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Do Cultural Differences in Successful ERP Implementations Exist?

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***Abstract*—**Using a methodology grounded in business process change theory, we investigate the critical success factors that affect ERP implementation success in United States and India. Specifically, we examine the ERP implementation at two case study companies, one in each country. Our findings suggest that certain factors that affect the success of ERP implementations are not culturally bound, whereas some critical success factors depend on the national culture of the country in which the system is being implemented. We believe that the understanding of these critical success factors will deepen the understanding of ERP implementations and will help avoid implementation mistakes, thereby increasing the rate of success in culturally different contexts. Implications of the findings and future research directions for both academicians and practitioners are also discussed.

***Keywords*—**Critical Success Factors, Culture, Enterprise Resource Planning Systems, India, United States

I. INTRODUCTION

CRITICAL Success Factors (CSF) methodology has been applied to many aspects of information systems research, including Enterprise Resources Planning (ERP) system implementations [1], [2]. By focusing on these factors, companies can avoid common pitfalls, increase the success rate of their ERP implementations and attain organizational goals [3], [4].

There is a growing body of literature on CSF for ERP implementations. Among these, [5] conducted an extensive review of the existing literature and created a unified critical success factors model. Reference [6] developed a classification of ERP critical success factors to demonstrate the linkages between ERP critical success factors, ERP success and ERP benefits. Reference [7] conducted a survey to identify and test the relative importance of the key players and activities across the ERP project life cycle that can affect the success of these projects. Reference [8] identified six common factors that are indicative of successful or non-successful SAP implementations based on content analysis of secondary data pertaining to ERP implementations. Reference [9] focused on critical factors causing failure in ERP implementations and then provided suggestions as to what to focus on to increase the rate of success in ERP implementations. Reference [10] investigated how companies upgraded their ERP systems successfully and came up with a list of recommendations for companies that are in the process of launching an upgrade to their initial ERP implementation. Reference [11] developed a dynamic model of enterprise system innovation to better understand the relationships between CSFs and to encourage exploration of more appropriate implementation strategies. Reference [12] focused on the impact of external contextual factors on ERP success and found out that industry and national economic climates have significant relationships with ERP success. Reference [13] identified the critical success factors for ERP implementations from the relevant literature, categorized them into a sound theoretical framework and linked them to ERP success outcomes. The authors also provided empirical evidence from two U.S. companies that have recently implemented ERP systems.

In this study, using a case study methodology grounded in business process change theory, we investigate if cultural differences exist in successful ERP implementations. Specifically, we examine successful ERP implementations at two case study companies, one in the United States and the other in India. We believe that the understanding of the similarities and differences will enable managers to be more proactive and better prepared for their ERP implementation projects, thereby increasing the rate of success in culturally different contexts.

According to [14], there are four dimensions that can be used to identify cultural differences between countries. The Indian culture is quite different from the United States in terms of these four dimensions of national culture as discussed below: (1) Power distance – India is more hierarchical with high power distance and more centralized authority than the U.S. (2) Individualism and collectivism - U.S. is a more individualistic society, while India is more of a collectivist society. (3) Uncertainty avoidance – India is moderately high in uncertainty avoidance and thus, Indians avoid ambiguous situation and unfamiliar risks. U.S., on the other hand, is low on uncertainty avoidance and can handle ambiguous situations and risks better, (4) Masculinity and feminity – In a high masculine society of U.S., managers are more aggressive. In these societies, money and rationality dominate. The dimension of uncertainty avoidance is highly relevant to information system implementations. Therefore, there is a

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need to examine if differences in critical success factors exist when ERP systems are implemented in culturally different contexts or if there are universal sets of factors that have to be satisfied regardless of the cultural setting? In this paper, we attempt to answer this question by examining a successful ERP implementation in the U.S. and another one in India.

II. Theoretical Framework

Since an ERP system implementation has come to involve changing the business processes of companies that implement such software, we felt that business process change (BPC) theory may prove useful in explaining the outcomes of our case studies. According to [15], when examining BPC outcomes, consideration should be given to (a) the environmental conditions for change and (b) the ability of the organization to manage change in these conditions. The authors proposed a framework that considers both the aspects of BPC management. According to their framework, any significant business process change requires a strategic initiative where top managers act as leaders in defining and communicating a vision of change. The organizational environment, with a ready culture, a willingness to share knowledge, balanced network relationships, and a capacity to learn, should facilitate the implementation of prescribed process management and change management practices.

Since the eight constructs identified by the framework incorporate all the critical success factors suggested in the ERP literature (See Table 1)**,** we decided to use the framework in our case studies to determine if they facilitate or inhibit the success of ERP projects (See Figure 1).

TABLE I
Frequently Cited CSF for ERP Implementations

Frequently Cited CSF	References
Top Management Support	[1], [5], [6], [7], [22], [23], [24], [25], [26], [27], [28], [29]
Project Management	[1], [5], [6], [7], [22], [24], [25], [27], [28], [29]
Change Management, Organizational Change, Commitment to Change	[1], [5], [7], [25], [26], [27], [28], [29]
Use of External Consultants	[5], [7], [26], [28]
Business Process Reengineering, Process Change, Process Management, Process Innovation, Clear Understanding of Business Processes	1], [5], [6], [7], [23], [24], [25], [26], [27], [28]
Use of Performance Measures, Monitoring and Feedback, Testing	1], [6], [24], [25], [27], [28], [29]

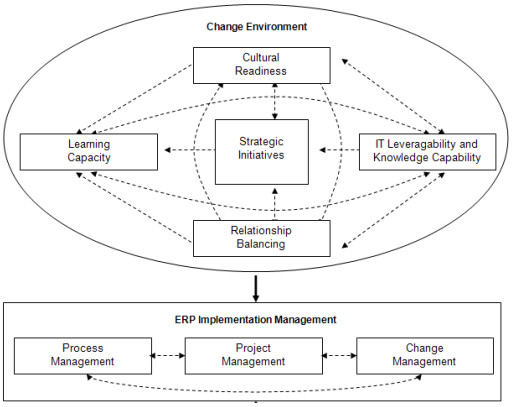

Fig. 1 Theoretical Framework

III. Methodology

Given the purpose of the study, case study approach was found appropriate. Case study methodology is a well-accepted approach to study the complex phenomena of technology implementations in organizational settings [16], [17]. This research strategy is particularly suited for studying contemporary issues in real-world settings when 'how' or 'why' questions are being posed and for situations where the experiences of actors and context of the action are important.
Data was collected primarily through interviews and archival sources. Interviews were conducted with executives who were familiar with the ERP implementation progress. In the case of the Indian company, the top management also provided us with news prints and Internet articles that specifically discussed their company's ERP implementation.

IV. Research Results and Findings

A. Description of the Cases

U.S. Company (Case Company A): Case Company A is a large automobile supplier that produces ready-to-install modules, components and body parts for all global car manufacturers. The company has more than 30 manufacturing facilities in 15 different countries and employs more than 10,000 high-skilled employees. The company is driven to be the innovative supplier of choice and is committed to leading edge technology in all product lines and business processes.

Prior to the implementation of ERP, the sales, marketing and operations functions of the company ran on about 30 different legacy systems. The mix of aging legacy systems that led to high cost support and lack of data visibility was the driving force behind the implementation of the ERP system. The top management of the company was determined to implement a total enterprise system that would not only provide a common IT platform but also would improve operational performances (improve customer response time, reduce work-in-process inventory, improve inventory turnover, increase data visibility, reduce operating costs, among others) and promote greater transparency to its customers globally.

The top management concluded that they would need a systematic, structured way of approaching the ERP implementation problem and formed an eight-member evaluation task force. The task force comprised of senior individuals from each of the following functional areas: accounting, purchasing, materials, production control, manufacturing, engineering, customer service, and information systems. The task force was given the responsibility of not only selecting the right ERP system but also ensuring smoothing implementation.

Indian Company (Case Company B): Company B is Asia's first and India's largest integrated private sector steel company. The company has a state-of-the-art 3.5 million ton steel plant and has the flexibility and capability of meeting the most rigorous demands from its customers worldwide. The Company adopted ERP technology to maintain their lead in the competitive steel industry. The Company's philosophy has always been to constantly learn, innovate and refine its business processes. Prior to ERP implementation, the case company faced the following 3 problems. First, the employees and management of the company had a cumbersome task of exchanging and retrieving information from their legacy systems. Second, the reliability of information obtained was questionable because of inconsistency and duplication of data from different departments. Third, since there was no built-in integrity checking for various data sources, accuracy was a big issue. All these problems, made the company not customer friendly. According to a senior management, "the whole system was tuned to the process and very little attention was paid to the customer demands. Therefore, the management of the company wanted to invest in software that could seamlessly integrate with its existing information system and further provide compatibility with its future implementations. After an in-depth study of functionality, cost, time, compatibility, esteem, operability, support and future organizational requirements was done, SAP topped the list of contenders and was selected."

B. Constructs: Definition and Analysis

This section briefly describes each construct of the research model [15] and then provides summative findings of our case studies for each construct. Whenever appropriate, respondents' statements are quoted to illustrate the construct. Consistent with the research objectives, specific questions were asked concerning each construct.

Construct 1: Strategic Initiatives: Process change typically begins with strategic initiatives (often included in the corporate strategic plan) from the senior management team [18]. These could be a reaction to a need (e.g., company's inability to provide adequate customer service) or a proactive push to leverage potential opportunities.

Company A chose to follow a "big bang" approach to implementation. They formulated and maintained a strategy of revolutionary change from the start. They envisioned a sweeping "all-at-once" approach of replacing the legacy system with the ERP system. This approach involved implementing all the required ERP modules (ERP consists of 12 main modules, each with a range of sub-modules), and then linking the whole ERP to the legacy systems [1]. The top management decided to adopt the "Accelerated SAP" methodology and set aside 3 years for implementation. This methodology comprises of the following five phases [19]: *Project preparation* (includes internalizing the goals and main tasks of the projects), *business blueprint* (complete description of how the company will implement the R/3 system to support its business activities), *realization* (final configuration of the R/3 system, including testing and release), *preparation for going live, setup for support* (setting up of a support organization to support the R/3 users, and a detailed system check, including monitoring of transactions to ensure the best performance possible), and *go live* (focuses on the final system tests, end user training, system management, and installation of the configured system).

Company B also used the big bang approach for implementing their SAP software. In the words of their President, "Implementing any ERP system is a challenge for an organization because of the declining success rate of ERP implementations world-wide. The challenge is compounded if the ERP provider is a world leader - SAP. At our company, however the challenge for us did not lie in successfully implementing SAP or in rolling it out to our 46 odd geographic locations across the country under a big bang approach in just eight months. The challenge lay ahead in building a conductive environment such that SAP was embedded in the hearts and minds of the people and the customers." The management took the implementation very seriously, and viewed ERP as a tool that added business value. Prior to implementation, the company received consent from all levels of the organization, thus ensuring that all parts of the firm were in support of this new initiative.

In both case study companies, top management was totally committed to implementing ERP and was willing to devote substantial amount of time and money for ensuring success. For example, the management of Company A felt strongly that the teams should be charged with the responsibility of not only identifying, examining and rethinking existing processes but also should be given the authority to re-engineer or develop new business processes to support organizational and ERP goals. As far as Case Company B is concerned, the task force comprised mainly of top management and consultants.

Construct 2: Learning Capacity: The major goal of learning is to provide positive outcomes through effective adaptation to environmental changes and improved efficiency in the process of learning. Increased efficiency can come from "learning by doing" and accumulation of knowledge through cross-functional interfaces. Learning can also come from organizational employees who constantly review the environment for new developments and opportunities (technology gatekeepers), consultants who span the boundary between the environment and the organization (boundary

spanners), and from customers. Construct 2 consisted of five variables.

Both companies showed tendency to create a learning environment based on appropriately responding to technological changes or learning from other organizations that had achieved best practices in the industry. The approach of bringing the ERP systems live "all-at-once" did not allow for the building of a collective knowledge base (of experiences) for the companies prior to implementation. However, prior to implementation, the management and project teams at both companies chose to learn from the experiences of other companies that had implemented ERP. The management at these companies also spent a lot of time reading and meeting people knowledgeable about ERP. They also responded to the new technology with adequate, self-motivated training wherever and whenever needed. Both of the companies used the services of external consultants, more so the Indian company since they had a shorter time frame for achieving success.

Construct 3: Cultural Readiness: Organizational culture facilitates (or inhibits) the integration of individual learning with organizational learning by influencing the organization's ability to learn, share information, and make decisions. Open communication and information sharing can promote a common culture and innovative behavior in the organization. So also can cross-functional training and personnel movement within the organization. This construct consisted of four variables.

In both companies, the initiative for the ERP system came directly from the top management. With respect to risk aversion, the management of both companies was clearly aggressive in deciding to implement the ERP system in a short time frame and also "all-at-once." In Company A, training was treated as a tool to create cultural awareness and transfer knowledge. Initially, 85 employees across the entire organization were trained to become internal trainers. These individuals were given the responsibility to train the remaining employees across the organization. They developed a training program that focused on both technical (basic navigation and task training) and non-technical (business processes and tasks) aspects. Manuals were also developed in different languages to enable ease of understanding for diverse participants. Thus, Company A not only effectively prepared and trained its employees but also created a change readiness in organizational culture. According to the management of Company B, "The business process was divided into two main segments: the core and supporting functions. A plan of action on the proposed ERP's impact was drafted depicting their relation to one another and to the business process. All employees were made to bear in mind the fact that the implementation of the ERP system was imperative and that the deadlines would not be very comfortable. The company took all efforts to ensure that the change did not produce any sort of resentment in the organization. This was done by educating everyone on the need and desirability of change. In addition all apprehensions relating to change were discussed and clarifications made to the fullest satisfaction."

Construct 4: Information Technology Leveragability and Knowledge-sharing Capability: The role of IT in the business process change project could be either dominant or as an enabler. Evidence suggests that IT led projects often fail to capture the business and human dimensions of processes, and are likely to fail. Therefore, a synergy between the business, human and IT dimensions of an organization is critical and should be promoted through cross-functional teams.

Both companies relied on their IT department to be enablers and facilitators of ERP implementation process. They took steps to ensure that users and all functional areas were considered in the systems development process and that interfaces to existing systems were properly undertaken.

In Company A, a business analyst group was formed to provide additional feedback to the ERP experts. This group was involved with piloting. When the business analysts were comfortable with the system, 85 trainers were brought on board from each division's different functional areas as explained earlier. Team leaders were then assigned to each area of the business and were responsible for coordinating training sessions. The trainers were responsible for teaching the other members of the organization. Again many hours were spent bringing all employees of the company up to speed with the ERP. At Company B, the core team which included both representatives from the IT department as well as various functional experts was trained in the first lot by consultants who served as implementation partners. This team was trained in the software configuration, implementation as well as the testing of various modules. This team was then given the responsibility to train the end users.

In both companies, communications technology such as e-mail enabled effective communication. However, Company A used teams more effectively during the implementation, and thus leveraged communication technology better in the process.

Construct 5: Network Relationships: Research indicates that under most circumstances cooperative, interpersonal and group behavior results in superior performance. Organizations that can manage these aspects of competition and cooperation continuously can benefit from employee incentives and controls, as well as instill change more effectively.

Both companies worked very closely with their ERP vendors and their consultants prior to and during the implementation process. Both companies even provided vendor consultants remote access to their systems. In case of Company B, the consultants played an integral role in every stage of the implementation process. According to a senior manager, "our consultants basically spent the whole 8 months at our premise and were part of every meeting and discussion."

Construct 6: Change Management Practice: Change management involves effectively balancing forces in favor of a change over forces of resistance. Organizations, groups, or individuals resist changes that they perceive threaten them.

Revolutionary and evolutionary change theorists propose contrasting tactics for accomplishing change that vary depending on the type of employee involvement, communication about the change, and leadership nature.

At Company A, in addition to the implementation team, change agents were appointed within each organizational entity. The role of these change agents was to raise employee awareness, remove obstacles and ensure follow-up. Even though several organizational units at Company A were independent and differed in culture, there was limited local resistance to the implementation approaches specified by the central ERP team. According to a member of the team, "Since no local implementation had to be aborted, any resistance was overcome by making some local adaptations." On the other hand, at Company B, while the core business processes were being mapped to SAP modules, a parallel activity called "Change Management" was initiated within the company. According to the General Manager, "The prime objective of change management was to reach out to people involved non-directly in the project to apprise them of the developments taking place."

Construct 7: Process Management Practice: Process management combines methodological approaches with human resource management to improve the outcome of business process change. Successful process management uses process measurement, tools and techniques and documentation.

Both companies used formal techniques and process metrics successfully for process measurement; however, they were more extensively used in Company A. For example, in Company A, project teams would regularly measure changed processes and articulate their value to management and functional groups. Also, techniques and methods such as data flow diagrams, CASE tools, and simulation were successfully used for process analysis and design by Company A. On the other hand, Company B emphasized more on process metrics to ensure that things were moving smoothly as planned.

Construct 8: Project Management: Project management refers to the application of knowledge, skills, tools, and techniques to project activities in order to meet or exceed stakeholders' expectations [20]. The goal of project management is to ensure that the project meets its budget, time and scope goals.

At both companies, the top management was extensively involved in the project and provided the necessary sponsorship. At Company A, the task force appointed by the top management conducted the package and vendor selection process and managed the implementation of the system afterwards. The top management decided to adopt the "Accelerated SAP" methodology and set aside 3 years for implementation. On the other hand, in company B, the task force was responsible for defining the project scope, project schedule and budget. Project management tools and techniques were also utilized, by both companies, to track project progress.

V. Conclusion

This study supports the findings of Davenport [21] that a well-planned and well-executed ERP implementation, in conjunction with a good change management program, can create a dramatic turnaround for the company. Based on the results of our case analysis, we can conclude that there exist some common underlying threads that are critical for ERP success. These threads or critical factors are consistent with the findings of prior research studies and are not culturally bound. First, according to [22], top management needs to publicly and explicitly identify the project as a top priority. In both instances, the top management did treat ERP implementation as a top priority. Second, a clear business plan and vision to steer the direction of the project is needed throughout the ERP life cycle [6]. Both Company A and B did have a clear business plan and therefore were successful in their ERP initiative. Third, project champion is critical to drive consensus and to oversee the entire life cycle of implementation [23]. In Case Company A, a high level executive sponsor was selected to be the project leader, while in Company B, the Managing Director was really the project champion. Lastly, according to [24], organizations implementing ERP should work well with vendors and consultants on software development, testing, and troubleshooting. In both cases (Company A and B), the project teams worked very closely with vendors and consultants to obtain inter-organizational linkages.

The approaches used by the case study companies are also consistent with Hofstede's dimension of cultural scales [14], specifically, the dimension of *uncertainty avoidance and power distance*.

First, the presence of a champion was considered very important in the U.S. context and not in the Indian context. In the Indian context, the top manager/top management was perceived to be the champion. A subordinate being a champion would be viewed as a challenge to the authority of top management. Second, the use of consultants or external expertise was considered more important in the Indian context since the staff in the Indian case company was less technologically sophisticated than staff in the U.S. company. The Indians implicitly accept that the SAP consultants are the experts and it is because of them that the system works. The collective nature of the Indian society accepts that experts become an integral part of the organization and the transfer of knowledge occurs at the conclusion of the project. Next, change management was emphasized more by the U.S. case company than by the Indian company. This is because organizational culture is determined and imposed by top management in the Indian context and therefore, change is accepted if it is demanded. Lastly, in cultures where power distance is much greater (e.g. India) there is considerable reluctance to accept empowering initiatives with respect to both physical and information-based activities. The employees in the Indian case company felt much safer when they were told what to do and what was expected. Therefore,

participative management was more visible in the U.S. case company.

The results of this study should assist both practitioners and academicians. The constructs presented in the study, along with the lessons learnt, should provide practitioners (especially non-technical managers) with insights on how to better understand and prepare for ERP implementation projects. Also, the constructs recommended in this study should assist academicians who undertake studies that focus on rigorous theory building and testing. For example, the results of our case studies would be beneficial for identifying comparable cases. We believe that future case study research would serve to reinforce and validate the findings of this study. In the area of theory building, the critical constructs identified can be used by academicians as the basis of undertaking rigorous empirical studies that test ERP success in relationship to these factors. .

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