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Updation of ERP Systems in India

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Abstract - In recent years there has been an increase in using Enterprise Resource Planning (ERP) systems in large companies and government corporations mainly in developed countries. However, due to recent economic growth, developing countries such as India are increasingly becoming major targets of ERP vendors. There is an urgent need for understanding ERP implementation issues in developing countries, as ERP systems are still in their early stages in these countries. This research investigates the organisational and national context within which ERP is adopted and used in India, and how the context and ERP influence each other. In general, this research is based on the need to study organisations in their societal contexts and information systems in their organisational settings. Case study findings suggest that the company sector plays an important role in ERP implementations in several key dimensions. ERP systems with in-built business practices express the tendency toward standardisation. In addition, the study investigates the challenges faced by organisations implementing ERP systems in India and factors influencing ERP upgrade decisions. Findings of this research suggest that ERP implementation and upgrade is influenced by, but not necessarily bound by, existing contextual factors -- national and organisational. "A model is an attempt to represent visually or verbally the most important elements in a real world situation as a basis for achieving greater understanding or conducting experiments to test the part or the whole". This paper presents a model recommended in this study. In line with the above definition, this paper represents ERP systems implementation and upgrade phenomena in a real world situation as a basis for achieving greater understanding.
Key Words : ERP Systems, Implementation, Updation, Model, India.

1. WHAT IS ERP?

An ERP system is a packaged business software system that allows a company to [3]:

- automate and integrate the majority of its business processes,
- share common data and practices across the entire enterprise, and
- produce and access information in a real-time environment

An ERP system as "a packaged software product that can be bought `off-the-shelf' by an organisation in order to integrate and share its information and related business processes within and across functional areas"[2][3]. This definition emphasizes the integration, laid by ERP, between various organisational networks, in particular functional divisions within organisations like finance, marketing, procurement, inventory, sales and distribution, human resources planning and payroll while downplaying the implicit side of the ERP systems, for example business processes embedded in the ERP.

2. UPGRADATION MODEL FOR ERP SYSTEMS

2.1 Upgrade and Improvement

This category refers to activities undertaken by organisation to optimise ERP systems and the decision leading to ERP system upgrade.

Two properties were identified namely: upgrade cycle and upgrade decisions.

2.1.1 Upgrade cycle

This refers to the length of period between ERP system upgrade in an organisation. The period can be short (less than 2 years) or long (more than 3 years).

The research findings reveal that long upgrade cycles are likely to add additional risks. Upgrades tend to be more difficult, more complex, and have a greater impact on the user environment when long period of time has elapsed. It is even more troubling when the ERP vendor stops supporting the version in use because it is out of date.
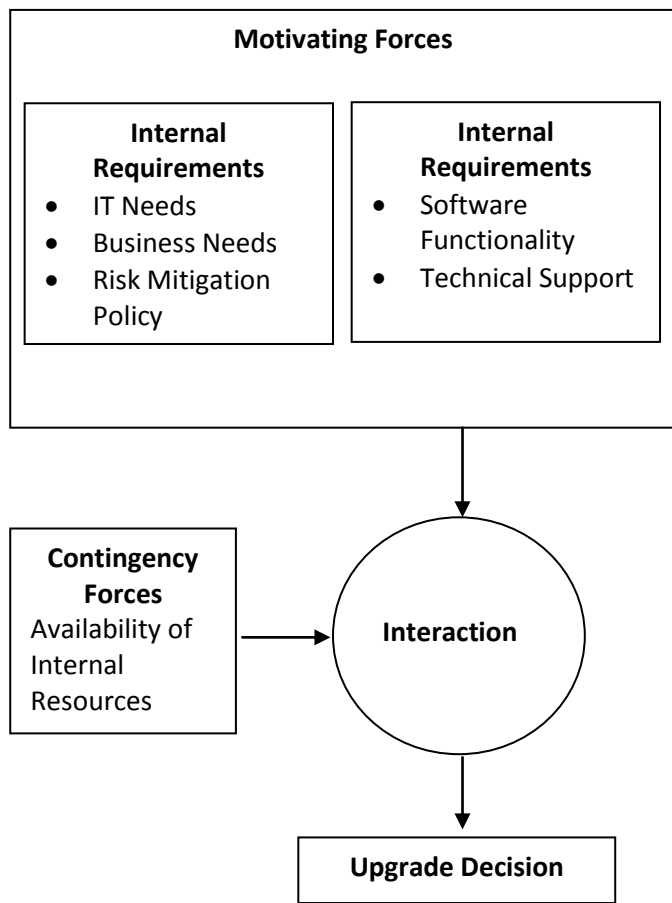
2.1.2 Upgrade decisions

This research identified four main influences on the decision to upgrade ERP systems. These are business and IT needs, risk mitigation, external dependence on vendor, and internal resource availability. These factors influence upgrade cycle discussed above. Business needs is a major influence on the upgrade of ERP systems.

Corporate and IT policies to mitigate software risks also emerged from empirical data as a factor influencing the decision to upgrade ERP systems. Several of the restrictions on software upgrades were codified in some of the case study organisations policies designed to mitigate the risks of using ERP software. Internal resource availability formed an important factor influencing ERP system upgrade.

Based on the analysis of the cases and comparisons between them, an empirical Upgradation Model was developed as following Figure. The decision to upgrade is shown to be influenced by factors classified into two main categories: motivating and contingency forces.

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Figure 1 : Model of the upgrade decision process

The upgrade decision reflects the interaction between those two factors. Our explanation of the model begins with motivating forces, which can originate from both internal requirements and from the organisation's dependence on the software vendor. These motivating forces would influence the frequency of ERP system upgrade also described earlier on as upgrade cycle.

2.2   Upgrade Decisions: Motivating forces

Motivating forces are considered to be any event, or requirement that triggers the interest to adopt a newer version of ERP system. From the study, two types of motivating forces were found to influence both upgrade decisions: internal requirements and external dependence. Three specific internal requirements were identified as influences on the decision to upgrade business needs; IT needs, and risk mitigation.

2.2.1 Business and IT needs

One of the most important factors identified in this study to be influencing ERP upgrade is business needs. It is understandable that demands from business users can motivate upgrade decisions because information technology application serves business users.

Given the function of ERP system to support business objectives, it comes as no surprise that business needs are a primary influence on upgrade decisions. However, our

findings help to clarify that not all business needs are equally influential. All areas of ERP system upgrade decisions appear to be based on judgments about the importance of those needs. In this respect, our results are consistent with the software maintenance literature's conclusion that users' business needs, as indicated by their demands for enhancements and extensions, is one of the most important reasons to perform maintenance [4].

2.2.1 Risk Mitigation

In addition to business and IT needs, our model identifies risk mitigation as an important motivation force. In both cases, upgrade decisions were subject to policies designed to mitigate the risks of using ERP systems. One of our case companies had a strict policy that required all its software to stay on vendor support all times. Although the policy's influence remained dormant when software was not close to the end of the vendor's sunset date, it became a powerful influence when software approached the sunset date without being upgraded. Another company policy was `no beta version'. The policy prevented upgrade to untested or unstable versions of ERP software. These policies mitigated the risks inherent in the packaged software.

Risk mitigation policies affected SAP, which approached its sunset date while other SAP projects were being pursued. Because further delays would have placed SAP into the unacceptable status of nonsupport, vendor dependence became a salient motivating force for the SAP upgrade. Although covered by the same policies, one of our case company upgrade was conducted well before the sunset date for the previous version and was not affected by the policy. However, the corporate policy would have applied to the company also if it were getting close to the sunset date. Thus, risk mitigation becomes a stronger motivating force over upgrade decisions as the risks associated with ERP systems increase.

2.3   External dependence on software vendor

When organisations adopt an ERP system, they become dependent on the software vendor to provide them with software functionality and technical support. In essence, they become subject to `locked in' relationships in which the external producers of software determine what their customers must do. In the case of large producers such as SAP, Baan, Oracle Financials, and JD Edwards, this dependence becomes a primary influence over upgrade decisions for packaged software. Such vendors may use pricing and support strategies to exert pressure on their customers to upgrade earlier than they wish [5], while the vendors reduce their own responsibility for supporting multiple versions of ERP software [6]. In brief, consumers of ERP system who depend on vendors for technical support and functionality do not have much choice but to comply. Thus, organisations in the environment surrounding a firm using packaged software exert influence over its software practices [7].

The creation of internal risk mitigation policies by customers reflects the strong dependence on vendors, who have the power to remove support for earlier versions and thus force customers into upgrades even when business needs are not

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judged to be a priority. Although new versions offer greater functionality, which might meet business needs, the requirement to upgrade or lose vendor support becomes a preemptive criterion for organisations unwilling to accept the risks of unsupported ERP system. Thus, vendors can prematurely end the life of a current ERP system version by setting a sunset date even though customers may still deem current functionality to be adequate.

In addition, to their dependence on vendors to provide support for the ERP system, organisations also rely on vendors for software functionality. In our cases, the only way for two of case organizations to receive software features that they wanted was to adopt vendor's upgrade. Despite large differences in the functionality of the respective ERP systems, we did not observe much in influences due to the ERP system's material characteristics. The software was critical to the organisation and was supplied by a powerful external vendor. Thus, because the consumption of ERP system is separated from its production by organisation and national boundaries, software characteristics may become practically irrelevant to the decision to upgrade. Only in cases where the ERP system is not critical could an implementing organisation decide to abandon an ERP system rather than upgrade it. Alternatively, an organisation could find another source, such as different vendor or an open source application, for satisfying its software needs. However, neither of these situations was evident in our study. Thus, the exact nature of software functionality appears to play no special role in the decision to upgrade. Although different types of software functionality were needed, any functionality that is critical to the organisation strengthens the dependence on vendors that supply those features. This dependence clearly influences the decision to upgrade unless the organisation decides to develop new feature in-house.

These findings are consistent with the theory of resource dependence [8]. According to the theory, an organisation's dependence on any important resource allows external organisations providing that resource to gain control over the decision processes. According to resource dependence theory, "It is the fact of the organisation's dependence on the environment that makes the external constraint and control of organisational behavior both possible and almost inevitable". The extent to which the organisation complies with external demands depends on the importance of resources, an external vendor's discretion over resource allocation and use, and the availability of alternative resources. In the case of the ERP systems studied, both systems were extremely important to case studies. Thus, the prospect of losing support and technical assistance was inconceivable. As a result, dependence on vendor became one of the most important motivating forces in an upgrade decision, reflecting the customer's dependence on external resources.

Vendor dependence is a long-term proposition. Once an ERP system is adopted, future upgrades become almost inevitable unless the organisation decides either to abandon its current version or to continue using the system without pursuing an upgrade. Prior research suggests that adopters of ERP systems view migrations to new versions as an unavoidable part of ERP systems life-cycle [9]. The choice is no longer

between upgrading and not upgrading, but rather deciding when the upgrade should occur. For this and other reasons, vendor relationships have assumed greater importance in research on ERP systems [10].

2.4 Contingency: Internal resource availability

The availability of internal resources is an important contingency affecting upgrade decisions. "Motivations may determine behaviors, for example, by only if the relevant resources are adequate" [11]. Clearly, every organisation faces resource constraints, so resources tend to be allocated where they are needed most. Although the availability of the resources alone is unlikely to trigger a decision to upgrade, lack of resources may mean that upgrade initiatives are postponed. The resource contingency played a definite role in the postponement of SAP upgrade until after the sunset date. Also, despite the attractiveness of SAP 4.5, one of case organization was not able to justify the expenditure of resources until other business needs increased the motivation. Thus, resource availability is contingent on the strength of the motivating forces. Although lack of resources can defer upgrade decisions where there is no immediate threat to business operations, resources can often be allocated when business needs to upgrade become more urgent.

2.5 Interaction among motivating forces and resource availability

From data analyses presented, it is apparent that upgrade decisions by different organisations may be different. Several factors were identified as having influence on the decision to upgrade ERP system. This pattern bears resemblance to other dynamic organisational decision processes. Stimuli for organisational decisions have different amplitudes, and a decision is evoked when the cumulative amplitude of stimuli reaches an action threshold. Decisions, therefore, are not determined by any single motivation and may vary from case to case. Even within a decision type, such as software upgrade decisions, forces may be unequally influential, making the general prediction of decisions difficult. The benefit of case studies of decision processes is a greater explanation of the interaction among motivating forces and resource contingencies.

In the two cases of upgrades described in this study, amplitudes and action thresholds were not explicitly assessed as part of the decision process. The threshold level was a subjective reference point made by managers, and no formal cost/benefit analyses were conducted at organisations. Nonetheless, it can be inferred from managers' comments that the upgrade decisions were affected by multiple influences, as shown in the model.

Many organisational decisions, including ERP system upgrades, involve commitment of resources that are in scarce supply. The condition of resource scarcity implied the need to prioritise projects in order of importance. Thus, resources are provided contingent upon other motivating factors and external dependencies.

In the study, motivating influences and internal resources interacted to influence decisions depending on their level of intensity and the availability of internal resources. In the

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normal situation where resources are scarce, the lack of resources dominates the interaction, particularly if the need to upgrade reaches the threshold so that it can no longer be deferred; it dominates the decision to make resources available. When the decision was made to upgrade SAP, the software was in danger of losing support and had to be upgraded immediately. One of the case organization was only able to justify the division wide upgrade to SAP when the need arose integrate the regionally distributed power generation plant using SCADA which was not compatible with SAP version 2.1H. The combination of stimuli provided the needed justification to conduct both upgrades.

While the research findings pertain to decision making under resource scarcity, it is likely that under conditions of sufficient resources, any legitimate motivation would evoke upgrade decision. This claim is supported by anecdotal evidence about previous upgrade decisions not included in our study. According to the Manager of a case company, when a department had fewer competing projects, upgrades were performed according to the director's preference to upgrade to a new version of ERP every fixed time cycle.

3. CONCLUSION

This paper presented the empirical model for Updation of ERP Systems. This model was derived from our empirical data. The model depicts the contextual factors which impact on the implementation and/or upgrade of ERP in organisation. From our data analysis, it is clear that the relative strength of the influences on upgrade decisions is dependent on the internal requirements of the organisation and the external influence of vendors. Thus, the model provides an empirically grounded basis for understanding contextual factors and their influence on ERP implementation decision. Additionally, this shows ERP implementation outcomes and understanding of how and why ERP systems upgrade decisions are made.

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