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Enterprise System Assimilation: phases, activities, and outcomes

Introduction

Enterprise systems (ES) are the backbone of most global manufacturing and service enterprises [Muscatello, Chen, 2008] and they continue to draw attention of the researchers [e.g., Hasan M. *et al.*, 2011, Sammon, Adam, 2010; Silva, Fulk, 2012]. Enterprise Systems (ES) were formerly identified with Enterprise Resource Planning (ERP) applications [Sedera, Gable, 2010]. Rosemann [1999] defines an ERP system as "a customizable, standard application software which includes integrated business solutions for the core processes (e.g., production planning and control, warehouse management) and the main administrative functions (e.g., accounting, human resource management) of an enterprise." These systems have later evolved into even more sophisticated application suites, including, besides ERP, also Customer Relationship Management (CRM), Business Intelligence, Workflow Management, Content Management and other functionalities, which are required to support information and workflow in organizations. Generalizing the above definition, one can state that an Enterprise System is a standard, customizable application suite that includes integrated business solutions for the major business processes of an enterprise, with the ERP system remaining the central component of this suite. Though Enterprise Systems are among the most popular pieces of business software, enterprises around the globe are still facing problems while adopting them [Aloini *et al.*, 2007; Wu *et al.*, 2007]. Most of the research has therefore concentrated on the Enterprise Systems' implementation success/failure factors [e.g., Dezdar, Sulaiman, 2009; Soja, Paliwoda-Pękosz, 2009]. Another important aspect, i.e. implementation process/methodology is omitted in the research since the early 2000's. The aim of this paper is to examine the assimilation process of a big Enterprise System, basing on two case studies of SAP assimilation in Polish organizations. The phases of the

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assimilation process will be determined, followed by activities, performed in each of the phase as well as resulting outcomes.

1. Enterprise Systems assimilation – literature review

The assimilation of an IT may be defined as: "the process of acquisition and deployment of the IT in an organization" [Bajwa *et al.*, 2004]. The general IT assimilation model is presented in [Kwon, Zmud, 1987] and later altered in [Zmud, Apple, 1992]. It divides the IT assimilation process into six stages:

1. Initiation – when a match is found between an IT solution and its application in the organization.
2. Adoption – when a decision is reached to invest in an IT solution.
3. Adaptation – during which the IT application is developed, installed and maintained.
4. Acceptance – when the application is employed in organizational work.
5. Routinization – the IT solution is perceived as something ordinary.
6. Infusion – when increase in effectiveness is observed due to IT application usage in a more comprehensive manner.

The first two stages represent the pre-implementation phase of the project, the two middle ones: implementation itself, while the last two: the post-implementation phase of IT assimilation.

Regarding the assimilation process of a specific piece of business software, which is Enterprise Systems, and their predecessors – Enterprise Resource Planning systems, the brief summary of early work is presented in Parr and Shanks [2000]. Basing on the previous research these authors propose an ERP assimilation model which comprises of three general phases:

1. Planning phase – which includes the selection of an ERP, assembly of a steering committee, determination of high-level project scope and broad implementation approach, selection of a project team manager and resource determination;
2. Project phase – which extends from the identification of ERP modules through to installation and cut-over;
3. Enhancement phase – which includes the stages of system repair, extension and transformation.

This approach is consistent with the view of Zmud and Apple, presented above in such a sense, that the assimilation process is divided into three

main sub-phases. Ahutiv *et al.* [2002] make a proposal of four-stage ERP implementation process: Selection, Definition, Implementation and Operation. Bajwa *et al.* [2004] altered this model by adding Awareness as the first stage and renaming Definition into Preparation. Ehie and Madsen (2005) concentrate on the project part of the assimilation and make a proposal of five stage model, i.e.: Project Preparation, Business Blueprint, Realization, Final Preparation, Go-Live and Support. The phases naming is consistent with that presented by SAP in ASAP implementation methodology, but the content of each phase differs. For example Ehie and Madsen suggest that Business Blueprint is the base of the system selection, whereas ASAP focuses on the implementation of already chosen system (SAP). Brief description of ASAP phases can be found in Esteves *et al.* [2003]. As ASAP is an ES project methodology, it takes the stance of a consulting enterprise, implementing the system, not the client. Thus the last activity is support of the operation, not operation itself. Comparing to the model of Bajwa *et al.*, ASAP has both preparation and definition (business blueprint) phases and separates the final preparation from the implementation phase. Ehie and Madsen recognize the awareness phase which precedes the project by stating that: "These phases are preceded by a critical look at a company's strategic enterprise architecture and surrounded by change management and business development components."

Generalizing the above one can state that the assimilation process consists of three main phases, with different possible divisions into subphases:

1. Pre-implementation (planning) phase – which includes building awareness of the necessity to invest in an ES, system selection, and definition of high-level project scope, schedule and budget.
2. Implementation (project) phase – which involves detailed project planning, implementation of the system, and activities necessary to launch the new system;
3. Post-implementation (operation/enhancement) phase – which involves system stabilization after go-live, its day-to-day use, as well as necessary repairs and enhancements.

The assimilation process may be better understood by the examination of detailed activities, summarized in Table 1.

Table 1. Enterprise System Assimilation activities and outcomes

Ahutiv *et al.* [2002]	Bajwa *et al.* [2004]	Ehie and Madsen [2005]	Esteves *et al.* [2003]
-	**Awareness:** Evaluation of current situation Gathering facts and information to identifying reasons to change	**Pre-project:** Driving implementation motive, Critical evaluation of internal/external aspects	-
Selection: Collection of information about the systems and implementations Needs analysis Collection of information about technological infrastructure Contract signing	**Selection:** Definition of project objectives Collection of vendor consultant information Needs analysis Evaluation of vendor and consultant alternatives Evaluation of IT infrastructure Feasibility study Finalizing contracts	-	-
Design: Definition of scope Establishing implementation teams and timetables Training of the implementation teams Initial implementation of the system	**Preparation:** Definition of scope Establishment of implementation teams and timetables Training of implementation teams Initial prototyping Determination of implementation approach	**Project Preparation:** Determination of project Steering Committee and team, Definition of scope, Creation of detailed project plan, Determination of responsibilities	**Project Preparation:** Definition of project objectives and scope, Preparation of project plan, Definition of project team

Ahutiv *et al.* [2002]	Bajwa *et al.* [2004]	Ehie and Madsen [2005]	Esteves *et al.* [2003]
Implementation: Gap analysis, Business process reengineering, Identification of complementary solutions, Construction of prototype, Data conversion, Definition of work procedures, Full implementation of the system Training of users, Acceptance tests	**Implementation:** Detailed gap analysis, Business process reengineering, Identification of complementary solutions, Construction of prototype, Data conversion, Clarity of work procedures, Full implementation, User training, Acceptance tests,	**Business Blueprint:** Analysis of current business processes, Education on ERP systems, System selection, Education on a selected system: functionality and configuration, New processes design,	**Business Blueprint:** Detailed documentation of the organizational structure and business processess, Scope adjustment
		Realization: Technical development: modifications, interfaces, data conversion, Prototyping and adjustments towards the final system	**Realization:** System configuration,
		Final preparation: Tuning and testing, Training	**Final preparation:** Testing, User training, Cut over activities
Operation: Establishing of support centers, Performance of changes and enhancements, Upgrading the system, System audit,	**Operation:** System use, Maintenance, Business integration	**Go-live and support:** Bring ERP modules live, Improve and expand ERP system continually	**Go-live and support:** Move from pre-production to production environment, Support organization set up for end-users,

Ahutiv *et al.* [2002]	Bajwa *et al.* [2004]	Ehie and Madsen [2005]	Esteves *et al.* [2003]
System termination			System performance improvement

Source: In the lead row.

The assimilation process variants, derived from the literature will be now compared with the results of the 2 case studies of SAP implementation projects.

2. Case study
2.1. Research design

A multiple case study was chosen as the research method. The unit of analysis was the assimilation process of an Enterprise System - SAP. Two cases were selected, differing in the circumstances of and approach to the system selection as well as in the implementation partner, conducting the implementation. The primary data collection method was analysis of the documentation, including project charters, blueprints, meeting minutes, schedules and protocols.

The research questions posed were the following:

RQ1: What were the phases of the assimilation process?

RQ2: What activities were done in each of the phases and what where their outcome?

2.2. Case study results
2.2.1. Company 1

Company 1 was free to choose any enterprise system available on the market. The reasons for the decision to change the legacy systems are not known to the researcher, as the available documentation starts from the selection process. Therefore the process of building awareness of the necessity to invest cannot be assessed in this study.

After the company decided to change the system, a selection process was launched. An external consulting company was hired to facilitate this process. A three month selection project was launched, consisting of the following activities:

1.   Business process analysis and modelling; current systems audit.
2.   Requirements analysis and specification.

3. High level gap-fit analysis of the systems on the market; creation of the short list; preparation of high level schedule; preparation of the request for proposal.

The outcomes of this phase were the following:

1. Business processes map,
2. Requirements specification document,
3. Request for proposal,
4. Short list of Enterprise Systems that matched the requirements,
5. High level project schedule and budget.

As a result, the SAP system was chosen as the optimal match for the company's requirements. The second stage was contract negotiations regarding both licence agreement with the vendor and implementation contract with the implementing consulting company. The requirements specification document, produced in the preceding phase was used as a basis for the scope definition in the implementation contract. Basing on that scope budget and schedule were defined and included in the contract.

After the contract was signed, the implementation phase begun. It consisted of five stages, according to the ASAP methodology:

1. Project preparation – with Project Charter being the main product. The Project Charter included:
    a. project scope and schedule (repeated from the contract),
    b. project organization, together with assignment of people to the organizational units (Steering Committee, Project Management Team, Implementation Teams for each functional area, consisting of key users and consultants),
    c. roles definition and split between the parties (client company and consulting company),
    d. project procedures: communication procedures, document templates, integration meetings' general plan, work reporting by the consultants,
    e. description of the technical infrastructure of the project.
2. Business Blueprint phase – during which a detailed analysis of business processes and requirements was made by functional consultants, who later designed the way these requirements would be reflected in the system. It consisted of analytical workshops, during which consultants interviewed business process owners and key-users with regards to the detailed functional requirements. Basing on

that knowledge consultants prepared the system design. The result was a Business Blueprint document, containing specification of system configuration, master data, extensions, reports, forms and interfaces'. Business Blueprint was a basis for configuration and programming work.

3. Realization - during that stage the system was actually configured, according to the design from the Business Blueprint, master data was prepared for migration from legacy systems and all needed programming work, regarding extensions, reports, interfaces and forms was performed. The outcome of this stage was the system ready for testing and end-user training.

4. Productive start preparation – during that phase the system was tested and errors were corrected. All the configuration was transported to the productive system (from the development system – through the test system). Master data were migrated to the productive system and key-users were trained. The product of this stage was system ready for go-live.

5. Go-live and support – the system was launched productively. Consultants supported the users in their day-to-day activities and first month-end closing. All errors encountered in normal system usage were corrected.

   After that phase, the maintenance agreement was signed between the parties – so that corrections and improvements could be made on a daily basis.

2.2.2. Company 2

The system change in Company 2 was imposed by the international holding of which it was part of. The company top management was however convinced that the change is necessary due to company growth which could not be supported by the current system any more. As the system was selected on the holding level, company 2 did not have to run the system selection process, however it was free to choose the implementation partner and had to negotiate the implementation contract with regards to detailed scope, budget and schedule. The implementation partner was pre-selected basing on the geographical proximity and informal research regarding the reliability of the companies available on the market. After that, the negotiations regarding project scope, budget and schedule took place. The implementation partner claimed that for the preparation of the fixed-price offer an analysis of requirements is needed.

Therefore a one-month analytical project was launched to prepare the requirements specification. Basing on that specification scope, budget and schedule was determined and contract signed.

Although project 2 was led by a different consulting company, the project phases, together with activities and outcomes were exactly the same as in case 1.

2.3. Summary of the case study

The two cases presented above differed with regards to the pre-implementation phase due to different initial conditions, and were similar with regards to the implementation phase. The post-implementation phase was not examined in detail: both projects went-live and the systems were supported according to the maintenance agreement but no detailed analysis could be made for that phase on the basis of available documentation.

The phases and activities were the following:

1. Pre-implementation (planning) phase, which included:
   – Identification of the need for change (awareness): both companies were aware that the system had to be changed due to business reasons. However the process of identification could not be analysed basing on the available data sources,
   – Analysis of business processes and requirements: which resulted in the definition of project scope for the system selection purposes in company 1. Company 2 did not perform this step as the system was imposed by the holding company.
   – System selection: in company 1. Company 2 did not perform this step as the system was imposed by the holding company.
   – Implementation partner selection: both companies run a process of preliminary selection of the implementation partner.
   – Scope/schedule/budget determination - implementation contract preparation: both companies negotiated the contract with the implementation partner. Company 1 used the scope definition from the system selection phase as the starting point. Company 2 launched an analysis workshop on that stage to determine the scope of the implementation. Basing on the scope, the budget and schedule was determined in both companies and included in the implementation contract.

2. Implementation (project) phase, which consisted of the following stages:

1) Project preparation – with Project Charter being the main product. The Project Charter defined:
   – project scope and schedule (repeated from the contract),
   – project organization, together with assignment of people to the organizational units (Steering Committee, Project Management Team, Implementation Teams for each functional area, consisting of key users and consultants),
   – roles definition and split between the parties (client company and consulting company),
   – project procedures: communication procedures, document templates, integration meetings' general plan, work reporting by the consultants,
   – description of the technical infrastructure of the project.
2) Business Blueprint – which resulted in the project design (Business Blueprint document), containing specification of system configuration, master data, extensions, reports, forms and interfaces.
3) Realization - during which the system was actually configured, according to the design from the Business Blueprint, master data was prepared for migration from legacy systems and all needed programming work, regarding extensions, reports, interfaces and forms was performed.
4) Productive start preparation – during which the system was tested and errors were corrected. Master data were migrated to the productive system and key-users were trained. The product of this stage was system ready for go-live.
5) Go-live and support – the system was launched productively and the system entered the post-implementation phase.
3. Post-implementation (operation/enhancement) phase: which involves system stabilization after go-live and its day-to-day use. This phase was not analysed in detail.

Conclusion

This paper presented the assimilation process of an ERP system in two Polish companies. It resulted in the following conclusions which are not stressed enough in the existing literature:

1) The system selection and implementation partner selection are two separate steps.

2) Requirements analysis phase is crucial not only for the system selection but also for the determination of scope, budget and schedule once the system is selected.

3) Requirements analysis has to be detailed during the project in the form of system design (in SAP implementations called Business Blueprint).

The analysis performed in this paper also allowed to present a more detailed list of actions in the realization phase of the project, together with respective outcomes, comparing to the existing literature.

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Enterprise System Assimilation: phases, activities, and outcomes (Summary)

This paper examines the assimilation process of a big Enterprise System, basing on two case studies of SAP implementation in Polish organizations. The phases of the assimilation process are determined, followed by activities, performed in each of the phase as well as resulting outcomes.

Keywords