

The Alignment of System and Organizational Design in ERP Implementation

A Review of Theoretical Perspectives

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ABSTRACT

An ERP system streamlines the business processes of different departments of an organization. The ERP system has an organizational structure embedded in it which is designed by the developers of the ERP package. These developers tend to incorporate standardized organizational processes but in reality, these embedded structures are often misaligned with the organizational structure where these ERP packages are implemented. The primary aim of this paper is to analyze a misalignment between the structure of an organization embedded in an ERP package and the structure of an organization where it is implemented. The paper argues that both package customization and organizational changes are required to deal with this misalignment. The paper identifies two views: static and dynamic to classify and review various information system (IS) theories in this context. The static view helps the managers and researchers to form an ideal path for the ERP implementation process and helps in dealing with the misalignment between the organization structure and the structure embedded in the ERP package during initial stages of ERP implementation. The static view in the context of ERP implementation is discussed using three IS theories: Resource Based View, Structural Contingency Theory and Technology Acceptance Model. A major drawback of this perspective is that it does not provide an insight into the dynamics of implementation processes. Since ERP implementation is an enterprise level project, it involves interaction between the different elements which produce some unexpected events. The dynamic view of the ERP implementation deals with the situation arising due to the unexpected complementary effect when various forces act together. In this view, three IS theories: Actor Network Theory, Emergent View and Socio Technical Theory are discussed. This paper highlights some of the key issues using these IS theories to help future research in this area.

Introduction

It is suggested by the proponents of an Enterprise Resource Planning (ERP) system that it enables integrating major business processes of an organization to achieve high quality of work, improve profitability and performance. The main feature of the ERP system is that it streamlines the business processes of different departments of an organization. "The other motivations behind adoption of ERP system include: cost reduction, improved efficiency, reduced product lifecycle time, improved customer satisfaction and enabling e-commerce" (Nicolaou 2004: 79). The ERP systems make data more available to the employees and thus improve their decision making ability (Hitt et al. 2002). But often, organizations

are apprehensive to replace their existing isolated systems with the ERP systems (Brown and Vessey 2003). They find that the huge investment of time and capital in the ERP systems is a high risk activity. "90% of SAP R/3 ERP projects run late and with the study of 7400 IT projects, only 24% completed in time and in budget" (Aloini et al. 2007: 548). Soh et al. (2000) analyze the case studies of seven hospitals in Singapore and suggest that the major failures in ERP implementation occur due to 'misfits' or the gaps between the functionality offered by the ERP package and that required by the organization implementing the ERP solution.

This paper explores the issue of the misalignment between the structure of the package and the organization which is a major cause for the ERP failures. The first section of the paper discusses why both organisational changes and package customization are

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required to fit the ERP system into the organization. The paper then explores the two views: static and dynamic using various IS theories in context of the ERP implementation to find different perspectives to achieve this adaptation.

ERP Implementation and Organizational Fit

An ERP package has an organizational structure embedded in it which is designed by the developers of the ERP package. These developers tend to incorporate standardized organizational process but in reality, these embedded structures are often misaligned with the organizational structure where these ERP packages are implemented (Soh and Sia 2004). It raises a key issue whether the organization should change to adapt to the embedded structure in the ERP package or the ERP package should be customized so that it can become compatible with the organization structure. The “organizations have to adapt to the systems than other way around” (Benders et al. 2006:197). The organizational structure embedded in the ERP package is considered to be the best practices and the organizations should adopt this structure. The three mechanisms for this institutional isomorphism are coercive forces, mimetic forces and normative pressure. The concept of “technical isomorphism is introduced which encourages actors (developers, consultants and users) to centralistic philosophy and standard incorporated in the ERP” (Benders et al. 2006: 201).

But changing only the organizational structure to adapt to standardized business process embedded in an ERP package is not a solution. There are many companies whose business practices are their differentiating factor from their competitors. Nike did not change its business process during the implementation stage as their different strategy and business process was its identity (Soh and Sia 2004). Also, the mechanisms of coercive, mimetic and normative pressures are region specific. The structure of the institutions in different regions are influenced by the government agencies, professional practises, religion etc. and in these cases the ERP package has to be modified according to the organizational structure of the company. Therefore, it can be inferred that both organizational change and package customization are necessary for the successful implementation of an ERP system. But a key concern in this regard is the extent to which the ERP package should be customized.

This question can be answered by taking two elements into consideration: imposed structures and voluntary acquired structures (Soh and Sia 2004). The imposed structures are influenced by the external factors like government agencies, professional

institutions, norms etc. and the voluntary structures are influenced by the organization experiences and practices. Both voluntary and imposed structures are present in the organization embedded in the ERP and the organization where it is implemented. These structures are often misaligned and there is a need to make adaptation among the two. The changes in the ERP package will increase the cost of implementation and making changes in voluntary structures in the organization can affect their identity. The author suggests that it is important for the organizations to identify the imposed structure within their organizational context which cannot be compromised and compare it with the imposed structures in the ERP package. If there is significant misalignment between the two, then there is a risk associated with the project. The author also suggests that the voluntary misalignments can be managed by a proper implementation strategy and change management steps like user training, project communication etc.

Therefore, from the above discussion it can be concluded that it is necessary to modify both organization and the system design so that they adapt to each other. Following in the paper, the two views - static and dynamic - are discussed using IS theories to explore the various elements affecting the fit of an ERP package into an organization.

Static View

This view provides a static picture of the complex forces and elements affecting the ERP implementation process. This view can help the managers to plan an initial strategy as, after evaluating these forces, they can build an ideal roadmap for the implementation process. Now, three important IS theories, Resource Based View, Structural Contingency Theory and Technology Acceptance Model, are discussed in the ERP implementation context which incorporates the static view.

Structural Contingency Theory

The structural contingency theory helps to study the relationship between the structure of a technology and the organization. Morton and Hu (2008) use the theoretical framework of structural contingency theory to examine the fit between structure of an organization and the structure embedded inside an ERP package. The authors perceive task interdependence and task uncertainty as the important contingencies in ERP implementation environment. The authors discuss the effect of these contingencies on the formal parameters of contingency theory which are structural difference, formalization and decentralization. The task interdependence contingency is inversely proportional to the structural difference, formalization and decentralization. The task uncer-

tainty is inversely proportional to formalization. But for a greater probability of success of ERP implementation, the authors propose high task interdependence and low task uncertainty. This causes a state of dilemma (Figure 1) whether to have more formalization or not. But the authors argue that the task uncertainty is a stronger contingency than task interdependence and, thus, high formalization with low centralization and low structural difference will result in low resistance by the users towards the change.

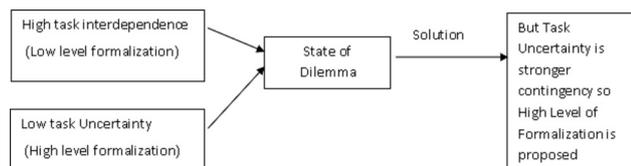


Figure 1: State of Dilemma with High Task Independence and Low Task Uncertainty

This theory can help the managers and researchers to assess the organizational structure and the amount of change required in the ERP package to fit into the organization. This study can also help the top management in selecting an ERP vendor as they can compare their own organizational structure with the structure of the organization embedded in the ERP packages of different vendors and identify a best match.

Resource Based View

The Resource Based View (RBV) gives a static picture of the resources which are possessed by an organization and how they can be utilized to build firm's capabilities. Karimi et al. (2007) explore RBV and argue that the complementary effects of the resources of an organization play a key role in determining the ERP implementation success. The authors give reference to a study by Makadok that an organization gains competitive advantage by "selecting and deploying resources to build capabilities and resource picking and capability building are complementary activities" (Karimi et al. 2007: 223). In context of ERP implementation, the authors empirically tested and identified three critical IS resources that play a key role in the ERP implementation. These are knowledge resources, relationship resources and IT infrastructure resources. The authors argue that these IS resources have greater combined effects as compared to in isolation and the ERP capabilities are directly related to the business process outcome of an organization. This theory provides a basis for managers and researchers to evaluate the key resources of the organization. Managers can play a significant role in identifying the synergies between resources and selecting a best set of resources to build ERP capabilities.

Technology Acceptance Model

A key motive of an organization for the implementation of an ERP package is to improve the productivity of employees. Therefore, there is a need to understand the impact of ERP implementation on the users. Gyampah and Salam (2004) propose a model which is an extension to the Technology Acceptance Model (TAM) and empirically examine it in an ERP implementation environment. The existing TAM framework takes Perceived Usefulness (PU) and Perceive Ease of Use (PEU) as external factors to examine the behavioural intention of the users about the change. Gyampah and Salam (2004) model, in context of ERP, takes three more external factors into account. These are training of employees, project communication and shared belief in the benefit of the system. The authors suggest that the shared belief in the benefit of the system can help the managers to analyze the advantages of the ERP to them and to the organization as a whole. The two other external factors, training and project communication help in developing this shared belief and also have a positive impact on PU and PEU. This theory allows managers to build an initial strategy to implement the organizational change during the ERP implementation. It has taken two important factors of project communication and training into the account. According to Akkerman and Helden (2002), the interdepartmental communication and cooperation also play a key role during a project crisis.

Static View and ERP Implementation

The static view plays an important role in forming an ideal path for the ERP implementation process and helps in dealing with the misalignment between the organization structure and the structure embedded in the ERP package during the initial stages of ERP implementation. The static view can help in the selection of ERP package and the ERP vendor such that the misalignment between the organization structure and the structure embedded in ERP package is minimal. The static view can also help in evaluating the existing resources of the organization as well as the design of training modules for the employees so that necessary organizational changes can be analysed in order to adapt the organization structure to the structure of organization embedded in the ERP package. The static view though fails to incorporate an important factor of frequent changes due to the dynamic interactions of different elements during an ERP implementation where managers have to make decisions in situations which were not anticipated in the initial strategy. These situations arise due to the interaction of various forces that participate during the ERP implementation process. Thus, to handle these situations the paper explores the dynamic view.

Dynamic View

The dynamic view of an ERP implementation deals with situations that arise due to unexpected complementary effects when various forces act together. Being dynamic in nature, this view helps managers to deal with the practical problems they encounter during the implementation of a technology. Further, the paper discusses three important IS theories: Actor network Theory, Emergent View Theory and Socio Technical Theory in an ERP implementation context which incorporates the dynamic view.

Actor Network Theory

Actor Network Theory (ANT) focuses on the alliances formed by different networks of actors. Elbanna (2006) uses an ANT framework and Improvisation to analyze the dynamic aspects of ERP implementation. Elbanna (2006) argues that the Improvisation approach can be applied to a rigid ERP technology and it is not only meant for low risk and low cost projects. The author uses a case study of the implementation of SAP in Drinco to explain this point. During the implementation of SAP in Drinco, there were many crucial stages like excluding EUB members and changing SAP 'plain vanilla' implementation strategy to adapt with Drinco's existing system. The Improvisation approach used by the top management played a key role in re-aligning the different actors in different networks of an organization to accomplish the implementation goal. Thus, it can be inferred that ANT provides an excellent framework for the managers and researchers to explore the dynamic aspects of ERP implementation. The case study of Drinco discussed in Elbanna (2006) gives an example of a typical situation of changing requirements occurring in almost every ERP implementation. The case teaches that, often, situation demands negotiation with the previous planned strategies and the actions performed at one stage affect the future implementation strategy.

Ensemble View

The ensemble view focuses on the effect of interaction of technology with a wide variety of communities of people. Xue et al. (2005) analyse the ERP implementation through a lens of ensemble view and examine that certain contextual issues arise due to the dynamic interaction of people and the ERP technology. In the contextual issues, cultural and environment are two major factors which play a crucial role in determining success or failure of ERP implementation. The study analyzes five case studies of ERP failure in China on grounds of cultural, environmental and technical issues. The research focuses on socio-cultural perspective and argues that "ERP has embedded norms, values and cultures

of developers who built the system with the local norms, values and culture of the location where the ERP will be implemented" (Xue et al. 2005: 285). The study provides an opportunity for different global ERP vendors to explore the cultural issue that causes many ERP implementation failures especially in China. This is because the majority of the ERP vendors have a western organizational culture embedded in their ERP package which fails to adapt with the Chinese or Asian organizational culture. This theory provides a useful tool for both managers and researchers to study the organizational fit with the structure embedded in the ERP system in terms of contextual issues of culture and environment.

Socio Technical Theory

The socio technical theory takes both social and technical factors into consideration. Lyytinen et al. (2009) examine the dynamic nature of socio technical theory using Levitt's socio technical systems comprising people, technology, task and structure as its core elements. The authors then incorporate this socio technical system in their proposed PSIC model and argue that "ERP implementation as a series of socio-technical change" (Lyytinen et al., 2009: 292). In context of ERP, the authors suggest that when a stable socio technical system is encountered by some significant events, a state of disequilibrium is created. Due to this, some gaps are created between the elements of the socio technical system and, thus, some measures have to be taken to fill those gaps and transform the system back into the stable state. The study provides an insight into the consequences of a stable system when it is encountered by any anticipated or unanticipated events that can disturb its state of equilibrium.

Dynamic View and ERP Implementation

In summary, a dynamic view is closer to reality than a static view. An important advantage of this view is that it helps the managers to deal with unexpected situations that are very frequent during implementation of large projects like ERP. During the implementation process, both package customization and organizational changes take place so that the misalignment between the two can be minimized. The dynamic view can help in analyzing the social environment like culture, actors participating during ERP implementation or the socio-technical changes that play an important role during the implementation phase of ERP. The dynamic view helps to tackle the issues which arise due to the interaction of various social elements.

Conclusion

This paper analyzes different IS research in the field of ERP implementation in organizations. The paper identified that both package customization and organizational changes are required to fit an ERP system into the organization. The two views - static and dynamic - are recognized to analyze the misalignment between the package and the organization using various information systems theories. The static view is useful for the managers for planning an initial implementation strategy which can serve as an ideal roadmap but fails to incorporate unexpected changes that occur due to the interaction of various elements during the ERP implementation. The dynamic view helps to deal with this situation and proves to be more useful especially during the implementation phase of ERP systems. However, this study has some limitations as it only focuses on aligning packages and organizations but does not incorporate environmental factors like politics, power etc. and how to handle risks associated with the ERP implementation.

There have been many past researches done in this field. However, there are several areas which are still to be exploited. The first area is that the ERP may be implemented in an organization which has different subsidiaries having different organizational structures made to fit an ERP package. Another area is that the majority of empirical studies focuses on manufacturing firms. By contrast, ERP systems are implemented in diverse industries including government, retail, hospitals etc. to an increasing degree. The issues with implementing ERP systems in these sectors can be different from those in manufacturing firms. Therefore, further research in these areas is recommended so that future ERP implementations can benefit.

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