On System Capabilities and Customer Requirements in ERP Implementations

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Abstract: As pre-packaged solutions developed for a generic customer, Enterprise Resource Planning (ERP) systems cannot satisfy 'out of the box' all the specific requirements of every entity where they are deployed, due to differences between the ERP application and the business model. The identification of disparities between the organization requirements and the ERP system capabilities allows determining adjustments expected in organizational practices to match the way the ERP application works, as well as modifications, customizations, or extensions needed in the software to fit inadequately addressed business processes. This article focuses on this issue by reviewing current methods that try to identify and bridge gaps between business requirements and system capabilities in ERP implementations.

1 Introduction

Enterprise Resource Planning (ERP) suites, with their comprehensive offer, can give business organizations an integrated view of the company. They can help manage resources in a unified way, allowing different units and users to exchange and share data seamlessly and to streamline financial, administrative, and operational processes. Additionally, besides linking internal business functions, they can also connect the company with customers and providers.

Earlier research (see, for example, [HK02, CA03, BJ04, LS04]) has identified as a key element of successful ERP implementations how to find a match between the system and the organization business processes. With this objective in mind, this study will succinctly analyze, assess, and relate some proposals that can be used to bridge the gap between the requirements of an organization and the capabilities of an ERP system. It will also establish a direction towards the building of a comprehensive approach for a capabilities and requirements alignment in ERP deployments.

The rest of this work is structured as follows: Previous studies on the subject of requirements and capabilities alignment are briefly examined in Section 2. Based on such analysis, some relevant elements that should be taken into account in the alignment process and that are often overlooked in ERP implementations are identified in Section 3. Final remarks and suggestions for future research are included in Section 4.

2 Literature Review

In order to prepare this article, research and practitioner literature was extensively explored. Some sources were found that dealt with the overall Information Technology (IT) and business alignment issue. These analyses were not included here since they examine a higher-level problem, the coordination of business and IT strategies. A few proposals were also found that intend to identify and address disparities in IT deployments. These studies employed gap analysis, abilities and needs alignment, or the analysis of differences between a baseline and a target architecture, and they will be briefly reviewed next.

J. O'Connor's and S. Dodd's proposal [OD99] can be used to identify mismatches between an ERP system and a set of business requirements. It presents a quite complete sequence of steps for the preparation of a preliminary functional gap analysis. This was the only article in the review that looked at system needs. However, the study does not include any suggestion for the further handling of gaps.

C. Rolland's and N. Prakash's ideas [RP00, RP01] simplify the alignment of needs and functionality by bringing both to the same level, that of requirements. The article examines matching from three points of view: The 'As Is' system, the 'To Be' system, and the ERP system. However, the study does not include the adjustment or extension of the business processes and the ERP application at the same time in order to get a harmonious solution. Additionally, the paper does not evaluate how easy (and practical) it could be to derive from the functionality the requirements that the ERP system is able to satisfy.

The principles proposed by the Chief Information Officer Council of the U.S. Customs Service in Springfield, VA, USA [Chi01] consider any existing or potential software product or set of products in a federal agency. Therefore, this approach could also be suitable for an ERP implementation. The authors used gap analysis as a tool to go from a baseline architecture to a target architecture. Like J. O'Connor's and S. Dodd's proposal, the article presents a sequence for the preparation of the analysis. However, as a set of guidelines, this paper does not explain in depth how the investigation should be accomplished.

M. Kolezakis's and P. Loucopoulos's [KL03] method intends to discover gaps between an organization and an ERP system, identifying the business processes that should be re-engineered in order to adopt the ERP suite. Like C. Rolland's and N. Prakash's proposition, it uses graphical representations for modeling business processes and ERP system functionality. The article does not provide any technique for the analysis of results.

S. Comella-Dorda et al. prepared an adaptable COTS software product evaluation process [CDDL$^+$04]. As part of the analysis techniques, the authors suggested to execute a gap analysis to determine the differences between the end-user processes and the processes assumed by each COTS product. Like J. O'Connor's and S. Dodd's paper, this study includes matrices for the study of gaps. This article was also the only one reviewed that proposed further handling of the disparities detected during the appraisal.

3 Towards a Comprehensive Approach

An element found in most of the proposals reviewed was the focus on only organizational requirements and ERP capabilities. However, if the ERP system does not get what it needs to be functional, it will not be able to satisfy the business requirements appropriately. Hence, a method that also considers the satisfaction of the application needs is required.

Simply detecting where an ERP application does not satisfy end user expectations or where organizational practices do not offer the resources that the software requires can suffice during the early stage of ERP application selection, but it may not be enough for later phases. Therefore, the analysis should also determine how to handle those discrepancies in order to fulfill the business needs without sacrificing the inherent application advantages.

Vendors, integrators, and business people often speak different languages, so misunderstandings are common. Hence, the inclusion of a validation step is extremely important in the analysis. Whenever system capabilities are matched to business requirements, or whenever a disparity is "solved", it is highly recommended to request a presentation of prototypes or demos in real deployments where the matching is clearly demonstrated.

In most companies, at any moment in the lifetime of an ERP system, organizational units can be added or dismantled, internal processes can change, and ERP modules can be incorporated, modified, or discarded. Therefore, once an alignment exercise is executed, a periodical review is recommended, since business requirements and system needs can evolve, leading to a misalignment between the system and the organization it must sustain.

4 Concluding Remarks

The fitting between an ERP application and the organizational processes and business needs is critical for ERP implementation success, since a wrong matching is likely to produce a system that will address the organizational requirements incorrectly. Furthermore, since no ERP suite can offer appropriate satisfaction of the business needs without proper customization, the requirements analysis and the subsequent synchronization of system capabilities and business requirements are important issues in most ERP deployments.

In order to address such a coordination, this article reviewed previous research on system capabilities and business requirements with a special focus on ERP implementations. The diverse approaches examined proposed different methods for the analysis, such as sequences of steps to be followed, tables to be filled, and diagrams to be developed. The literature appraisal also allowed us to identify some critical points that must be taken into account for the development of a business requirements, system needs, system capabilities, and business resources alignment process: inclusion of application needs satisfaction in the analysis, management of discrepancies and proposal of fulfillment strategies once a matching is found, validation of results, and periodical reviews.

As future work, an approach for such an alignment will be formulated considering the positive elements of previous methodologies, direct ERP implementation experience, and

the recommendations presented in this article. Later on, a sample of vendors, integrators, and ERP users should validate the method. Additionally, there are several automated tools that can help implementation teams in their software selection, during the requirements management, or that support the whole application life-cycle, such as *Caliber-RM*[1] from Borland, *DOORS* from Telelogic, *IT-Matchmaker* from Trovarit AG, *Rational RequisitePro* from IBM, and *Requirements Management* from rhythmiQ. It would be useful to review them in order to check for interesting ideas that could be applied during the alignment process.

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