

# **COMPARATIVE ANALYSIS OF CRM AND SCM SYSTEMS IMPLEMENTATION APPROACHES**

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## ***Abstract***

Extended Enterprise Systems and especially their implementation process are relevant issues for practitioners and researchers. The problems documented and published offer an idea of how hazardous and complicated is to obtain all the promised benefits of these information systems. In this paper, we analyze the characteristics of Customer Relationship Management systems and Supply Chain Management system; and, inspired by results from software development approaches, we offer a comparative analysis and proposal for general implementation approaches for CRM and SCM systems. Since these systems are very different in their essence, their implementation approaches, methods and processes should also be different.

***Keywords:*** CRM, SCM, implementation approaches, methods and processes.

## **1. INTRODUCTION**

Managing an enterprise for success, be it a private-for-profit company or a public administration, usually requires carrying out many complex business processes that involve significant amounts of human and material resources. The use of information systems (IS) and information technologies (IT) in selecting, organizing and managing large volumes of data to support operational transactions, decision making, and the automation of activities and processes, has represented a significant advance in this field for enterprise management. Now we can find IS and IT in the core of key functional areas and all around the value chain, from product supply to the control of post-sale services.

Particularly, the past decade has brought about the successful emergence and tremendous growth of IS-based enterprise solutions named Enterprise Resource Planning systems (ERP), the design and functions of which offer standard software functionality ready to integrate and manage the internal functional areas and business processes, in order to automate most of the business transactions common to many companies. Soon after the appearance of ERP systems, academia took interest in the research of this new type of IS, mainly because there were a great amount of failed projects during its implementation process (Moller, 2005).

Much research has been undertaken around ERP systems implementation, and many case studies have been done, from which sets of ERP implementation critical success factors and risks have been identified (Esteves 2004, Skok and Legge 2002, Nah et al 2001, Al-mashari 2001).

ERP systems have settled and matured together with their implementation, becoming an essential tool for the new generation enterprise. With the maturity of the ERP systems, new software systems have appeared in order to address enterprise domains not covered by ERP systems. Software solution providers, satisfying the newly formed needs of the enterprises, started to develop new packaged software systems and tools to refine the productive processes, searching for the integration between customers and suppliers to create commercial alliances and to foster longer-term and better relationships with customers. These software systems, considered as a new generation following ERP, were first named as ERP II (Kumar, 2001) but nowadays they are usually referred to as Extended Enterprise Systems (EES) (Sutton, 2006), being typically represented by two big components: Customer Relationship Management systems (CRM) and Supply Chain Management systems (SCM).

Similarly to ERP Systems, EES have also presented a series of complex difficulties in their implementation and deployment processes within enterprises, most of them by the lack of proven methodologies (Gartner, 2003); therefore, current research is focussing in finding reasons and possible solutions for this situation. So far we also know that some implementation processes of EES conducted in certain scenarios have not achieved the required goals (Bull, 2003; Corner & Hinton, 2002). In this respect, we consider that the research and proposal of adequate EES implementation approaches, methods should consider the analysis of the specific nature and the different goals and the various types of EES.

In an attempt to contribute to EES implementation research, in this paper we present an initial comparative analysis of issues relevant to CRM and SCM systems implementations. This analysis pretends to understand the main differences between the implementation of CRM and SCM systems in particular, as a first step before the proposal of adequate implementation processes for these two types of EES. We expect with this contribution to settle the bases in order to obtain well-suited implementation approaches, methodologies and processes for each one of the considered EES, namely CRM and SCM systems, that will hopefully help in the future reduction of the many failures associated with their implementation projects.

This paper is presented in four main sections: In section 2 we present the possible approaches to apply in the implementation of EES; in section 3 we describe how these approaches can be used in the implementation of EES; and finally in section 4 we present the concluding remarks and the further work that we would like to elaborate in the near future.

## **2. IMPLEMENTATION APPROACHES**

As we mentioned before, EES have faced a series of problems during their implementation phases which has led us to consider the possible causes and to analyze the current use of implementation methods to deploy EES in enterprises. We believe that a possible cause for the high failure rate in EES implementations, more in CRM than in SCM implementations, can be the inappropriate use of implementation approaches and methods for EES, inherited and only slightly adapted from ERP implementation methods.

Given the many differences in nature between CRM and SCM systems, and between them and ERP systems, it seems that this may be a basic source of problems. Thus, we think that each one of the EES types should be addressed in a different way, according to the particular instance of the system and the project. Moreover, it seems that EES implementations should include certain features not considered in ERP projects that could aid and support the overall process in order to obtain a better control of their development. For this purpose, we think that such features ought to be gathered from the analysis of other related areas. Looking into the software development process area, we find two main development approaches that may prove useful for the objective of comparing CRM and SCM systems implementations, namely agile methods and plan-driven methods (Boehm and Turner 2003).

Agile methods are a recent family of software development processes approach that focus on customer satisfaction, low level failure rates, fast delivery times and answers to rapidly changing environments. They point to minimize possible risks by using defined period of times called iterations, which can be viewed as “mini-projects” that include the required tasks to create parts of the whole project.

On the other hand, plan-driven approach has been used for many years in software engineering to develop projects that require predictability, stability and high assurance. The progress is generally measured in terms of deliverable artefacts such as requirement specifications, design documents, test plans, code reviews and the like. They are used within stable and predictable environments.

According to Boehm and Turner (2003), there are certain characteristics common to both software development methodologies that can be used to decide in which situations it is more suitable to use an agile approach or a plan-driven approach. Those characteristics are depicted in Table 1.

<b>Project Characteristics</b>	<b>Agile home ground</b>	<b>Plan-driven home ground</b>
<b>Application</b>		
Primary goals	Rapid value, responding to change.	Predictability, stability, high assurance.
Size	Smaller teams and projects.	Larger teams and projects.
Environment	Turbulent, high change, project focused.	Stable, low change, project and organization focused.
<b>Management</b>		
Customer relations	Dedicated onsite customers, focused on prioritized items.	As-needed customer interactions, focused on contract provisions.
Planning and control	Internalized plans, qualitative control.	Documented plans, quantitative control.
Communications	Tacit interpersonal knowledge.	Explicit document knowledge.
<b>Technical</b>		
Requirements	Prioritized informal stories and test cases, undergoing unforeseeable change.	Formalized project, capability, interface, quality, foreseeable evolution requirements.
Development	Simple design, short increments, refactoring assumed inexpensive.	Extensive design, longer increments, refactoring assumed expensive.
Testing	Executable test cases define requirement, testing.	Documented test plans and procedures.
<b>Personnel</b>		
Customers	Dedicated, collocated crack performers.	Crack performers, not always collocated.
Developers	At least 30% full-time Cockburn level 2 and 3 experts; no level 1B or level -1 personnel.	50% Cockburn level 3s early; 10% throughout 30% Level 1B's workable; no Level -1s.
Culture	Comfort and empowerment via many degrees of freedom (thriving on chaos).	Comfort and empowerment via frameworks of policies and procedures (thriving on order).

Table 1. Agile and plan-driven project characteristics (Boehm & Turner, 2003).

Also, Boehm & Turner (2003) have classified the main characteristics of a software development project in four main groups, and have used them to establish a comparison of both methodological approaches. They state that there are definite home grounds for agile and plan-driven methods, although the actual extremes are rarely populated. Also, there is a relationship with the position of a method, between the home grounds and the type of project and environment where it will most likely succeed. In Table 1, we can

appreciate the main differences between plan-driven and agile methods, and as the authors state, developers have to determine if agile methods, plan-driven methods or a combination of the two will work best for their project.

In the same way, these authors have also identified five critical decision factors associated within the agile and plan-driven home grounds, as shown in Table 2. Size and criticality factors are used to distinguish between agile and plan-based methods; the dynamism factor represents the nature of the development environment, and the personnel and culture factors refer to issues around the people involved in the project. These discriminators are useful to select the most suitable approach to manage a software development project.

<b>Factor</b>	<b>Agility discriminators</b>	<b>Plan-driven discriminators</b>
Size	Well matched to small products and teams; reliance on tacit knowledge limits scalability.	Methods evolved to handle large products and teams; hard to tailor down to small projects.
Criticality	Untested on safety-critical products; potential difficulties with simple design and lack of documentation.	Methods evolved to handle highly critical products; hard to tailor down efficiently to low critically products.
Dynamism	Simple design and continuous refactoring are excellent for highly dynamic environments, but present a source of potentially expensive rework for highly stable environments.	Detailed plans and “big design up front” excellent for highly stable environment, but a source of expensive rework for highly dynamic environments.
Personnel	Require continuous presence of critical mass of scarce Cockburn level 2 or 3 experts, risky to use non-agile level 1B people.	Need a critical mass of scarce Cockburn level 2 and 3 experts during project definition, but can work with fewer later in the project, unless the environment is highly dynamic. Can usually accommodate some level 1B people.
Culture	Thrive in a culture where people feel comfortable and empowered by having many degrees of freedom; thrive on chaos.	Thrive in a culture where people feel comfortable and empowered by having their roles defined by clear policies and procedures, thrive in order.

*Table 2. Comparison of agile and plan-driven factors (Boehm & Turner, 2003).*

### **3. IMPLEMENTATION APPROACHES FOR EXTENDED ENTERPRISE SYSTEMS**

Despite that a software development project has substantial differences with an implementation project, we believe that the above characteristics and discriminators can be applied to the analysis of EES implementation approaches, in order to later on minimize risks and manage more successfully the implementation process.

In this section we extrapolate and apply the Boehm & Turner foundations presented to the case of CRM and SCM systems and, according to their respective characteristics and environments, we can determine the approach that seems to fit the best to the implementation process of each one of those EES. But first let us define in more depth the purpose of EES, and more specifically of CRM and SCM systems.

EES provide a technological platform to integrate and coordinate business processes of several functional areas of an organization. They facilitate the sharing of strategic information among all the functional and management levels of the organization, and they play an important role in eliminating data fragmentation due to the existing legacy systems within the organization, by proposing a special standard and shared reference data model. Specifically, CRM and SCM systems support strategic and fundamental processes for the correct fulfillment of competitive goals of the Sales and Logistic functional areas of the organization.

A Customer Relationship Management (CRM) system includes tools, technologies and procedures that allow managing, improving and facilitating sales, support and related interactions with customers, prospects, and business partners throughout the enterprise (Davenport et al., 2001). The main goal of a CRM system is to help sales and marketing people to analyze of customer behavior and its value for the organization by using technology and human resources. Research already made in this area states that, using CRM systems, organizations may obtain loyal and more satisfied customers by improving their business, reducing acquisition costs and gaining acknowledgment of their brand, which it is translated to a better financial performance (Gefen & Ridings, 2002). Some organizations only implement some functionalities of a CRM system and, although this action may limit the whole system functionality, it is a great step towards integrating the missing modules in the future to achieve a complete implementation.

On the other hand, a Supply Chain Management (SCM) System is a packaged technological solution that, after its deployment, it offers to the organization several advantages to coordinate their raw material acquisition, production and logistic processes, and at the same time, it improves relationship with customer and suppliers, building long-term strategic alliances. We can define a SCM system as the technological solution that manages and give support to activities related with product delivery, from raw material management until the final product reaches the end customer. It includes processes for raw material acquisition, production and assembly, storage, inventory control, order management, distribution along commercial channels and customer delivery (Lummus & Vokurka 1999). A SCM system will allow the organization to automate and control in a better way processes related to product acquisition, production and warehousing in order

to obtain the desired benefits. In order to achieve these benefits, an implementation process is required. According to Hammant (1997) and Power (2002), since the supply chain implementation process is difficult due to its own nature a development process with well-defined phases must be carried out.

### **ANALYSIS OF EXTENDED ENTERPRISE SYSTEMS IMPLEMENTATION APPROACHES**

The academic field, as previously mentioned, gained interest first in ERP systems and more recently in both CRM and SCM systems due to the number of implementation projects that present total failures or low satisfaction levels, with the implied risks to enterprises. In this case, researchers have used in-depth case studies as the main research method in order to analyze real-life implementation processes and try to find the causes that motivate the unachieved goals of the involved EES (Sridharan & Caines, 2005).

Both CRM and SCM systems, and their implementation projects, are very different by nature, from their use to their environment. As a contribution to EES implementation research, we have elaborated an analysis based on the work presented in section 2, by applying the characteristics of the software development approaches to both CRM and SCM implementations, in order to compare and resolve which approach seems to be best suited for CRM and SCM respectively, as depicted in Table 3. We believe that this comparison will be useful to identify the approach to follow when the implementation process is executed.

Project characteristics	Agile Home grounds	N	Plan-Driven Home ground
<b>Application</b>			
Primary goals	Rapid value, responding to change	● ▲	Predictability, stability, high assurance
Size	Smaller teams	● ▲	Larger teams and projects
Environment	Turbulent, high change, project focused	● ▲	Stable, low change project and organization focused
<b>Management</b>			
Customer relations	Dedicated onsite customers, focused on prioritized increments	● ▲	As-needed customer interactions, focused on contact provisions
Planning and Control	Internalized plan, qualitative control	● ▲	Documented plans, quantitative control
Communications	Tacit interpersonal knowledge	● ▲	Explicit documented knowledge
<b>Technical</b>			
Requirements	Prioritized informal stories and test cases undergoing unforeseen change	● ▲	Formalized project, capability, interface, quality, foreseeable evolution requirements
Development	Simple design, short increments, refactoring assumed inexpensive	● ▲	Extensive design; longer increments; refactoring assumed expensive
Test	Executable test cases define requirements	● ▲	Documented test plans and procedures
<b>Personnel</b>			
Customer	Dedicated, collocated Crack performers	● ▲	Crack performers, not always collocated
Developers	At least 30%, full-time Cockburn Level 2 and 3 experts: no level 1 or Level -1 personnel		50% Cockburn level 3s early, 10% throughout 30% Level 1B's workable, no Level -1s
Culture	Comfort and empowerment via many degrees of freedom (thriving on chaos)	● ▲	Comfort and empowerment via framework of policies and procedures (thriving on order)

● CRM IS	▲ SCM IS
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Table 3. Extended Enterprise Systems in the agile and plan-driven home grounds.

Overall, we can appreciate that, according to the evaluation presented in Table 3, and comparing the agile and plan-based characteristics with those related to SCM and CRM

systems, we can think that while the plan-based approach lends itself more adequate to the SCM systems environment, it seems that CRM implementations can be better addressed with the application of an agile approach. Let us argue this position particularly for each one of the characteristics, grouped by types.

*Application:* CRM systems are usually projects whose application needs to be prepared to quickly respond to changes in the requirements, maybe one of the reasons being the dynamic and sometimes unstable environment of the commercial processes in the organizations. For example, most of the time the marketing department needs to adequate their processes to obtain new information about competitors, clients, new markets and market tendencies. On the other hand, in the SCM home grounds usually systems implementations require coordination of many members of the logistic chain, involving a large working team that needs a well-based and detailed plan to pursue the success of the overall SCM implementation process. Additionally, while SCM systems deal with information processing for operational transactional purposes, CRM systems concentrate more on information analysis for commercial decision support.

*Management:* Management of the CRM projects demands for qualitative control, since it is initially difficult to measure objectively issues such as customer satisfaction with a quantitative scale. Communication is based on regular but more informal meetings, with presentations and brainstorming sessions with users. These do not know ahead of time what they need from the future CRM system; instead, they discover the functionality and possibilities of the system as it is deployed and used. All this being opposite for the case of SCM systems, where communication is formalized and functionality is understood from prior logistic experience, and through the use of common models such as SCOR, while the relevant knowledge is explicitly represented in documents and procedure manuals.

*Technical:* Technically, CRM and SCM systems are also quite different, for example in the environment for capturing requirements. In CRM systems requirements are changing and unpredictable at initial stages and they are discovered along the whole implementation process; in SCM systems requirements are formalized from the beginning and their evolution is more predictable because they hardly present any changes in short periods. Another difference is the test process: a CRM system needs to test its functionality through test cases and the opinion of users, while a SCM system has parameters and metrics predefined to evaluate processes.

*Personnel:* Both systems require well-prepared practitioners and the commitment of the top managers in their implementation processes. Perhaps the main difference is given by the environment. Marketing people linked to CRM systems are creative people who need freedom and work without constraints. Thus, CRM implementers must have the appropriate skills to manage and involve this type of user. In contrast, in the implementation of SCM systems there are production and logistics engineers that are used to work with methods, procedures and orders, and with the purpose of being productive they prefer to work with frameworks. Information systems or software

engineers may find themselves more like these other engineers, which may ease communication and collaboration.

The critical decision factors and the discriminators presented in Table 2 can be applied to EES in a way similar to that used by the original authors. Regarding size, a CRM project is usually developed by a small team while for an SCM project a large and coordinated team is required. The criticality of a SCM project is handled with documentation and defined procedures, unlike CRM projects where the difficulties are often faced with real-time on-the-fly solutions. The dynamism of a CRM environment contrasts with the pre-designed plans and actions of a SCM environment as well as the profile of the people involved in both projects: CRM project members require certain degrees of freedom to carry out their tasks while SCM project members have their roles and actions defined since the beginning.

#### **4. CONCLUSIONS AND FURTHER WORK**

ERP and EES systems have expanded their presence in today business activities during this last decade, given the significant advance of information systems and technologies and the growing competition of enterprises in a global level. A significant growth of such systems is expected and has been foreseen by specialized market analysis firms that expect the full incorporation of these systems across most industries, processes and functional areas.

However, there are still big problems with the low success and satisfaction rates accomplished with current implementation processes, resulting in bad reputation for EES despite the great functionalities they offer. For this reason we have focused on proposing in this paper a contextual comparative analysis of CRM and SCM systems, in order to facilitate in the future possible solutions for the current problems.

The analysis presented opens possibilities to integrate and adapt characteristics of software development approaches into the implementation processes of enterprise information systems. The enrichment of the general process with features of other approaches may provide the adaptability and course of actions the implementation should follow depending on the environment it takes place. Therefore, this could help the personnel involved in the projects with risk management, higher satisfaction levels and reduction of failures.

The next step in this research will be to explore and deepen the relations between the EES and the software development approaches to describe and analyze which features and particularities from agile methods and plan-driven methods can be translated to the implementation process of CRM and SCM systems, respectively. While, on a general level, CRM systems demand for an agile approach and SCM systems requires a plan-driven one, in fact, as in bespoke software development, the analysis can be refined so as to consider agile and plan-driven situations within one implementation project, be it for CRM or for SCM. We expect to gather enough elements from these perspectives and to elaborate a formal proposal for integrating them into EES implementation approaches.

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