

CRITICAL SUCCESS FACTORS OF ERP IMPLEMENTATIONS IN BELGIAN SME'S: A MULTIPLE CASE STUDY

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ABSTRACT

In this paper, we discover and classify critical success factors for ERP implementations. Through a detailed survey in four Belgian SME's, we determine which factors contributed to the success of the implementation and compare them with CSF's found in literature. Our results show that most of the success factors, found in the literature apply to Belgian SME's, although some factors, such as a clear scope definition, management reporting, standardized infrastructure, don't seem to be regarded as success factors in Belgian SMEs.

1 INTRODUCTION

ERP systems are extensive, integrated software systems, supporting the internal operations of an enterprise. They bring about enormous investments in software and in package customization. Many cases are known of ERP implementations, failing to deliver the promised functionality and even endangering the future of the implementing company. The best known example is probably the ERP project, carried out by the American FoxMeyer company, which supposedly led to the bankruptcy of the company in 1996 (Scott, 1999).

However, a survey in the United States revealed that 70% of the companies implanting ERP consider the project as successful (Mabert et al. 2000). More than 55% of the companies admit that the planned budget was exceeded, with an average of 60.6%. When these budget overflows are counted as failures, the success rate of ERP implementations does not reach 50%.

In view of these alarming figures, researchers and companies have looked for ways of improving the chances of success of ERP implementations. Research into ERP implementations around the globe has revealed some of the ERP critical success factors (Mabert et al. 2000, Olhager & Selldin 2003, Parr & Shanks, 2000, Bingi et al 1999, Al-Mashari et al. 2003). Though, most of the previous research in this area focused predominantly on implementation of ERP systems within large organizations. This comes as no surprise since the ERP market — which was primarily focused at the high end spectrum — only recently changed its focus towards SME's (Kremers & van Dissel, 2000).

Critical success factors for implementations of ERP in a SME environment may differ substantially from ERP implementations in large enterprises: it is by no means obvious that critical success factors of ERP implementations may be extrapolated to SMEs. Moreover, we are focusing on one particular region: Belgium. And as Shanks et al. (2000) showed, the approach to ERP implementation should not be copied from one country to another.

In this paper, we develop a view on critical success factors of ERP implementations of medium-sized Belgian companies. In a first instance, we search the literature for critical success factors of ERP implementations. This leads to a general classification framework for ERP success factors. We then study four Belgian medium-sized companies with a successful ERP implementation, from four different sectors of the industry. Through a detailed survey in these companies, we verify if the ERP success factors, discovered in the literature, are relevant for these companies.

2 CRITICAL SUCCESS FACTORS FOR ERP IMPLEMENTATION

A critical success factor (CSF) is a factor which, if addressed, significantly improves the chances of a successful project implementation (Pinto & Slevin 1987). There is no general consensus on the critical success factors of an ERP implementation. In the literature, the number of CSFs varies from nine to sixteen (Ernst & Young 2006, Holland & Light 1999, Nah et al. 2001, Parr & Shanks 2000, Shanks et al. 2000, Sumner 2005, Umble et al. 2003). The merging of these lists of CSFs leads to a list of over forty candidate CSFs. In order to structure these candidate CSFs, we divide them into five groups according to the theme:

1. Vision, scope, and goals;
2. Culture, communication, and support;
3. Infrastructure;

4. Approach
5. Project management.

We have grouped the CSFs, discussed in the literature into these four groups. Below, we review these CSFs and their meaning.

Vision, Scope, and Goals

This group contains CSFs relating to the vision of the enterprise, the scope of the ERP project and the goals of the implementation. The critical success factors of this group are:

- Vision, Strategic goals and Business plan.
 - A clear and motivating overall business vision (Holland and Light 1999, Nah et al. 2001, Umble et al. 2003).
 - A clear project mission, related to the business needs (Nah et al. 2001).
 - The clear definition of strategic goals of the project. The identification of project expectations, results and benefits (Ernst & Young 2006, Holland and Light 1999, Nah et al. 2001, Umble et al. 2003).
 - A clear business plan, describing strategic and tangible benefits, the project resources and timing, the costs and the risks (Nah et al. 2001).
 - A clear model of the target business after the implementation of the project (Holland and Light 1999, Nah et al. 2001).
- Scope.
 - A clear definition of the ERP project scope (Parr and Shanks, 2000, Shanks et al. 2000).
 - The limitation of the scope to essential business functions (Parr and Shanks 2000, Ernst & Young, 2006).
- Efficient management reporting.

Culture, Communication, and Support

- Senior management support.
 - Project approval,
 - Identifying the project as top priority,
 - Senior management participation,
 - Defending and supporting the project,
 - Mediate between parties in times of conflict,
 - Involvement with corporate strategy,
 - Understanding of ERP technology and issues,
 - Proper assignment of resources to the project,
 - Identify and support new goals and objectives,
 - Communicate the shared organizational vision and the role of the new system to the staff,
 - Identify and approve new organizational structures, roles and responsibilities,
 - Approve codes of conduct for the use of the new system.

Senior management support is instrumental during the whole project implementation. It may be encouraged by coupling it to corporate compensation policy (Nah et al. 2001). Strong leadership is important for major projects. It may therefore be advisable to have a senior manager take responsibility over the ERP project (Umble et al. 2003).

- User involvement. (Ernst and Young, 2006).
- Effective change management (Nah et al. 2001, Shanks et al. 2000, Sumner 2005, Umble et al. 2003). Some company properties may ease the implementation of changes:
 - A corporate culture with shared values and common goals (Nah et al. 2001);
 - A culture that encourages open communication (Sumner 2005);
 - A strong corporate identity (Nah et al. 2001);
 - A flexible organization, open to change (Nah et al. 2001, Umble et al. 2003);
 - Emphasis on quality (Nah et al. 2001);
 - Strong information technology capabilities (Nah et al. 2001);
 - Determination to accept and use new technologies (Nah et al. 2001);
 - Determination to overcome implementation problems (Parr & Shanks 2000).

- Internal communication (Holland & Light 1999, Nah et al. 2001).
 - Communication of expectations at all company levels.
 - User participation by taking into account user requirements, remarks, reactions and by seeking user approval.
 - Formal presentations by the project teams and announcement of the project results within the company.
 - Announcement of the project scope, objectives and activities before the project onset.
- Supplier management (Sumner 2005).

Infrastructure

This group contains critical success factors, related to the IT infrastructure. It contains two critical success factors:

- A standardized IT infrastructure (Ernst & Young 2006, Ross et al. 2006).
- Suitable business and IT legacy systems (Holland & Light 1999, Nah et al. 2001).

Approach

This group contains critical success factors related to the overall approach to the ERP implementation. The critical success factors of this group are:

- A formalized project approach and methodology (Ernst & Young 2006, Holland & Light 1999). Three basic methodological approaches are possible (Holland & Light 1999):
 - The skeleton approach, where the project starts with a limited implementation, which is expanded in subsequent versions.
 - The single module approach, where the ERP system is implemented module per module.
 - The big bang approach, where a complete system is implemented.
- Focus on user requirements. This critical success factor is mentioned by Sumner (2005).
- Use of external consultants (Shanks et al. 2000, Sumner 2005).
- User training (Shanks et al. 2000, Sumner 2005, Umble et al. 2003).
- Data accuracy (Shanks et al. 2000, Umble et al. 2003). Two factors of importance are:
 - The data quality of the data, input from legacy systems into the ERP system, should be guaranteed.
 - The absolute need to input correct data into the ERP system.
- Alignment with business processes (Holland & Light 1999, Nah et al. 2001, Parr & Shanks 2000).

Project Management

Many authors consider project management related factors to be critical for a successful ERP implementation. The main critical success factors from this group are:

- Proper project planning, phasing and follow-up (Holland & Light 1999, Nah et al. 2001, Shanks et al. 2000, Sumner 2005, Umble et al. 2003). Elements of proper planning are:
 - The description of the project goals: the goals should be realistic in terms of required quality, time and money (Ernst & Young 2006, Parr & Shanks 2000).
 - The project scope. This includes the identification of the business processes to be included in the ERP implementation, the choice of ERP modules and the identification of the changes to the standard ERP packages. It is essential that these choices are correctly made.
 - The project plan with phasing and the critical path;
 - The milestones and deadlines;
 - The resources plan;
 - The organization of the project follow-up.
 - Contingency measures.
- Proper project management (Ernst & Young 2006, Sumner 2005, Nah et al. 2001, Parr & Shanks 2000, Shanks et al. 2000, Sumner 2005).
- Good project teams (Nah et al. 2001, Parr & Shanks 2000, Shanks et al. 2000, Umble et al. 2003) Some important factors are:
 - Collaboration on a single physical location;
 - Incentives for teams delivering within time and budget;
 - Regular meetings managing partnerships;
 - Incentives and risk-sharing agreements between partners.

3 METHODOLOGY

In order to find out whether the critical success factors apply to Belgian SMEs, we selected 76 SMEs with known successful ERP implementations. In this selection, we considered companies with a number of employees from 10 up to 250 and with a yearly revenue of less than 50 million euro or a balance total of less than 43 million euro to be small to medium-sized enterprises. The number of employees, the revenue and balance total were verified in the Trends Top 100 000 of Belgian companies (Biblo-Roularta 2007). Information on ERP implementations in these companies was obtained from company websites, from websites of ERP vendors and partners and via personal contacts with ERP consulting firms.

The 76 companies were provided with a list of questions on their implementation. From the responses, four representative companies were selected for further study. A polar sampling technique was used: each of the companies belongs to a different industry sector. General information on the four studied companies is given in Table 1.

Semi-structured interview techniques were used to interview key players within each company. Pseudonyms are used to disguise the identity of the participating companies.

4 CASE STUDY IN FOUR BELGIAN COMPANIES

4.1 F-Co

F-Co is a leading European manufacturer of latex foam products. The company has production sites in Belgium and the Czech Republic and has sales offices in Portugal, Spain, Italy, Greece, the U.S., Canada, China, South Korea, Japan and Australia. From 2001 to 2004 the company has restructured its production lines and closed down two sites, moving part of the production from Belgium to the Czech Republic. After three years of losses, the company is profitable since 2005.

F-Co has implemented the SAP ERP system, including the modules supporting purchasing, order entry, materials management, production planning, financial accounting, distribution and logistics and asset management. According to F-Co, 10% of each of the implemented modules needed to be modified to suit the needs of the company. In addition, F-Co has implemented a data warehouse/business intelligence system, an advanced planning system and the company is considering the integration of its customer information system with its ERP system.

Before the ERP system, the ICT infrastructure of F-Co was rather limited. The ERP system was implemented at one single site (Belgium). The implementation project was divided into several small sub-projects, each with its own deliverables. However, the ERP system was operationally introduced in a “Big Bang”.

F-Co spent ample effort to manage the ERP implementation project and to keep it under control. The duration of the project was initially estimated at six months, but the project took between 7 and 12 months to complete. The total cost was within the planned budget of 1 to 1.5 million euro. The company aims at a lifetime of 10 years for the ERP system.

The users were heavily involved in the implementation of the ERP system. They were informed, could participate in the project by offering suggestions and advice, were given ample training and were also involved in the identification of the requirements. Although the users did not formally accept the final project results, acceptance is high and the attitude of users towards the new system was largely positive.

<i>Company</i>	<i>Activity</i>	<i>Employees</i>	<i>Revenue (mio Euro)</i>	<i>Balance total (mio Euro)</i>	<i>Profit (Loss) (Mio Euro)</i>
F-Co ¹	Latex-foam	113	34.1	24.5	1.9
M-Co	Process engineering	57	14.5	8.2	(0.2)
O-Co	Vegetable oils	87	84.0	43.3	0.3
W-Co	Tires and Wheels	51	40.5	79.2	4.6

¹The names of the companies are changed for reasons of confidentiality.

Table 1. Properties of the four companies, considered in the multiple case-study.

<i>Component</i>	<i>Fraction of total cost</i>
Hardware	10%
Software	60%
Consulting	5%
Implementation team	5%
Training	20%

Table 2. The division of the total cost of the ERP implementation of F-Co.

	<i>Fraction of project staff</i>
Users	50%
Business analysts	15%
Technical experts	10%
External consultants	25%

Table 3. The composition of the ERP implementation team at F-Co.

Senior management at F-Co had a pivotal role in the ERP implementation. Senior management approved the project. They also assumed the final responsibility of the project and gave it top priority, defending the project whenever necessary. This proved to be of the utmost importance, as the ERP project lead to major reorganizations within the company. The openness to change of the organization and an organizational culture of open communication were important factors in the final success of the ERP project. Other aspects that were considered of importance are a strong corporate identity, the commitment to new technology and the strong will to overcome operational problems.

F-Co appointed a project champion. This person, from the middle management, became the promoter and facilitator of the ERP project, defending the project at all occasions and resolving internal and external project conflicts.

One quarter of the ERP implementation project team was composed of external consultants (see Table 3). The project manager was chosen, based on the person's competences and experience, reputation and flexibility being the secondary factors. Team members were selected among the top performing staff of the company. Some team members, being involved in several projects, were only involved part-time in the ERP project. The project team did not have the authorization to take critical decisions independently, as critical decisions were taken by the company management, in close consultation with the project team. The project team was motivated by extra compensation for delivery of the project within time and within budget.

4.2 M-Co

M-Co is the Belgian branch of a major world-wide provider of specialized products and technologies for separation, heat transfer and fluid handling. M-Co constructs new machinery and modifies and upgrades existing installations. M-Co is divided into two divisions: one for the development and implementation of equipment for complex processes and another division providing products and services for high performance engineering.

M-Co has implemented the Intentia ERP suite by Lawson. It supports purchasing, order entry, materials management, financial accounting, distribution and logistics and financial management. The Intentia system is interfaced with a data warehouse and with third-party query and reporting tools.

M-Co reported a considerable performance improvement after the ERP implementation. Information is more readily available, business processes are better integrated and supply management and financial management have improved. The company now has a better customer order management and a shorter order-to-delivery cycle. However, M-Co reports that staff management processes and supplier relationships have not improved after the introduction of ERP.

The vanilla ERP system covered about 80% of the business processes of M-Co. To close the gap, both the business processes and the ERP software were modified. To modify the business processes, M-Co used business process re-engineering and process modeling tools. Most of the modifications were in the distribution and logistics module, where 30% of the module needed modification. About 20% of the financial module needed modification and about 5% of the purchasing module. The order entry and materials management modules were not modified.

The ERP project was divided into several subprojects. Of particular importance were the multi-site issues, as the ERP system needed to be rolled out on several sites, within the framework of a standardized infrastructure. The overall ERP project, including the division into subprojects, was planned in advance. No disaster planning and no overall new business architecture were made.

The ERP project received a higher priority on time, budget and staffing than other projects in M-Co. The project overran slightly in budget and staff and had a major overrun in time, taking between 7 and 12 months to complete. The total project cost was between 1 and 1.5 million euro. The progress and performance of the project was only measured by project management related criteria. Operational criteria were not considered although user feedback was taken into account.

<i>Component</i>	<i>Fraction of total cost</i>
Hardware	30%
Software	35%
Consulting	10%
Implementation team	10%
Training	15%

Table 4. The division of the total cost of the ERP implementation of M-Co.

<i>Fraction of project staff</i>	
Users	40%
Business analysts	20%
Technical experts	20%
External consultants	20%

Table 5. The composition of the ERP implementation team at M-Co.

Users were timely informed on the project, but were not actively involved. Only management participated actively in the project by offering requirements, advice and feedback. However, the project was positively accepted by the users. Probably, the appointment of job helpers was instrumental for user acceptance. Users received extensive training in the new system, both technical training to use the software as business-oriented training, to understand the business processes behind the ERP software. Data accuracy was emphasized during training sessions.

The participation of M-Co top management was crucial for the success of the ERP project. Top management approved the project and assumed responsibility. They publicly characterized the project as top priority and supported it at all instances. The corporate culture of flexibility, shared values and common goals, enabling open communication also had a positive effect. The top management also selected a project champion from the middle management, although it remained unclear how this person effectively contributed to the success of the ERP implementation.

The project manager was selected because of this person's capabilities and flexibility. Another selection criterion was reputation. Experience was not taken into account. Not all project team members were full-time assigned to the project. The project team needed to consult with the management to make critical decisions. There were no extra compensations for completing the project on time and within budget.

4.3 O-Co

O-Co is the European division of a global player in the development and production of vegetable oils and fats for use in food and snacks, especially in chocolates, cookies and ice creams. These products are also used in the baby-food industry, for the production of margarines and dairy products and in deep-fried snacks.

O-Co has implemented the SAP ERP system to support purchasing, order entry, materials management, production planning, financial accounting, distribution and logistics and financial management. Other business functions are implemented with specific software, interfaced with the SAP system. In addition, the ERP system contains a data warehouse module, management query- and reporting tools and advanced planning facilities. O-Co is considering to open up the system to its customers.

The functionalities offered and the vendor support were the prime factors in the selection of the ERP software. O-Co estimates the useful lifetime of the ERP system at five years. The ERP system was implemented to replace existing specifically developed systems. Simplification, standardization and the improvement of relationships with customers and suppliers were other factors influencing the transition to ERP.

The major benefit of the ERP implementation at O-Co was the improved integration of business processes. Other benefits were the improved quality and availability of information, a better financial management and — to a lesser extent — improved materials management. O-Co also registered slightly improved interaction with customers and suppliers and slightly better cash management.

About 70% of the existing business processes were directly supported by the ERP software. The implementation thus required significant modifications to the ERP package. To close the gap, business processes were modified and modifications to the ERP software were implemented. Special attention was paid to keeping modifications to business processes and the software to a strict minimum. Before migration from the existing systems to ERP, the existing data was extensively monitored for errors. In addition, users were made aware of the importance of entering correct data into the ERP system.

Project management and follow-up posed no significant problems. The project was accorded very high priority, so budgets, time and staff were allocated with priority to this project. The project completed within time and budget and showed a slight staff overrun. The total cost of the ERP project was between 1 and 1.5 million euro. The project took between 7 and 12 months to complete. The project was evaluated against project management criteria only,

<i>Component</i>	<i>Fraction of total cost</i>
Hardware	10%
Software	10%
Consulting	50%
Implementation team	20%
Training	10%

Table 6. The division of the total cost of the ERP implementation of O-Co.

<i>Fraction of project staff</i>	
Users	50%
Business analysts	10%
Technical experts	0%
External consultants	40%

Table 7. The composition of the ERP implementation team at O-Co.

ignoring operational criteria. No particular extra compensation was provided for completing the project within budget or within time.

During the implementation, particular attention was paid to the involvement of the users. Users were timely informed about the ERP project. In addition, their requirements, remarks, reactions and feedback were thoroughly taken into account. The project team considered it an important issue to actively seek the approval of the users. Another important factor was the active involvement of the top management, who gave the project all possible support: approval, identification as top priority, conflict resolution, advocating, commitment and active participation. However, the O-Co top management did not assume the final responsibility of the project, this responsibility being carried by a member of the operational management team. The adoption of the ERP system was further enabled by the corporate culture of open communication, openness for change, a commitment to new technology and the strong will to overcome operational problems.

To further aid the adoption of the ERP system, change agents were appointed. O-Co also appointed a project champion, selected from the middle management. The tasks of this person included: presenting the advantages of the system, defending the project against critics, resolve conflicts, keeping contact with users and detecting problems with the new system.

The project team was composed from the best staff members from within O-Co. It is remarkable that half of the project team consists of end users. The remainder of the project team largely consisted of external consultants, with limited participation of internal business analysts. The most important factors in the selection of the project manager were the capabilities, experience, reputation and flexibility. All critical decisions in the project were taken by the corporate management.

4.4 W-Co

Part of a global industrial corporation, W-Co is a provider of industrial and agricultural tires and complete wheels. These are used in agricultural machines, but also in forklifts and other industrial machines. W-Co has three sites in Belgium: a sales office, a distribution center and a site dedicated to agricultural tires. Since the restructuring of the company, there is no more production in Belgium, production being relocated to Sri Lanka and Spain.

W-Co has implemented the Intenia ERP software by Lawson. The supported functions are purchasing, order entry, materials management, production planning, financial accounting, distribution and logistics and financial management. The ERP system also contains e-business functions and management query- and reporting tools. It also interfaces with a data warehouse.

The ERP system was implemented to simplify and standardize the ICT systems and to improve interaction and communication with suppliers and customers. The Intenia ERP software was selected, based on the functions offered, the vendor support and the references.

The ERP software covered 95% of the existing business processes. The remaining gap was closed by modifying the ERP software. Business processes remained unchanged or were at most marginally modified. The production planning and distribution and logistics modules required 5% modifications. The order entry module required 10% modification. The ERP system was rolled-out in a single operation.

The ERP project was only loosely planned: there were no critical paths defined and there was no room for contingency. However, the project was split into subprojects and a complete model of the future business was elaborated. The project completed within time and budget and with the allocated staff. There was a small budget overrun. The project took between 7 and 12 months to complete. The cost of the ERP implementation was between 1 and 1.5 million euro.

<i>Component</i>	<i>Fraction of total cost</i>
Hardware	5%
Software	15%
Consulting	50%
Implementation team	10%
Training	20%

Table 8. The division of the total cost of the ERP implementation of W-Co.

<i>Fraction of project staff</i>	
Users	10%
Business analysts	50%
Technical experts	20%
External consultants	20%

Table 9. The composition of the ERP implementation team at W-Co.

The project was evaluated using project management criteria only. The return on investment of the project was estimated at 5%, the useful lifetime being estimated at three to five years. No specific extra compensation was provided for project completion within budget or within time.

At the onset and during the project, user input was solicited. Their initial requirements and feedback on the final implementation were taken into account, although users were not asked for formal approval. The user community was represented by a few users, although the complete community was timely informed about the project. Users were trained extensively and well in advance, emphasizing data accuracy. Most of the training concentrated on practice with the new system. Additionally, job helpers were appointed. Globally, users played a major role in the ERP implementation at W-Co.

Several changes in the structure and culture of the organization were necessary at W-Co. Top management was instrumental in this, clarifying the role of the ERP system and the required changes in corporate culture. Top management had a very large participation in this project: approving the project, alignment with corporate strategy, public identification as top priority and conflict mediation. In addition, top management provided a project champion and took the final responsibility over the project.

The project members were selected among the best available staff. Not all project team members were full-time assigned to the project. The principal criteria for the selection of the project manager were the person's reputation and flexibility. The project team was authorized to take urgent critical decisions autonomously, although proper communication with the management was considered important.

5 DISCUSSION: A COMPARISON OF CRITICAL SUCCESS FACTORS

In this section, we compare the observed critical success factors of the four cases (Section 4) to the theoretical framework, developed in Section 2.

Vision, Scope and Goals.

- Vision, strategic goals and business plan. Most of these factors are well in place, the cases confirming the importance of vision, strategic goals and business plan as a CSF.
- Scope. The scope was properly defined in the four cases. However, the cases show that an explicit limitation of the scope is less important for SMEs than for large enterprises.
- Efficient management reporting. All four studied companies have implemented query- and reporting tools for management reporting. However, it is not possible to determine to what extent these reporting tools contributed to the success of the ERP implementation.

Culture, communication and support.

- Senior management support. The study of the four cases shows that in all four cases senior management support was an important factor for the success of the ERP implementation, confirming the importance of this CSF.
- User involvement. Three of the four implementations actively involved the users. At O-Co users even had a primordial role in the implementation. User approval of the final system was less pronounced, but was also present in three cases.
- Effective change management. Only one of the studied companies, O-Co, did a business process re-engineering. However, all of the studied companies had the necessary corporate culture to embrace change. A suitable corporate culture, open to change, appears to be a more important factor.
- Internal communication. This factor was considered important in all four studied ERP implementations.

- Supplier management. Three of the four companies collaborated closely with their supplier to ensure ERP implementation success..

Infrastructure.

- A standardized IT infrastructure. F-Co and W-Co had rather standardized IT infrastructures while the two other companies did not. Our results show that a standardized IT infrastructure is not an important CSF for ERP implementation in SMEs.
- Suitable business and IT legacy systems. The situation in the four studied companies is varied, so we cannot draw any conclusions on this CSF.

Approach.

- A formalized project approach and methodology. The four studied implementations followed a formalized project approach, so we may conclude that this is an important factor.
- Focus on user requirements. Three of the four studied implementations emphasize the need to focus on user requirements, so we may consider this an important CSF.
- Use of external consultants. All studied companies have used external consultants. Three companies stated that this was done to tap into expertise of business processes, systems configuration and module customization. Although none of the four companies outsourced its project completely to external consultants, the use of external staff is considered an important CSF.
- User training. Three out of four studied companies cite user training as a critical factor. The companies offered both technical and functional training to the users, although the fraction of technical training varies from 30% technical training (O-Co) to 75% technical training (W-Co). Practice training was fundamental in all cases.
- Data accuracy. Although all four studied cases took measures to ensure data accuracy, both during conversion and during the use of ERP, it is not clear that this is actually a critical success factor for a successful ERP implementation.
- Alignment with business processes. In all four studied cases, there was a good alignment between existing business processes and the ERP software, reducing the number of required modifications and programming effort. As SMEs normally have more limited business processes than large enterprises, we conclude that alignment is a less important CSF for SMEs than for large enterprises.

Project Management.

- Proper project planning, phasing and follow-up. The four studied ERP projects were all properly planned, although W-Co did not cater for contingency and did not analyze the critical paths of the project planning. Follow-up was included in all project plans. Three companies divided the project into subprojects, although only F-Co defined expected benefits per subproject. The four companies confirmed the importance of project planning for the success of their project, so we conclude that proper project planning, phasing and follow-up is a major CSF.
- Proper project management. Good project management is strongly correlated to proper project planning. The four studied ERP projects reported good project management. We conclude that this is an important CSF.
- Good project teams. This includes the choice of a good project leader, the appointment of a project champion and the proper staffing of project teams. Three of the four studied companies forward capabilities and experience as major factors to select a project leader. Reputation and flexibility were generally considered less important. We conclude that the choice of a project leader, based on the person's capabilities and experience appears to be an important CSF. All four companies appointed a project champion, although the contribution of the project champion to the final result is not clear. The composition of the project teams, being a mix between external consultants, internal business- and technical analysts and users, varies from one project to the other. However, it is important to obtain a mix of internal experts, external consultants and users within the project team.

6 CONCLUSIONS

We have searched the literature for critical success factors of ERP implementations and we have structured these factors in several groups. We have studied four ERP implementations in Belgian SMEs in order to determine which of the critical success factors, found in the literature, apply to these companies.

We conclude that the largest fraction of the critical success factors, found in the literature, apply to the four studied implementations. The most important critical success factors we have identified in ERP implementations in Belgian SMEs are:

- A clear vision on the strategic goals of the ERP implementation.
- Senior management support.
- Active user involvement.
- A suitable corporate culture, open to change.
- Internal communication on the ERP project, both before and during the project.
- The proper management of the ERP supplier.
- A formalized project approach and methodology.
- A focus on the user requirements.
- The use of external consultants.
- User training, both on technical aspects and on business aspects, oriented towards practice.
- Proper project planning, phasing and follow-up; proper project management.
- A project team, composed of a mix of users, internal technical and business experts and external consultant.

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