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## **A Comprehensive Study on the Differences in ERP Implementation between Manufacturing and Service Industry**

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### **ABSTRACT**

*In the first part, this paper presents a review of current literatures on key critical success factors (KCSFs) and their inevitable relative links with ERP benefits, project (strategic) goals and objectives in ERP implementation; this literature review searches for the available KCSFs in two sectors: manufacturing and service industry. The second part of paper looks into the available literature on differences in manufacturing and service industry. From these differences we deduct that there are differences in ERP implementation between manufacturing and services.*

### **INTRODUCTION**

In the course of the 1990s, ERP systems evolved when the functionality of MRPII in production was blended with other applications concerning quality, maintenance, marketing, sales, personnel and various other support activities. Thus, ERP systems moved away from the manufacturing environment to support of the entire manufacturing company and from there to the support of service companies as well. These changes in functionality and application environment have had an important impact on implementation processes for these systems. There is a voluminous literature on implementing ERP systems, which has resulted in an increasingly long list of critical success factors. There is little systematic attention, however, for the question if implementation requires different approaches if it takes place in a services environment instead of a manufacturing environment.

Inspired by some implementation failures in a services environment, we have carried out a systematic review of the literature on this issue. First, we have compared the literature on MRP implementation with the literature on ERP implementation. Since ERP is supportive of many more service elements in the manufacturing environment, we expected some first clues from this comparison. Furthermore, we have compared the literature on ERP implementation before 2000 with that after 2000. Before 2000, implementing ERP was most frequently tied to solving the Y2K problem and solving various other problems with legacy systems, whereas this is most certainly less so after 2000. Again, we expected this comparison to give us a clearer view on differences in implementation requirements between manufacturing and services. In our review we looked at differences in the reasons for ERP adoption (including project goals, business objectives) and differences in project routes (project phases) and key critical success factors in implementation between manufacturing and services. Our investigation shows that some differences can indeed be identified that appear to be related to the inherent differences between manufacturing and services. We conclude that, compared to a manufacturing environment, implementation in a services environment needs to be less technology oriented, more bottom-up and more concerned with external integration with customers.

### **Research Objectives**

The objective of this research is to investigate the factors influencing the success and failure of ERP implementation and more specifically to investigate the differences in ERP implementation between manufacturing and services. We expected that the entire ERP implementation process from business re-engineering to the replacement of IT legacy systems requires a different approach to management, personnel and organization in

manufacturing compared to service sectors. The existence of such differences would explain the failure of implementation projects in a number of firms.

From a project management perspective, without recognition of the differences in ERP implementation between the two sectors, the process of ERP implementation in services will have to go through a traditional lengthy route earlier established in ERP implementation for manufacturing. Moreover, the use of the ERP implementation methodology developed in manufacturing will lead to the incorporation of the wrong key critical success factors (KCSFs), neglecting differences in the impact of such KCSFs and missing benchmarking opportunities with implementation routes in either service or manufacturing sectors. The benefits of the recognition of these differences for the project owner are a better visibility of the project route, a clear implementation strategy and utilization of appropriate resources at the right time, and at the right phase of the project content on critical areas.

### **The Scientific Approach**

The literature on implementation tends to look at 'KCSFs' having an impact on the success or failure of projects. Much of the literature is concerned with very general factors. It is argued, for instance, that successfully implementing ERP systems calls for strong leadership, a clear implementation plan, and a constant watch on the budget (Mandal and Gunasekran, 2003). In search for differences, most researchers (Markus et al., 2000) follow the suppliers in distinguishing between small and large businesses and differences in engineering characteristics between industries (Brinkkemper, 2001). Our purpose is to search for additional KCSFs that point to the necessity to differentiate between services and manufacturing industries. By doing so we hope to contribute to learning from the past failures in implementing ERP systems.

The scientific relevance of our research on the differences in the process of ERP implementation between manufacturing and services concerns the improvement over previous efforts by researchers through searching differences in KCSFs in ERP implementation, differences in components of project route and differences in the process of ERP implementation between the two sectors. The target groups of the research are professionals, managers, and academics. We suggest that the generic ERP implementation roadmap has often not provided a clear project route. In finding KCSFs, we recognized the differences in the process of ERP implementation between the two sectors. And in addressing the differences in ERP implementation methodologies between the manufacturing and service sectors, we sharpened the project routes in ERP implementation in each sector. We tried to provide a more comprehensive look at the differences in the process of ERP implementation in order to build a sustainable visibility in processes. The first contribution of this research is the identification of important differences in KCSFs between the sectors manufacturing and services. Identification of differences in KCSFs is new, although there has been significant research in the identification of the KCSFs without recognition of differences between manufacturing and services. The second contribution of this research is our differentiation of the processes of ERP implementation in the two sectors and most important rejecting the concept of universality of implementation methodology for all industries.

### **LITERATURE REVIEW**

Our research is concerned with the KCSFs used in industry practice. There is a large literature on KCSFs based on the traditional method of identifying KCSFs such as in the project management body of knowledge (PM-BOK). Similarly, there is a large literature on KCSFs based on the same traditional method of identifying KCSFs in ERP implementation. These KCSFs are the pressure points in IT projects. We used the approach to finding KCSFs, which has been applied in industry for a long time. The KCSFs bridge the link between ERP implementation and improvement in business performance across strategy, business processes, IT, structure, culture and management systems. ERP KCSFs demonstrate the linkages between ERP critical factors of success, ERP success and ERP benefits (Al-Mashari et al., 2003). The KCSFs are the well-deployed visions and missions that have been translated and communicated at all levels within the organization. How well the KCSFs are relayed into the organization is a major condition for the ERP systems to yield the desired benefits (Lyytinen and Hirschheim, 1987). KCSFs determine whether the ERP implementation will be successful.

A number of authors have identified a variety of factors that can be considered to be critical to the success of an ERP implementation (Umble et al., 2003). Nah et al (2003) stated that the high failure rate of ERP

implementation called for a better understanding of its KCSFs (Somers et al., 2000). Nah et al., (2003) identified eleven KCSFs from an extensive literature review and then she used this result as a benchmark to evaluate the survey of Chief Information Officers' (CIO) perceptions of the degree of criticality of these KCSFs in ERP implementation. Nah et al.,'s (2003) identification of the KCSFs and their citations by ERP practitioners point to knowledge accumulation and convergent opinions of both academics and practitioners.

### **Key Critical Success Factors (KCSF)**

A number of researchers have identified KCSFs in the process of MRP implementation (Chen, 1996). In a comparative analysis of MRP II implementation and ERP implementation, researchers have also identified the KCSFs prior to the millennium change (Cramer, 1998). Their research suggested differences in KCSFs between MRP implementation in manufacturing and ERP implementation in manufacturing and services such as; project related tasks, contingency approach to ERP implementation, contingency approach to interfaces, outsourcing ERP implementation tasks, application of simulation cases, and the importance of continuity of team members in ERP implementation projects (Kylstra et al., 1997).

In the period of around the millennium change with the related software problems, a number of scholars also focused on identification of KCSFs in the process of ERP implementation (Al- Mashari et al., 2003). The differences in KCSFs between ERP implementation and MRP implementation routes appear to be due to (a) incorporation of a service section in ERP, (b) higher requirements for project management skills (c) the invisibility of the project route. The intention of the literature review was initially to compare and analyse the findings of various researchers in different ERP projects across all industries.

However, in this process, we identified differences between KCSFs in ERP implementation for manufacturing and services. As a consequence, without recognition of the differences in impact of KCSFs and differences in KCSFs between each sector, a clear implementation strategy with a solid ERP project route towards an effective and productive outcome in ERP implementation will not be possible. In our literature reviews, most of the KCSFs seemed generically derived from a project perspective in which ERP implementation was taken as a project management task. The project and change management tasks in ERP implementation processes differ in many dimensions from the project management of traditional projects which industry has experienced up to now. The European implementation industry has been developing the project routes for ERP implementation for some time. Specific project and change management competency is one of the KCSFs required in ERP implementation. This competency factor is an element of a new research area examining emotional intelligence (EQ-emotional quotient) in change management practice.

After our review of KCSFs in MRP implementation in manufacturing, i.e., activities related to tangible goods, and in ERP implementation in manufacturing and services, i.e. with the inclusion of activities related to intangibles, we looked at the differences in processes of ERP implementation for different industries (i.e. implementation methodologies and re-engineering). We then looked systematically for evidence concerning the differences in KCSFs in ERP implementation and differences in ERP implementation processes between the two sectors manufacturing and services.

### **ERP implementation**

Earlier researchers focused on the fit between specific organizational dimensions and dimensions of Information Systems (IS) because of the multiplicity of the organizational dimension (Bingi et al., 1999). Over 70% of the research studies concluded with a model arguing that the better the fit among the contingency variables, the better the performance. Henderson and Venkatraman (1993) developed the "strategic alignment model", emphasising the fit among business strategy, IT strategy, organizational infrastructure, organisational processes, and IT infrastructure and processes. Soh et al., (2000) suggests that ERP misfit stems from the firm requirements, or country-specific requirements that do not match the capabilities of ERP. Henderson and Venkatraman's strategic alignment model implies that effective and efficient utilisation of IT requires the alignment of IT and business strategies. In other words, business success depends on the linkage of business strategy, IT strategy, IT structure, organisational infrastructure and processes. The need to align business and IT planning was emphasised as both

critically important and increasingly problematic (Burn, 1997). Swan et al., (1999) argues that organizational misfits of ERP exist due to the conflicting interests of user organization and ERP vendors.

Hong (2002) carried out a field survey of thirty-four organizations and suggests that ERP implementation success significantly depend on the organizational fit of ERP and certain implementation contingencies. Thus, the concept of organisational fit has been the core research construct to explain the implementation success within different IT implementation contexts.

The mutual adaptation of ERP and organisational processes is an iterative process entailing on-going social action that is early constrained by both the structural properties of the organisation and the built-in properties of the ERP systems (Volkoff, 1999). One reason for non-adoption, partial-adoption, or discontinuance is lack of “feature-function fit” between the company’s needs and the packages available in the market. There are very few companies that do not have specialised processes dictated by their industry according to one consultant (Slater, 1999).

An important criterion used in selecting ERP system is the ERP fit with the current business processes (Everdingen et al., 2000). Since the ERP philosophy is process-based, rather than function-based, ERP necessitates disruptive organizational changes (Volkoff, 1999). Successful ERP implementation must therefore be managed as a program of wide-ranging organisational change rather than as a software implementation.

Implementation of a technical innovation is viewed as a dynamic process of mutual adaptation; reinvention of the technology and simultaneous adaptation of the organisation. Adaptation may address the user procedures, assumptions, knowledge, or relationships as well as physical aspects of technology. Burn and Szeto (2000) established significant differences in perspectives of IT managers and business managers and factors contributing to the successful strategic alignment of IT and organisation using Henderson and Venkatraman’s (1993) strategic alignment model as framework. He studied several industries and indicated that management perspectives were largely equivalent in IT strategic alignment within each industry. However, significant differences were found between industries. The conclusion of the analysis was that the strategic alignment varies primarily in relation to the nature of industry and/or its dependence on IT.

Palaniswamy and Tyler (2000) suggests the need for a large-scale empirical survey with statistical measurement and invariance analysis over different types of systems in order to understand the differences in ERP implementation methodology and performance. However, based on case studies analysis he found no evidence that ERP implementation and its performance were influenced by demographic factors. ERP systems claim universal applicability. Indeed, universal applicability is an important phenomenon in information science research, focusing on “information” as a generic attribute of all productive processes. Nevertheless, there are many differences between industries that may warrant different approaches in the implementation of ERP systems. In view of the large number of implementation failures, it seems appropriate to question the wisdom of treating the problem of ERP implementation as one that is more or less identical across different industries. A high percentage of failures suggest that it may be useful to identify differences between so-called KCSFs affecting ERP implementation success in different sectors of the economy. The ERP implementation methodologies currently offered by global suppliers are only distinguishing between large and small businesses across all industries.

### **Effect of Sector Differences on ERP implementation**

The ‘best practice’ implementation models do differentiate for different industries (e.g. banking, pharmaceutical, chemical and petrochemical), but these differences refer only to the setting of parameters of the ERP package and not to the implementation process. The project guidelines offered by ERP package suppliers are not very specific concerning the skills and experience required in large ERP implementation projects. Bailey (1998) identified three approaches to planning for project management of ERP implementation in both manufacturing and services: linear (i.e., planning and management of a project through the identification of a detailed set of tasks and deliverables), exploratory (i.e. the use of an iterative approach to evolve a product toward a detailed goal) and personal (i.e. the setting of targets and time scales for managing organizational and personal change). Al Mashari et al., (2003) state that an effective ERP implementation requires a holistic view of the implementation process.

Project management and change management competencies are the two core competencies required to effectively manage the changes and move the organization to desired goals. Project managers of ERP implementation cannot predict the route and the outcome of each phase of implementation, as they should in traditional projects. In our research, we refer to these shortcomings as the relative invisibility in ERP implementation processes.

Visibility in this context refers to a clear picture in processes of ERP implementation, KCSFs, details of the content of processes, skills and knowledge of implementation and the right placement of the resources in the process of implementing an ERP package. Invisibility refers to shortcomings in some of the items mentioned above. The relative invisibility of the ERP implementation process has been identified as a major cause of ERP implementation failure (Griffith et al., 1999). Kumar (2002) argue that the invisibility and project risks of the process of ERP implementation can be reduced through differentiating between risks that can be resolved by action and risks that require hedging. Before the adoption of an ERP system is decided, the impact of ERP and process adoptions should be estimated from a risk assessment perspective (Brehm et al., 2001) in order to minimize the potential business disruptions and user resistance. These authors, however, do not differentiate between different kinds of implementation environments. Nevertheless, differentiation seems to be a logical course in developing methodologies to solve the problems of invisibility in the process of ERP implementation.

Earlier research has investigated various possible dimensions of differentiation looking for instance at project content (i.e., implementation phases) (Al-Mashari et al., 2003), KCSFs, project goals (ERP success and benefits), reasons for ERP adoption, and relation of the components with each other (Nah et al., 2003), project management (Shanks et al, 2000), impact of ERP on operational performance (McAfee, 1999), KCSFs and reasoning's for ERP adoption (Davenport, 2000), differences in level of complexity of projects (Kumar, 2002), differences in organizational structure of the firms, (Soh et al., 2000), differences in organizational, national and geographical culture (Soh et al., 2000), differences in reasons for ERP adoption for the small and large firms (Markus et al., 2000), differences in IT strategic alignment between manufacturing and service sectors (Mabert et al., 2003), differences in managing manufacturing and service organizations (Bowen & Ford, 2002), (differences in) KCSFs in ERP implementation for manufacturing and services and differences in the process of ERP implementation between the two sectors. Indeed, a review of the literature suggests that the concept of differentiation is a logical follow-up research step in research concerning the ERP implementation process for various industries. Bowen and Ford (2002) have identified differences between the manufacturing and service sectors at several levels.

He argues that these differences in management of organizations and flows of information lead to different requirements when implementing IT; different project management competencies, different project routes, different project phases, and a different implementation approach. He also finds differences in project contents between organizations producing tangible products and those producing intangible products, because, as a result, the inbound and outbound logistics across the service organizations vary in many aspects from manufacturing. Inspired by such findings, our research has focused on the differences between services and manufacturing in ERP implementation processes.

### **Differences between Manufacturing and Services Industry**

Apart from the traditional services (e.g., banks, hospitals, restaurants etc.), the services as supporting activity to manufacturing developed into a new sector with its own characteristics. As an independent entity it served both manufacturing and service organizations.

The new sector arose when manufacturing organizations got larger and more complex and the separation between production and services became inevitable.

Other large service provider entities such as banks, hospitals, hotels, consulting firms, and recreation centres are independent entities, which are not necessarily related to manufacturing and did not emerge as supporting services to a production facility.

Since we define manufacturing as the integrated organization of production and supporting services, we produce two definitions on services. The first definition is the services as supporting activities within manufacturing and the second definition is the service sector, which we distinguish in this research from the manufacturing sector.

### **Differences between production and service within the manufacturing sector**

As we described earlier, manufacturing consists of production and supporting service activities. As firms became larger and more complex, the service activities grew into entities with their own identity in business. In fact, the concept of integrating production processes and supporting services was first developed on production sites. Long before the seamless integration of supporting activities, the manufacturing sites were equipped with huge machines, mainframe systems, running a completely integrated system around the clock.

In production, various units were seamlessly integrated through various mainframe systems under the title Distributed Control Systems (DCS), supplied by large mainframe suppliers from Honeywell and Siemens to IBM and Bailey. The real-time information was transmitted from one unit to another through software installed inside the hardware. The similarity of DCS and ERP systems lies in data communication, on line real time data, data processing and analysis, and the provision of information for decision-making by management of operations. With DCS a command-and-control system was established. The human machine interaction was limited to observation of data and change of commands to processes. This process of integration has been going on for several decades while ERP is only a decade old. It was only two decades ago that the importance of restructuring and automation of the supporting services were discovered as a major benefit. The question here is whether this trend of adoption of trends from manufacturing by services should continue.

Bowen and Ford (2002) has identified differences between manufacturing and service sectors at several levels: Operations (Shostack, 1987), Product (tangibility versus intangibility) (Zeithmal, 1981), Management of the organization (Bowen & Ford, 2002), Inventorization (incl. inventory related costs and other operational costs) (Lovelock & Wright, 1999), Organizational Culture (working environment) (Bowen & Schneider, 1988), Type of personnel (Shetty & Ross, 1985), Internal business processes (Shostack, 1987), External business processes (Shostack, 1987), Lead times (Collier, 1987), Level of personnel and client interaction (Langeard & Eiglier 1983), Personnel marketing attitude (George & Gonross, 1991), Potentiality for conflict (Winsted, 2000), Managerial problems (Lovelock & Young, 1979), Managerial competencies (EQ levels), Level of adaptability to IT integration (Lovelock & Wright, 1999). Involving clients in co-production in the service sector requires a different attitude and a different working culture.

The system becomes a complex organization of intangible production. This complex organization generating intangible products requires a different type of management.

### **PERCEPTIONS OF THE KCSFS IN ERP IMPLEMENTATION**

The most important KCSFs based on their impact are listed in order of importance in table 1. This degree of importance and/or the impact factor is not necessarily valid for all ERP projects. We developed this ranking from the available literature and from our own practical knowledge on ERP implementation. The available insights on KCSFs in ERP implementation were adopted from Nah et al (2003), Markus and Tanis (2000), Markus et al., (2002), Al-Mashari et al., (2003), Umble et al., (2003), and Hong (2002).

A review of successful ERP implementations pointed to leadership and management commitment as the most important KCSFs (Bingi et al., 1999). Microsoft's top management was instrumental in overseeing its ERP project, and the entire board reviewed and approved the implementation plans (Deloitte & Touche, 1998). Umble et al., (2003) identifies the software selection steps and the implementation procedures as KCSFs in ERP implementation. Furthermore, he linked ERP success and benefits to fulfilment of fifteen KCSFs during the three ERP implementation phases of (a) setting up; (b) implementation; and (c) evaluation. The major KCSF and at the same time benefit of ERP implementation is the required level of Business Process Re-engineering (BPR). In theory all the processes within a firm must conform to the ERP model (Al-Mashari et al., 2003).

**Table 1. The most important KCSFs in ERP implementation.**

Project (management) ownership (generic)
Organizational culture (generic)
Organizational fit (generic)
Process segmentation (non generic)
Step-by-step implementation (generic)
Clear implementation strategy (non generic)
Clear project management route (generic)
The project owner change management competency (non generic)
Training (generic)
Partnership on supplier and client sides with ERP software (non generic)
Contingency approach to (post) implementation (non generic)

In a survey of Chief Information Officers (CIOs) from 1000 companies on their perception of KCSFs in ERP implementation Nah et al., (2003) identified eleven KCSFs in ERP implementation from which the CIOs selected the top five KCSFs. She broke the eleven KCSFs down into many sub-KCSFs covering a wide range of ingredients. These top five KCSFs were top management support, the presence of a project champion, ERP team work including the composition of the team, project management including a change management program, and culture. Various literature reviews suggested organisational fit, internal restructuring, project management, pre-implementation attitude, as more important than the others. Since it has become increasingly common for large IT projects to be managed by multifunctional teams, the management of the process of implementation has become very complex (Al-Mashari et al., 2003).

There is ample evidence to demonstrate that perceptions of employees who are expected to use new IT can have a critical impact on the degree to which an implementation effort succeeds or fails. Extensive organisational investments in shaping pre-implementation attitudes do not always achieve the desired effects. Despite extensive investments of time, money and effort, the length of time people worked with the firm and in their position had a greater impact on their attitudes towards ERP (capabilities, value, acceptance and timing) than high levels of pre-implementation involvement (Abdinnour-Helm & Lengnick-Hall, 2003). The KCSFs in strategic IT alignment were the top management attitudes in IT alignment towards the business objectives and integration of internal systems with the external market (Burn & Szeto, 2000).

### **Differences in KCSFs between Manufacturing and Services**

From our review of the literature, we could also identify a set of common KCSFs as well as differences in KCSFs in ERP implementation between the manufacturing and service sectors. The common KCSFs are given in table 2. The differences in KCSFs are given in table 3.

**Table 2. Common KCSFs in ERP implementation in manufacturing and services.**

1. Organizational fit (Bingi et al., 1999)
2. Level of process management (Al Mashari et al., 2003)
3. Management involvement (Al Mashari et al., 2003; Jitpaiboon & Kalaian, 2005)
4. Organizational leadership (Mandal & Gunasekran, 2003)
5. Project management view incl. clear implementation plan and constant watchdog on budget (Mandal & Gunasekran, 2003; Kalczynski, 2005)
6. Strategic alignment with IT (Burn & Szeto, 2000)
7. IS strategic planning (Heo & Han, 2003; Whitten, 2004)
8. Contingency approach to adoption of Information System Planning (Heo & Han, 2003)



9. Organizational readiness and people (Corporate culture) (Abdinnour-Helm & Lengnick-Hall, 2003)
10. Level of IT integration with business processes (Hong, 2002)

## CONCLUSION

In the literature review for the period prior to the millennium change, the characteristics of a number of the differences in KCSFs in ERP and MRP suggested the immaturity of project routes due to (a) incorporation of service sections, (b) lack of experience in working with a new package (ERP) or (c) the fear for the unknown in the process of ERP implementation. Since the MRP focus was on manufacturing sector and ERP implementation extended the items of manufacturing to the service sector, the differences in KCSFs in MRP implementation and ERP implementation were evidence for differences in KCSFs in ERP implementation between manufacturing and services. The initial differences in KCSFs between MRP and ERP are the additional KCSFs that are only related to ERP implementation: (a) project related tasks, (b) a contingency approach to implementation, (c) a contingency approach to interfaces, (d) outsourcing of implementation tasks, (e) application of simulation cases, and (f) importance of continuity of team members on ERP projects. For the post millennium-change period, we generated a larger set and other important differences in implementation from the latest findings on KCSFs in ERP implementation. We suggest that these additional findings on differences in ERP implementation are due to the complexity of ERP system and to better understanding of the differences between MRP implementation and ERP implementation. The process of ERP implementation demands the preparation of business processes (i.e. organisational fit), preparation of people (i.e. corporate culture) and preparation of technical systems (i.e., legacy systems), change management competencies, and project management (i.e., planning and competencies etc.) all of which are much less needed in MRP implementation.

**Table 3. Differences in KCSFs in ERP implementation between manufacturing and services.**

<u>Manufacturing</u>	<u>Services</u>
Understanding internal processes for adaptation (Soh et al., 2000)	Understanding external processes for adaptation (Brown, 2001)
Standardization (Legare, 2002)	Process Optimisation (Legare, 2002)
Management perspectives and attitudes towards IS/IT adoption and application (Somers et al., 2003)	External revenue strategy (Brown, 2001)
The development of internal IS & IT Competencies (Caldeira & Ward, 2003)	External customer centric (Brown, 2001)
Internal cost savings strategy (Mandal & Gunasekran, 2003)	
Internal customer centric (Umble et al., 2003)	
Stage-wise implementation (Umble et al., 2003)	

From the literature, it appears that project related KCSFs (e.g., project management and change management (competencies), planning, budgeting, contingency approach and etc) are identical in ERP implementation for manufacturing and services. However, there are differences between ERP implementation and MRP implementation, so there must be important differences in KCSFs in the process of ERP implementation between manufacturing and services. Therefore, the KCSFs related to the content of the project in ERP implementation will be different between manufacturing and services. In our literature review on KCSFs, we uncovered differences in KCSFs and differences in project routes in ERP implementation between manufacturing and services. For the period prior to the millennium change, there are clear project related differences in KCSFs between MRP implementation and ERP implementation. There are differences in the degree of impact of KCSFs in ERP implementation between manufacturing and services. There are differences in KCSFs in ERP implementation between manufacturing and services. For the period of post millennium, we found more differences in KCSFs, i.e., in addition to the project related ones, than for the period prior to the millennium change. These additional differences were either due to the complexity of ERP system or to the better understanding of differences between

MRP implementation and ERP implementation. ERP implementation asks for preparation of business processes (i.e., organizational fit), preparation of people (i.e., corporate culture) and preparation of technical systems (i.e., legacy systems), change management competencies, and project management (e.g., planning and competencies etc) in comparison to MRP implementation. These differences also suggest the differences in process of ERP implementation for the two sectors. These differences conclusively led us to recognition of the differences in project management and change management of ERP implementation between manufacturing and services.

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