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DOES KAIZEN SIGNIFICANTLY REDUCE THE FAILURE RATE OF THE IMPLEMENTATION OF BUSINESS SOFTWARE AT SME?

Andreas Schartner

Vilnius Gediminas Technical University, Saulėtekio ave. 11, LT-10223 Vilnius, Lithuania
Email: andreas.schartner@gmx.de

Abstract. Over the last 20 years, several independent surveys have revealed that a failure rate of approximately 70 % has manifested in the implementation of business software, known as ERP (Enterprise Resource Planning). The implementation process of ERP knows several approaches. None of these approaches could influence the failure rate significantly. Kaizen has supported automotive industry over more than 4 decades to ensure a success rate of nearly 100 % in introduction process of new car models. This paper will demonstrate how Kaizen can be applied to the ERP implementation process to allow a success rate of nearly 100% at SME production companies.

Keywords: Kaizen, ERP, Implementation, Success Factors, Failure Rate.

Jel classification: M11

1. Introduction

Kaizen (改善) stands in Japanese for "improvement" or "change for the better." It refers to philosophy in industry that focuses upon continuous improvement of processes in manufacturing, engineering, and business management. It has also been applied in healthcare, psychotherapy, government, banking, and other industries. When used in the business sense and applied to the workplace, kaizen refers to activities that continually improve all functions, and involves all employees from the CEO to the assembly line workers (Imai, Masaki 1986; Emiliani *et al.* 2007; Bodek 2010).

It also applies to processes, such as purchasing and logistics, which cross organizational boundaries into the supply chain (Colenso 2000). By improving standardized activities and processes, kaizen aims to eliminate waste (Tozawa, Bunji 1995). Kaizen was first implemented in several Japanese businesses after the Second World War, influenced in part by American business and quality management teachers who visited the country. It has since spread throughout the world (Laraia *et al.* 1999) and is now being implemented in many other venues besides just business and productivity.

None of the major software vendors of business software (SAP, Oracle, Microsoft, etc.) have so far applied Kaizen to the complex issue of implementing their business software in the fields of Enterprise Resource Planning (ERP), Customer Relationship Management (CRM), Supply Chain Management (SCM), Product Data Management (PDM), and so on, despite the fact that the failure rate of business software implementation reaches about 70 % (Majed 2000).

This paper will primarily investigate ERP systems since they support the flow of information throughout a company's departments, such as sales, purchase, planning, warehousing, production, dispatching, and financials (Davenport 1998). The implementation of ERP system is known as a lengthy and complex process, and there have been many cases of unsuccessful implementations (Parr, Shanks 2000), which have had major impacts on business performance (Deutsch 1998; Diederich 1998; Nelson, Ramstad 1999).

The company BOB'S WORLD AG applies in its ERP implementation projects the Kaizen principle and defines as first Kaizen cycle the basic process (see Fig. 2). Further Kaizen cycles are determined as optimization cycles to expand the basic process and improve functional coverage of the ERP processes in enterprises.

The Kaizen approach applied by BOB'S WORLD AG subdivides the ERP implementation process in so-called manageable pieces for enterprises and assumes to increase significantly the success of the ERP implementation process. The goal of this paper is to give proof to this assumption. The five success factors time, budget, satisfaction, benefits, and value are investigated and evaluated.

2. Background and literature review

ERP systems have been playing a major role in manufacturing businesses over the last four decades. Still, the implementation of ERP systems has remained a critical issue (Cotteleer 2002; Langenwalter 2000; Soh *et al.* 2000; Umble *et al.* 2003). Success factors and implementation risks have been investigated in the past. So far, the focus has only been on filing statistics about failure rates and pointing out the reasons, which lead to these failure rates (Parr, Shanks 2000; Majed *et al.* 2003; Soh *et al.* 2000; Sumner 2000). The methodologies of implementing ERP are reduced till now by recommending avoiding the major reasons for the failures of implementing ERP systems.

2.1. Surveys

Over the last 16 years numerous surveys provided statistical data over the rate of failure of IT and business software projects in large-, medium-, and small-sized businesses. By the early 1990s, The Standish Group International Inc., Boston; KPMG, Toronto; Gartner Inc., Stamford, Connecticut; and the Aberdeen Group, Boston, all had already pronounced IT project failure a serious problem. The results of a number of surveys are the following:

- Panorama Consulting Survey 2011

Panorama Consulting is located in Centennial, CO, USA. Their survey was conducted with approximately 185 companies, which implemented ERP within the last 4 years. 61.1 % of ERP implementations took much longer than expected. 74.1 % of ERP implementations went over budget. 48 % of companies surveyed failed to realize at least half of the business benefits they expected from their ERP systems (Panorama 2011).

- Panorama Consulting Survey 2010

Their survey was conducted with approximately 1600 companies, which implemented ERP within the last 4 years. 35.5 % of ERP implementations took much longer than expected. 51.4 % of ERP implementations went over budget. 67.5 % of companies surveyed failed to realize at least half of the business benefits they expected from their ERP systems (Panorama 2010).

- The Stratmor Survey 2008

The Stratmor Group is located in Peachtree City, GA, USA. Their survey comprised representative sample of executives from midsized and large retail and wholesale mortgage origination firms. 78% of projects were perceived as delivered late, over budget or with less than full expected value. Of these projects, 43 % were over budget by an average of 23 %, 100 % were delivered late by an average of 8 months and 71 % delivered less than full expected value (Stratmor 2008).

- Panorama Consulting Survey 2008

Their survey was conducted with 1322 companies between 2005 and 2008, which implemented ERP within the last 3 years. 68 % of ERP implementations took much longer than expected. 61 % of ERP implementations go over budget. 79 % of companies surveyed fail to realize at least half of the business benefits they expected from their ERP systems (Panorama 2008).

- The Robbins-Gioia Survey 2001

Robbins-Gioia, LLC, is located in Alexandria, VA, USA. Their Survey Scope comprised 232. A total of 36 % of the companies surveyed had, or were in the process of, implementing an ERP system. 51 % viewed their ERP implementation as unsuccessful (Robbins-Gioia 2001).

- The Conference Board Survey 2001

The Conference Board is located in New York, NY, USA. Their survey interviewed executives at 117 companies that attempted ERP implementations. The interviews showed that 40 % of projects failed to achieve their business case and 25 % were over budget (Cooke *et al.* 2001).

- The Gartner Group Survey 2000

The Gartner Group is located in Stamford, CT, USA. Their survey was based on 1,375 respondent interviews that showed roughly 40 % of all IT projects failed to meet business requirements (Champlain 2003).

- The KPMG Survey 1997

KPMG Canada made the survey. Out of 1,450 questionnaires sent, 176 were analyzed. Among the projects it analyzed, 61 %failed to meet business-sponsor expectations, 75 % missed scheduled completion dates by 30 % or more and 51 % substantially exceeded their budgets (Whittaker 1999).

- The Chaos Report 1995

The Chaos Report was originally published by the Standish Group, located in West Yarmouth, Massachusetts, in 1994. Their survey originally sampled 365 respondents, covering more than 8,300 software implementations in large, medium and small-sized companies. Only 31 % of projects delivered 100 % of their expected value were on-time and on-budget (Jorgensen *et al.* 2006).

- The OASIG Study 1995

The Organizational Aspects of Information Technology (OASIG) is located in London, UK. Their survey drew their opinion from a sample of approximately 14,000 user organizations represented by 45 interviewed business experts. The success rate quoted revolves around 20-30 % based on its most optimistic interviews (Collins *et al.* 2010).

It was claimed in 2008 in infoworld.com (Lewise) that 70 % of ERP implementation failed. 80 % of customers in the manufacturing sector are unhappy with their current ERP. 60 % of ERP projects fail given the time and deliverable business benefits. 90 % fail to deliver any ROI (business value). 80 % of ERP projects fail given the budget.

Not all surveys investigated identical success factors. The table below provided by the author lists the results of the surveys to point out the failure rates as a summary:

Table 1. Survey Summary in % (Source: created by author)

No	Survey	D.[1]	B.[2]	S.[3]	B.[4]	V.[5]
1	Panorama '11	61	74		41	
2	Panorama '10	36	51		68	
3	Stratmor	78	43			71
4	Panorama '08	68	61		79	
5	Robbins-Goia	51	51	51	51	51
6	Conf. Board		25	40	40	40
7	Gartner Group			40	40	40
8	KPMG	75	51		61	61
9	Chaos Report			70	70	70
10	OASIG	69	69			69
11	Infoworld.com	60	80	80	60	90

1=Duration, 2=Budget, 3=Satisfaction, 4=Benefits, 5=Value

2.2. Critical success factors (CSF)

Altogether, a considerable number of CSFs have been indicated to be measured in order to determine whether an implementation of ERP can be regarded as a failure. Based on the surveys above, any critical success factor indicating more than plus 15 % deviation is regarded as a failure according to the surveys above.

Reconsidering the surveys above, the following 5 critical success factors can be identified:

- Estimated duration versus actual duration
- Estimated costs versus actual costs
- Estimated satisfaction versus actual satisfaction
- Estimated benefits versus actual benefits
- Estimated value versus actual value

There is an inherited correlation between the success factors. With exceeded duration of an ERP implementation project, the implementation costs of the ERP project will go up. Low user satisfaction (acceptance) with the ERP system causes exceeded duration of an ERP implementation project. Finally business benefits are reduced, and business value (ROI) is reduced. For instance, Failure has been defined as an implementation that does not achieve a sufficient (ROI) identified in the project approval phase. Using this definition, it has been found that failure rates are in the range of 60 to 90 % (Ptak 2000).

2.3. Reasons

Below, four independent reviews of ERP implementation projects have been considered to generally list the reasons for failing in meeting CSFs.

- Learning from Failed ERP Implementation

Table 2. Reasons (Source: Srivastava 2009)

No	Reasons
1	Poor leadership from top management
2	Automating existing redundant processes
3	Automating existing non-value-added processes
4	Unrealistic expectations
5	Poor project management
6	Inadequate education and training
7	Trying to maintain the status quo
8	A bad match
9	Inaccurate data
10	ERP implementation is viewed as an IT project
11	Significant technical difficulties

Table 2 lists primarily reasons, which indicate that management, project team, ERP end users, and external consulting support had a conflict in goals, which was not resolved at the beginning of the ERP implementation projects.

- Critical Failure Factors in ERP Implementation

Table 3. Reasons (Source: Wong, Scarbrough 2005)

No	Reasons
1	ERP system misfit
2	High turnover rate of project team members
3	Over-reliance on heavy customization
4	Poor consultant effectiveness
5	Poor IT infrastructure
6	Poor knowledge transfer
7	Poor project management effectiveness
8	Poor quality of Business Process Reengineering
9	Poor quality of testing
10	Poor top management support
11	Too tight project schedule
	Unclear concept of the nature of ERP system
	Unrealistic expectations from top management
	Users' resistance to change

Table 3 lists primarily reasons, which indicate planning and structuring of the ERP implementation projects were inappropriate (e.g. poor project planning results in high turnover rate of project team members or over-reliance on heavy customization is a result of poor quality of Business Process Reengineering).

- Cardinal Sins of ERP Implementation

Table 4. Reasons (Source: Ligus 2009)

No	Reasons
1	Lack of top management commitment
2	Inadequate requirements definition
3	Poor ERP package selection
4	Inadequate resources
5	Resistance to change/lack of buy-in
6	Miscalculation of time and effort
7	Misfit of ERP software with business processes
8	Unrealistic expectation of benefits and ROI
9	Inadequate training and education
10	Poor project design and management
11	Poor communications
12	Ill-advised cost cutting

Table 4 lists primarily reasons, which indicate that ERP implementation projects fail because of not providing the required environmental conditions with respect to people, functionality, and planning.

- Enterprise Resource Planning – Failure

Table 5. Reasons (Source: Barton 2001)

No	Reasons
1	Inherent complexity of ERP implementation
2	Outside consultant issues
3	Inadequate training
4	Process risk and process barriers
5	Corporate culture
6	Unrealistic expectations
7	Over-customization of software
8	Using IT to solve the problem
9	Timeline flexibility
10	Infrastructure

Table 5 lists primarily reasons, which indicate that the ERP implementation process is a much broader issue and affects the entire enterprise. The risk of failure is everywhere!

Basically, the reasons of failure cause the effect on the CSFs. One or more of the reasons of failure have direct or indirect influence on any of the CSFs listed above. The four listings of reasons of failure can be grouped according to the following table provided by the author:

Table 6. Reasons Summary (Source: created by author)

No	General Reasons
1	Leadership - support from top management
2	Project Management - planning, budgeting, etc.
3	Resources - selecting inadequate resources
4	Functionality - inadequate coverage of BPs
5	Training - insufficient training of internal users
6	Consulting - lacking expertise
7	Environment - corporate culture, inaccurate data

If an ERP implementation project fails in any of the seven reason groups, the effect for failure is significant on any other - or even on all other - reason groups.

2.4. ERP implementation methods

There are several types of methods that can be used to implement an ERP system. The types “big bang implementation”, “phased implementation”, “parallel implementation,” and “modular implementation” form the main types that are used to implement an ERP system (Gallivan 1996).

The big bang relates to the cosmological theory (Big bang) where the start of the cosmos happened at one moment in time. This is also the case with the big bang implementation method where the new system is adopted on one date (Eason 1988).

Phased implementation means that the implementation will happen in several phases, e.g., ranging from “need to have” to “nice to have.” So after each phase the system is a little closer to be fully adopted by the organization (Gallivan 1996).

In case of parallel implementation method the old and the new system are running parallel so all the users can get used to the new ERP system, but still can do their work using the old ERP system.

Modular implementation means that the implementation will happen by major modules, e.g. first finance, second sales, and finally planning and production, in several phases. So, after each implementation of a major module, the system is more put together and closer to be fully adopted by the organization.

- Big Bang Implementation

This method minimizes overall implementation time and cost, however, is by far the most complex. In a big bang go-live, the new system replaces all other prior systems in a single cutover. Successfully performed, it actually minimizes impact, elapsed time and cost. However, the multifaceted nature imposes great risk due in part to a high number of interdependencies. If any single department, user community or line of business fails, the entire implementation is at risk. For this approach to be successful, there must be a clear mandate from the top of the organization, dedicated leadership by veteran (internal or external) resources, an experienced change management leader, a proven implementation methodology, period risk analysis, near real-time project monitoring and strong user training programs (Davenport 1998; Eason 1988; ERP Asia Group).

- Phased Implementation

In a phased approach, the company generally first focuses on the “need to have” business re-

quirements and limits the initial implementation to a controlled number of organizational units. Once initial success is achieved, the production system is upgraded to include more 'nice to have' or complex functions and features and is expanded to include additional organizational units. The approach of staging discrete project phases sequentially permits organizations to reduce scope, take smaller bites, advance in more of an iterative process, perform reviews between phases and incorporate lessons learned from one phase into successive phases. While a phased approach ultimately consumes more time (and therefore cost) as compared to a big bang, it is generally perceived to be less complex and thereby reduces overall risk (ERP Asia Group).

- Parallel Implementation

In a parallel approach, the company prepares the new ERP system in the same manner as in a big bang approach. The obvious disadvantage of the parallel approach is that the users have to maintain two ERP systems and incur more project costs. The advantage of the parallel approach is that the company can go back to the original ERP system when it becomes obvious that the new ERP system does not fulfil the required standards set by the company (Davenport 1998).

- Modular Implementation

In a modular approach, the company implements business functions by ERP modules. The obvious disadvantage of the modular approach is that the new ERP modules have to be interfaced with existing business functions and incur a longer duration of the project and, thus, more project costs. The advantage of the modular approach is that the company can go back to the original business functions and can stop at predetermined time, when it becomes obvious that the new ERP modules do not fulfil the required standards set by the company (Davenport 1988).

The surveys over the last 16 years cover more than 16,000 companies, which have applied the four different implementation methods in their ERP projects. The reasons of failure do not point out that the wrong implementation method was used in their specific projects. This leads to two conclusions:

a) The implementation method is not the reason for the averaged failure rate of 70% for the success factors.
b) None of the existing implementation methods do significantly reduce the averaged failure rate of 70 % for the success factors.

2.5. ERP implementation tools

In the early days of ERP implementation, which were the 80s with respect to ERP products deserving label ERP system by covering all the major business functions in enterprises, there were only manuals, which described the functionality of the individual ERP products, and textbooks, which could be considered as teaching material, available. The interrelationships between the individual ERP functions were still poorly considered. This was also caused since only very little ERP and project management expertise among business consultants were available in these days.

In the middle of the 90s, two tools were added to the ERP implementation process. These tools were the following:

- Goal Directed Project Management (GDPM)

GDPM from Coopers & Lybrand was developed in the early 90s. Coopers & Lybrand analyzed about 1700 IT projects and found out that 80 % of all IT projects were poorly planned and they were prone to fail. Several ERP vendors (e.g. Baan B.V. in the Netherlands) applied GDPM in their ERP projects to implement their ERP business software.

- Business Process Modelling (BPM)

BPM gained importance in enterprises with the standardization of quality standards according to the norms *EN ISO 9000 ff*. This was an initiative from the car manufactures Chrysler, Ford, and General Motors. They started in 1988 the task force „Supplier Quality Requirements Task Force (SQRTF)." In 1992 the task force was assigned to standardize all quality guidelines. In 1994, the „QS-9000 - Quality System Requirements"was published. These Quality System Requirements had impact on all processes within an enterprise and therefore also on all ERP business functions and processes. In 1992, Prof. Wilhelm Scheer published a concept called ARIS (ARchitecture of integrated Information **S**ystems) and developed the tool ARIS with the goal that any enterprise information system can fulfil the necessary requirements. Again, several ERP vendors adopted this concept of ARIS in their ERP projects to implement their ERP business software with standardized ERP business processes. In 1996, the company Baan B.V. released their Dynamic Enterprise Modeller, which was fully integrated in their business software SSA Baan IV – at this time the no. 2 ERP product in the world.

Over the last 16 years, GDPM and BPM have become standard tools applied by any ERP software vendor. Nonetheless, the failure rates of ERP implementation projects have not significantly

dropped as the surveys between 2005 and 2011 show in comparison with the surveys between 1995 and 2004.

3. Research methodology

A case study method has been adopted for determining the specific CSFs, "how" they were influenced by the effectiveness of a Kaizen approach for ERP implementation, and for concluding "why" the factors led to success and "how" they influenced ERP implementation. The case study is applied as the research strategy in the attempt to examine a contemporary phenomenon in its real-life context, especially when the boundaries between phenomenon and context are not clearly evident (Yin 2003). Thus, the case study method can help to acquire rich data for exploring how CSFs in different ERP implementation phases affect ERP implementation failure and/or success. Based on a case study methodology (Yin 2003), a research protocol was established. The protocol was critically evaluated and reviewed by an industrial practitioner to ensure that the protocol design is appropriate for answering the research question. All results were reviewed by top management, project managers and project team members (such as the IT manager, logistics manager, production and logistics supervisor, senior logistics manager and external ERP consultant).

All the written documentation regarding the organization's ERP implementation process was accessed and examined. These include meeting minutes, email communications, proposals, ERP project related presentation materials, implementation documents, intranet and knowledge management systems. As the respective interviewees evaluated the systems based on different perspectives, judgment was provided and this was reviewed and confirmed by the chief informant (e.g., project manager) of the company. After all the data were input into the textual table for multiple case studies comparison, specific patterns could be identified and findings could be summarized (Yin 2003).

4. Research framework

Many organizations appear to underestimate the issues and problems often encountered throughout the ERP life cycle (Markus *et al.* 2000). A number of phase models in the literature suggest that a specific focus is required within the various stages of ERP implementation (Parr, Shanks 2000). Understanding life cycle management issues will also help to direct the ERP research agenda (Chang *et al.* 2000).

For this research, five small enterprises have been selected, which range from 5 to 50 ERP users, with a discrete manufacturing process. None of the 5 enterprises have used a fully integrated ERP system before. Basically, accounting (1C from 1C company, Russia) is used with some warehouse functionality for stock evaluation. Planning was done primarily with Excel from Microsoft. Therefore, the five implementations can be regarded as initial ERP implementations.

The five enterprises implemented the Ukrainian or Russian version of the ERP business software BOB'S_WORLD (BW) from BOB'S WORLD AG (BWAG) in Vienna, Austria. The ERP business software BW is functionally comparable with SSA Baan IV from Infor Global Solutions (Alpharetta, GA, United States). The ERP implementations for the five enterprises took place in Ukraine (2 in Lviv and 3 in Kharkov) between May and December 2011.

The five enterprises selected BW according to the following scenario:

Table 7. Selection Scenario (Source: BOB'S WORLD 2011)

No	Steps
1	Presentation of ERP basic process (see Fig. 1).
2	Presentation of the ERP basic process in BW.
3	Presentation of required data (see Fig. 2).
4	Enterprise provides sample data in Excel.
5	Presentation of the ERP basic process in BW with enterprise's sample data by a video.
6	Presentation of implementation process with BW.
7	Adapt the ERP basic process to maintain the Pareto principle.
8	Enterprise provides complete data in Excel.
9	Sign contract between enterprise and BWAG.
10	Confirm the start of the implementation

Table 8. Master Data (Source: BOB'S WORLD 2011)

Item Master	Bill Of Material	Operations
Item Code Description Item Type Warehouse Inventory Unit Sales Price Purchase Price Currency Order Quantity Safety Stock Lead Time	Item Master Code Component Quantity	Item Master Code Sequence Number Task Workcenter Machine Run Time Setup Time Man Occupation Machine Occupation

The ERP basic process focuses on the basic functionality needed at any small- and medium-

sized enterprise according to the Pareto principle (also known as the 80–20 rule or the law of the vital few). The Pareto principle states that, for many events, roughly 80 % of the effects come from 20 % of the causes (Bunkley 2008; Gen 2002; Rushton *et al.* 2000). With respect to ERP, it means that with

20 % ERP functionality 80 % of the ERP business processes can be managed.

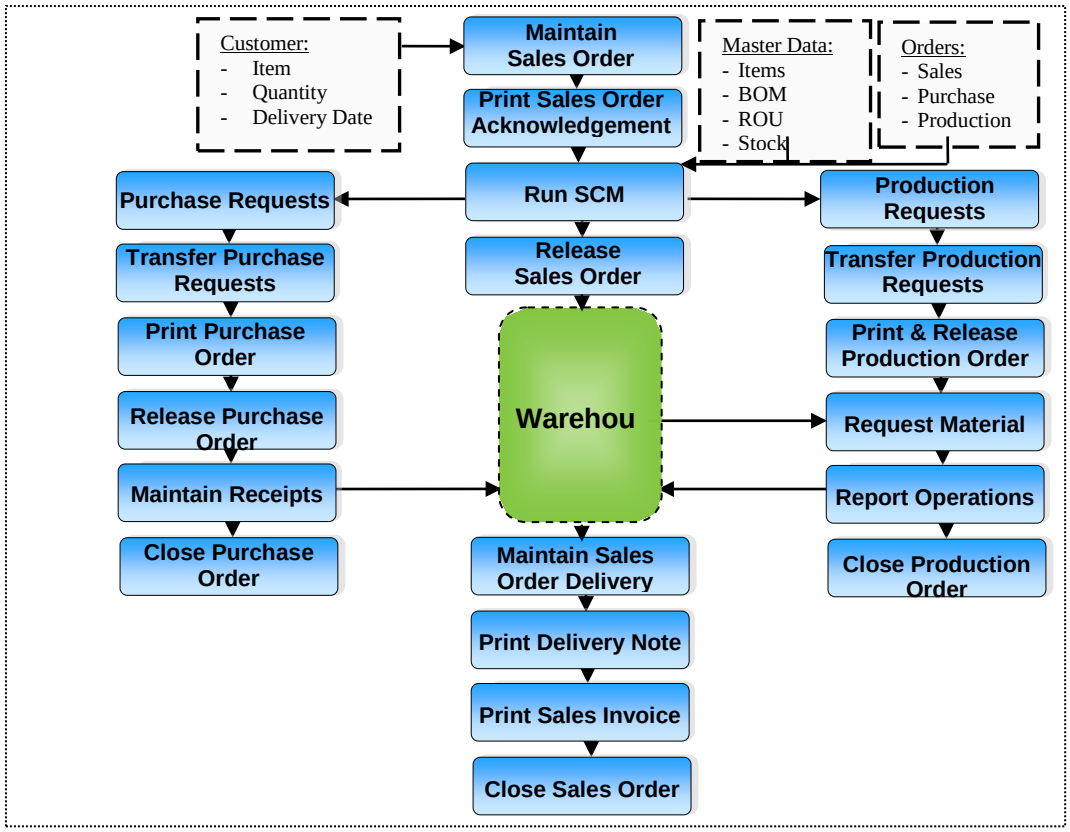

Fig.1. Basic Process (Source: BOB'S WORLD 2011)

The implementation of the ERP basic process with BOB'S_WORLD manifests the first Kaizen cycle. It also follows the principle "stop the line to keep it running" in order to eliminate difficulties in the implementation process of the basic process by the responsible people (Helfrich 2002). It is also assumed that when an enterprise cannot master the basic process, it can hardly master the more complex ERP business processes. The duration of the implementation for the ERP basic process was limited to five to twelve days of external consulting and training support, respectively. All ERP basic business processes introduced by the external consultant were recorded by video for the individual ERP users of the enterprise. At the end of the implementation process, the ERP basic processes were simulated by the enterprise's ERP users in the form of a rehearsal and "go live" date was fixed after this.

During the last four months, four companies have concluded at least another Kaizen cycle to add ERP business processes to the ERP basic process (e.g., back-flushing in production, sales contracts, warehouse distribution, hours accounting, scrapping material in production, master production planning, etc.). Any Kaizen cycle is limited to three days of external consulting in order to go productive on short notice.

Comparing the traditional phase models (Markus *et al.*; Parr, Shanks; Bancroft *et al.*; Ross), there is a clear difference between the phase models, which primarily focus on subdividing an ERP implementation project in several phases (e.g., project planning phase and after the ERP system is up and running, there may be a post-implementation review and later a stabilization phase), and the Kaizen approach. Each Kaizen cycle is a "big bang."

The Kaizen approach splits the ERP implementation project in cycles. The first and absolutely essential cycle is the ERP basic process. It can be that the ERP basic process has to be amended with ERP business functions from the expanded ERP processes (e.g., approval process, warehouse replenishment process, capacity requirement planning, etc.) since the ERP business function is essential for the enterprise's basic process.

After the first Kaizen cycle is completed and the ERP system runs stable, the enterprise, i.e. the responsible ERP users for the ERP business processes, is free to decide about the functional composition of subsequent cycles to cover further ERP business processes. Kaizen usually delivers small improvements, but the culture of continual aligned small improvements yields large results in the form of compound productivity improvement.

5. Case studies

The five enterprises were selected based on the following criteria:

- firstly, they had completed the ERP implementation process,
- secondly, the outline of the ERP basic process was almost identical,
- and thirdly, the project team, top management and consultants were willing to share the problems and benefits they encountered during the ERP implementation process. And ERP related documents could be disclosed for research purposes.

An overview of each case is presented in this section, followed by a detailed comparison of the five cases. Subsequently, a summary of ERP implementation's critical success factors is presented.

The following tables, which are provided by the author, list the key parameters for the five enterprises to be compared. The higher the planned numbers in the column DATA, the more complex is the investigated ERP implementation process.

All five enterprises are of the type discrete manufacturing in different industries. The number of users represents the number of people who will operate the ERP system after the implementation. The time to prepare the master data represents the time the enterprises needed to fill out Excel templates as shown by Figure 2. After master data was prepared a project plan was set up to define project duration and external consulting support. After concluding the ERP implementation process the actual numbers for project duration and external support were recorded. Finally the planned and actual numbers are compared to evaluate the CFSs time and budget.

Table 9. Enterprise A (Source: BOB'S WORLD AG)

No	Parameters	Data
1	Type of industry	Engines
2	No. of users	10
3	Preparing master data	12 weeks
4	Planned implementation time	8 weeks
5	Actual implementation time	11 weeks
6	Planned external consulting	5 days
7	Actual external consulting	7 days

Table 10. Enterprise B (Source: BOB'S WORLD AG)

No	Parameters	Data
1	Type of industry	El. Devices
2	No. of users	5
3	Preparing master data	3 weeks
4	Planned implementation time	4 weeks
5	Actual implementation time	2 weeks
6	Planned external consulting	5 days
7	Actual external consulting	3 days

Table 11. Enterprise C (Source: BOB'S WORLD AG)

No	Parameters	Data
1	Type of industry	Conveyor
2	No. of users	25
3	Preparing master data	8 weeks
4	Planned implementation time	12 weeks
5	Actual implementation time	10 weeks
6	Planned external consulting	10 days
7	Actual external consulting	9 days

Table 12. Enterprise D (Source: BOB'S WORLD AG)

No	Parameters	Data
1	Type of industry	Tubes
2	No. of users	50
3	Preparing master data	12 weeks
4	Planned implementation time	12 weeks
5	Actual implementation time	13 weeks
6	Planned external consulting	15 days
7	Actual external consulting	16 days

Table 13. Enterprise E (Source: BOB'S WORLD AG)

No	Parameters	Data
1	Type of industry	Plastics
2	No. of users	15
3	Preparing master data	4 weeks
4	Planned implementation time	8 weeks
5	Actual implementation time	4 weeks
6	Planned external consulting	5 days
7	Actual external consulting	4 days

6. Analysis of CSFs

The CSFs assessed are identical with the CSFs from the chapter "Critical Success Factors." Duration and costs of the implementation project are derived from the table Project Summary. The CSFs for user satisfaction, business benefits, and business value (ROI) have been assessed in interviews with top management, project management, consultants, and ERP users on the scale "Good," "Medium," "Poor," and "Fail." The CSFs are discussed in more detail after the results for the CSFs. The results are expressed as negative deviation in %.

Table 14. CSF Summary (Source: created by author)

No	CSF	A	B	C	D	E
1	Duration	38	0	0	8	0
2	Budget/Costs	40	0	0	7	0
3	Satisfaction	25	0	0	20	0
4	Benefits	0	0	25	25	0
5	Values (ROI)	0	0	0	25	0

- Duration

The CSF duration compared the planned duration with the actual duration. The project at enterprise A taught the external consultant one lesson: Never take a relative of the CEO as the internal project manager. This was also mentioned and pointed out by Alexander Popov at Russian IT in September 2010.

- Budget/Costs

The CSF budget/costs compared only the budgeted with the actual external consulting costs. The internal project costs were not budgeted and finally evaluated. The time the individual enterprises needed to prepare the full set of master data is an indicator for the complexity of the project.

- Satisfaction

The ERP users, internal project managers, and external consultants were interviewed after the ERP implementation project. Due to the fact that the Kaizen approach was applied in the ERP implementation projects, the ERP users could maintain a high level of motivation in the project, the internal project manager could maintain the overview of the project at any time, and the external consultant could focus on the essential tasks.

- Benefits

Top management and ERP users evaluated in the interviews the business benefits gained through the ERP implementation process with the status quo before the project. Directly after completing the ERP implementation project at enterprise A, this enterprise was ISO certified by a German enterprise as a potential supplier and reached 83 points out 100. The CEO of enterprise A stated that the ERP implementation contributed with at least 15 points.

- Value

Top management evaluated the project with respect to Return on Investment (ROI). The ROI ranged between 2 to 4 months according to the estimates of the CEOs with respect to the time saved by employee (ERP user) per day in future in comparison with the external project costs and continuous running costs for the ERP system.

7. Conclusions

The average duration of an ERP implementation process takes according to the surveys of the Panorama Consulting between 2008 and 2011 (see chapter 2.1) approximately 18.4 months and the ROI is roughly 2.7 years – without considering the cancelled ERP implementation processes. These numbers are the result from investigating all types of industries in large enterprises and the SME market and are applied to tier 1 to tier 3 ERP software vendors. The ERP implementation processes investigated by Panorama Consulting were aiming at the 100 % solution and failed by about 70 % with respect to the CSFs.

The average duration of the ERP implementation processes investigated in this paper was exactly 5 weeks with a preparation period of 4.8 weeks. The ROI was estimated with about 3 months on average. The major difference between the traditional ERP implementation process and the Kaizen approach is that the Kaizen approach splits the ERP implementation process into manageable pieces with clearly defined objectives.

This study is a starting point to rethink the implementation process of ERP systems at enterprises. In Western Europe and North America (structured ERP market), enterprises, entering now the third generation of ERP systems with respect to technology (mainframe ERP systems, ERP systems based on client-server architecture, and now web-based ERP systems), generally dispose of a good understanding about ERP and what it entails on enterprises. In the unstructured ERP market (e.g. Eastern Europe), the implications of ERP on enterprises are more based on expectations.

The human factor has been neglected in this study in order not to put this paper out of proportion. The human factor on the ERP implementation process at enterprises has to be included in further studies, since a motivated implementation team at all levels is one of the key factors, which lead to fulfilling the critical success factors in the ERP implementation process. The general statement “The longer an ERP implementation process takes, the more likely the ERP implementation process is about to fail.” is more than just common sense.

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