDUCATION INSTITUTIONS**

**KEY WORDS:** Technology Implementation; Higher Education Institutions; Postmodern ERP; HOOF

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**ABSTRACT**

The research investigates barriers while implementing Enterprise Resource Planning Systems (ERP) in higher education institutions (HEIs). A significant dataset of primary data is collected at private HEIs in the Bosnia&Herzegovina (B&H) region of the Canton of Sarajevo. The qualitative variable analysis is used to examine the factors of the ERP implementation. Results indicated that among nine variables each representing a barrier for implementing ERP, only the Difficulty of cross-functional coordination barrier was not an impediment. Top barriers, on the other hand, were Constrained comprehension, Lack of Organizational Leadership, Insufficient education and training of employees, Inadequate strategy and strategy not formulated in the strategy map. This study offers a Postmodern ERP Multi-Layer Implementation Model (PMLIM), to outline the factors in two dimensions, i.e. postmodern ERP and higher education institutions (HEIs); across three layers of organization, at the user, department and organization.

**INTRODUCTION**

There are numerous studies that focus on the adoption or implementation of ERP in general but have not explored the concept of postmodern ERP implementation in the HEI context. With regard to B&H, the degree of information system research is even smaller compared to the developed countries. This study aims to evaluate the effect of various elements from the organization that contribute towards the implementation. Moreover, the research on organizational players has focused on factors from three level of the organization, i.e. organization, departmental and end-user layer.

**LITERATURE REVIEW**

Efficient processes and cost reductions are among the numerous benefits of implementing an ERP system. The integration of an ERP system has established a convergence of operational and technological stakeholder dialog with fresh possibilities. Sharing data has given a way to improve communication through multidisciplinary interactions. CSF's current study has risen compared to the success factors recognized in the 1990s. CSF's evolution has evolved along with methods of application of postmodern ERP and industry evolution (Kristjansdottir et al. 2018).

Gartner (2014) defines Postmodern ERP as the reinvention of suite-centric ERP into domain specific apps, some of which may be domain complexes or lower footprint apps that are incorporated as required but evaluated by functional requirements and agility over structural rigor, single supplier policies, single codebase, accessibility of IT governance or other IT-centric environments. The assessment is based on the model HOOF (hybrid, outsource, on-premise, flip).

**REVIEW OF CURRENT SITUATION ON ERP IN HEIs IN BOSNIA&HERZEGOVINA**

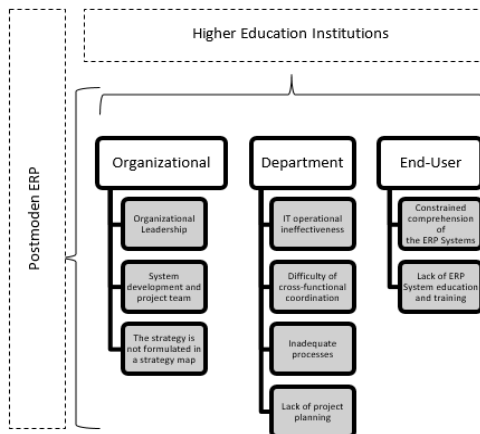
Empirical research on the impediments to effective ERP in a B&H public organization proposed the need to generalize study results to the education sector (Roztockki 2017). Studying of B&H context is unique in the geographical region of Southeast Europe due to its specific cultural elements, including the very strong interplay of power, politics, and political structures.

A conceptual framework for ERP assessment of HEIs in B&H has been forwarded focusing on the organizational level, however research on manufacturing companies in B&H recognizes various layers within an organization (Kralji et al. 2011). Ignoring the broader contextual factors can lead to the failure of ERP initiatives in B&H. Furthermore, empirical evidence for top management assistance and organizational culture is gathered only from end-users (Ilin et al. 2017). Although appropriate empirical and conceptual studies are emerging, current study on HEIs stayed underdeveloped, especially

evident in existing study on ERP in the context of B&H.

**PMLIM MODEL**

Building upon the multi-layer factors for ERP implementation as well as the conceptual model of hybrid postmodern ERP implementation scenario (Gartner 2014), this section precises and formulates nine factors representing implementation of ERP across three major layers, i.e., organisation, department and end-user and two-dimensional context, i.e. HEI sector in B&H and postmodern ERP.



**FIGURE 1 - ERP implementation factors Conceptual Model with two dimensions and three layers**

The conceptual model designed for this study is shown in Figure 1, which provides particular variables for each of the three levels in accordance to the research questions. Finally, it is suggested that the factors influencing the execution of ERP across all three layers and in two dimensions lead to the implementation of postmodern ERP in B&H HEIs.



**FIGURE 2 - Research Sample**

**METHODOLOGY**

A qualitative research method has been used to gather and study data in this research work. The theory of different organizations to abandon the ERP is collected from research articles, books and studies. Possible reasons found through their studies shape the questions of the interview. The interviews were conducted by the persons responsible for the ERP project from the year 2014 in the research sample institutions.

The results are based on the answers gathered in the interviews and other data collected from different documents and discussions held with the employees of the institution. The argumentation of the ERP implementation failures and successes in the literature are compared with the reasons why the ERP failed in the organization observed.

**RESULTS**

From the outcomes described in detail in the past chapter of this research, when considering the fact that all interviewees found that they were requested to clarify information about the obstacles, as well as extra questions that were not listed among the primary prepared question list, it can be concluded that interview answers were quite extensive in terms of addressing significant obstacles to the implementation of ERP.

After detailed analysis of research results, table (Table 1) with status on acceptance/rejection of predetermined hypothesis has been prepared.

**TABLE 1 – Hypotheses Status**

HYPOTHESIS RESULTS		
#	Hypothesis	Status
H1	H1: Constrained comprehension of ERP systems is an impediment for implementing ERP System by private universities at Sarajevo Canton area.	Accepted
H2	H2: Lack of Organizational Leadership is impediment for implementing ERP Systems by private higher education institution at Sarajevo Canton area.	Accepted
H3	H3: Insufficient education and training of employees is impediment for implementing ERP System by private faculties at Sarajevo Canton area.	Accepted
H4	H4: Inadequate strategy and strategy not formulated in the strategy map is a barrier for implementing ERP by private HEI at Sarajevo Canton area.	Accepted
H5	H5: Ineffective IT operations is an impediment for implementing ERP system by private faculties at Sarajevo Canton area.	Accepted
H6	H6: System development and project team is an impediment for implementing ERP by private HEI of at Sarajevo Canton area.	Accepted
H7	H7: Difficulty of cross-functional coordination is an impediment for implementing ERP by private faculties at Sarajevo Canton area.	Rejected
H8	H8: Inadequate processes are an impediment to implementing ERP system by private universities at Sarajevo Canton area.	Accepted
H9	H9: Communication and project plan is an impediment for implementing ERP by private universities at Sarajevo Canton area.	Accepted

Basis for execution of the study was the constructed Multi-Layer Factors Model that emerged through a comprehensive literature analysis of factors affecting the realization of ERP in higher education, in two dimensions, postmodern ERP and HEIs context, and the three layers of HEIs, organizational, department and end-user.

Empirical data for the pilot project was gathered through interviews with members of the three levels of a sample private HEI. The three levels are not directly connected as they are affected by separate variables.

Based on the qualitative research assessment, the empirical results showed that for studying of implementation at the organizational level all three suggested factors are barriers on the way to the postmodern ERP: Organizational Leadership, System development and project team, and The strategy is not formulated in a strategy map.

The variables for studying of implementation of ERP at departmental level resulted with three of four suggested factors, IT operational ineffectiveness, Inadequate processes, Lack of project planning, are barriers for postmodern ERP. Only the factor Difficulty of cross-functional coordination was not an obstacle as the study results from interview and case study of the sample university confirmed.

Finally, the variables for studying of implementation at the end-user level resulted also as being obstacles for postmodern ERP at HEIs. These barriers are Constrained comprehension of the ERP Systems and Lack of ERP System education and training.

Interviewees specified that the factors regarding System development and project team, IT operational ineffectiveness, Lack of project planning, Lack of ERP System education and training are avoidable barriers for implementing ERP.

During the interview the candidates highlighted that the factor Organizational leadership, mainly the "top management support" was of huge importance to prevent them. This means that if "top management support" were to be an obstacle to implement ERP, it would contribute to many other issues.

Through the case study and deep in the analysis of the sample HEI, it is clear that the factor Constrained comprehension caused negative cascade effect for the ERP initiative. In particular, the Constrained comprehension of top managers was the main reason why the ERP initiative ended as an additional reporting and monitoring system at the HEI.

It is therefore not surprising that having "organization leadership" as an impediment is the most hazardous condition for the organization on the road to implementing the ERP, and it is not surprising that "top management" stands at the top position in the barrier rankings studied by many scientists.

**CONCLUSION AND FUTURE RESEARCH**

The aim of this study was to study the contributing factors to the implementation of the postmodern ERP in HEIs. Data from the HEIs in B&H throughout the organizational, department and end-user levels have been gathered for this purpose. In order to assess the factors affecting the implementation of ERP in B&H higher education sector, a multi-level model was proposed.

Eight out of nine study hypotheses have been demonstrated to be important and accepted in the results analysis. A total of four private HEIs have been consulted for data collection.

Critical data evaluation methods were employed to extract meaningful outputs and qualitative analysis was lastly used to make the model align with the organizational, departmental and end-user level.

The concept model may, in future, be employed in other countries in higher education sector. Similarly, the same applies worldwide to the business sector as well.

Furthermore, for the B&H other administrative units, the study may be replicated and reused. In addition, in examining the implementation of ERP, research methods may be further expanded.

Moreover, a quantitative study can help to propose changes to the making of decisions to improve the implementation of ERP. Finally, for cross-sector and intercultural comparisons, the model presented within the study may be replicated or adapted.

### RECOMMENDATIONS

As the result of this studies shows organizational leadership and leaders' comprehension of ERP as a key factor on the road to the postmodern ERP, the leaders will have to overcome the challenge of balancing the information complexity and process interdependence against the value that needs to be achieved. It is highly recommended that awareness sessions are organized and workshops are held for the leaders of higher education institutions on broader understanding of ERP, especially the postmodern ERP concept. This is probably the baseline and potentially key to efficient postmodern ERP execution.

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