Internal Resource Demand for ERP-System and Partner Evaluation at a Medium-Sized Enterprise with a Discrete Manufacturing Business Model in 2020

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Abstract: This paper presents and analyzes data of the internal human resources spent by a medium sized Austrian industrial company to evaluate an implementation partner and the fitting ERP system to replace the existing legacy system.

Keywords: ERP evaluation project; resources; medium-sized enterprise

1   Introduction

Replacing legacy ERP systems in medium-sized enterprises with a discrete manufacturing business model is a challenge that affects the whole organization running that system. Given the presumed average product lifespan of a typical ERP installation of 15-20 years and the ERP digitalization wave in the early 2000s many ERP installations currently are – or are increasingly becoming – due to be replaced. Choosing a new ERP system and the partner to implement it is a strategic decision that will greatly impact the following 20 years (or more) of the organization running on that ERP installation. The question how much internal human resources such an evaluation project would consume is hard to answer, little data is available to compare a project plan to empirical data of past projects for validation of planning, allocating and – not at least – protecting internal resources from overplanning and avoiding unnecessary risk to the evaluation project. This article aims to shed light on the internal resource impact of an ERP evaluation project on a medium-sized enterprise with a discrete manufacturing business model. To this aim we are using collected data of the ERP system and partner evaluation project at "Company" during the year 2020 and analyze the data in context of the project's structure, plan and achieved actual project progress. [Be03; MSR12; NC09; RGM]

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2   Methodology

2.1   Collection of actual data on internal resource demand

Starting with the project kick-off in February 2020 we kept record on our personal actual time spent on the project. Records for time spent on the project was exact to a quarter of a person day and assigned to the name of the person, the project work package / stream, sometimes supplemented with a comment.

The data collected for this paper covers the project time from March 2020 until October 2020, after the main workload of requirements definition, fact-finding and shortlisting was done. 3 months of planned negotiation and closing were yet ahead when writing this paper. We presume that the internal effort of the 3 remaining months in the project will be mainly allocated to the PM-stream (project management / core team meetings) and SL-stream meaning final negotiations with the shortlisted vendors and the then identified target vendor.

3   Analysis

3.1   Starting Situation at "Company"

"Company" develops, produces and distributes strengthened multi-layer plastic pipe systems. Since over 60 years these innovative pipe systems find various applications in structural and civil engineering. Traditional core markets are Austria and Germany which are considered as home markets due to production facilities in Leonding (Austria) and Ebenhofen (Germany). France, Italy, Scandinavia, Spain and Switzerland are the most important export destinations with growing market success in the Middle East, Northern Africa and South-East Asia.

The existing legacy ERP-solution in Leonding is used by approx. 80 users. The legacy ERP solution in the German production site is not yet integrated except from a BI-interface and was considered out of scope for the current ERP evaluation. Nevertheless, a future integration of both production sites in one ERP system is a long-term goal and should provide integration benefits.

In 2020 "Company" was running its logistics operations on a legacy INFOR AS ERP installation dating back to 2004 combined with a 2011 introduced SAP R3 installation for finance and controlling. The fact that daily operations still need to work on the old AS400 hosted green screen for certain functions seems anachronistic in a world of user experience optimized mobile apps and service oriented architectures in cloud-hosted environments programmed using function-rich, open-source community reviewed object oriented highly reusable and unit tested code of fourth-generation programming languages.

Even though the legacy ERP system in use was dated, the pressure to replace it did not mainly come from lack of functionality, connectivity or usability. Key users and users were in fact quite satisfied with individually programmed custom functions tailored to the exact business process needs of the organization over a lifespan of many years. Usability issues were not pressing, as long as keyboard-shortcut driven user interaction guaranteed high productivity in day-to-day operations. Connectivity – even with a high degree of EDI connections to customers – was solved mainly using FTP data exchange to a high level of satisfaction for the business.

The pressure to replace the ERP system came mainly from a perceived lack of support and a continuing decline in the number of active consultants for INFOR AS. Not least because highly valued know-how carriers inside the organization of "Company" were about to reach their retirement age was there a perceived risk of know-how loss and a risk of declining system productivity and stability that led to the kick-off of an ERP replacement evaluation project.

Additionally, the system barrier between logistics in INFOR AS and finance/controlling in SAP that only exchanged creditors, debitors and bookings via text-file-based asynchronous interface functions left a lot of actual enterprise controlling to be done in third-party software for business intelligence or spreadsheet calculation with a high degree of human effort to keep data synchronized and results consistent. On top of that, comprehending the sequence flow of business documents over two systems proved to be a tedious task requiring excessive manpower when analyzing possibly erroneous cases.

3.2   ERP evaluation project approach

We structured the ERP evaluation project in two phases: In the first phase we analyzed our internal requirements and started a detailed fact finding on a longlist of 20 possible partners with different ERP systems. After preselecting a set of 10 partners based on our scoring of their reference customer projects, we performed 2 hour "reference visits" using videoconference technology and screensharing. Based on our scoring of the perceived performance on these reference visits we narrowed down 7 competitors to present their respective system based on a detailed script covering presumed ERP-standard use-cases that are particularly relevant to our business processes. Scoring and discussing these use-case performances resulted in a shortlist of 4 competitors.

By the time we decided on our shortlist we had also finished our detailed requirements document. The finalized requirements description was a 130-page document listing 970 requirements items grouped by the project work streams and was the main document of our call for bids sent out to the shortlisted competitors.

The second phase started by sending out our detailed requirements documentation to the previously decided shortlist of competitors. A first deadline required the competitors to send

in questions to the requirements that were compiled and answered by the project team. All questions and answers were again provided to all competitors. On this basis the competitors had a final deadline to send their finalized quotations and present them in a time slot of two hours in front of the project core team. Following these quotation presentations, we would identify our target partner and achieve an optimal agreement based on the comparable competitors' offers and conditions by negotiating the finalized project agreement.

Deciding on a target system would optimally cover our requirements together with a target partner that had proven to understand our "business language" finalizing a project treaty in order to be ready for the follow-up implementation project was the defined aim and end of the evaluation project.

3.3   ERP Evaluation Project Organization

The project organization was structured as follows: A steering committee composed of the two top managers and the CIO. Project Sponsor was one of the two top managers. Project management was assigned to the head of the ERP team within the IT department. The project core team assembled the two ERP-team members and one key user from each of the main internal ERP stakeholders: finance, controlling, customer service, warehouse management, production planning, purchasing and supply chain management. Two external consultants accompanied the evaluation project providing ERP-evaluation know-how, best practices and training for the core team to find a common understanding of ERP core context, the "big picture" and the use of de-facto-standardized "ERP language" as far as such a thing exists over the different ERP domains of the big ERP software vendors.

3.4   Compiled Data Grouped by Work Package

The streams defined and assigned during the project kick-off were as follows:

- FF: Fact-Finding, including design, sending and analysis of a fact-finding inquiry targeted at the longlist of competitors and efforts for "reference visits" using video-conference technology at selected reference customers named by competitors in the evaluation.

- PM: Project Management, including core team meetings and any coordination efforts over different work packages.

- I2O2C: Inquiry to Order to Cash meaning the requirements for the sales and delivery process, partly interconnecting or even covering warehouse management requirements, due to the structure of our organization.

- SCM: Supply Chain Management requirement definition including a connection of the different processes and work packages with a special emphasis on forecasting and planning.

- FICO: Finance and Controlling.

- M2S: Make to Stock meaning our requirements for production planning process with special regards to the integrated forecasting process in cooperation with the sales department. This work package also included special requirements to guarantee high efficiency in production execution with regards to optimizing production setting-up and coupling the production of similar product groups in plastics extrusion and injection molding.

- SL: Shortlisting and final selection of the implementation partner in the second phase of the project.

- DM: Data Migration meaning to describe master data structures and possibly relevant transaction data to be migrated to the future system.

- P2P: Purchase to Pay, meaning our purchasing and vendor management requirements.

- MM: Material Management requirement definition meaning mainly to describe the specialties of the historically grown structure of the material master data in the legacy system.

- LDT: Warehouse Management and transport distribution, although partly covered in the I2O2C work package.

- R2R: Record to Report covering requirements for ETL-processes in order to guarantee the existing BI-solution to work properly and provide consistent reporting before and after the project mainly based on ERP data.

Stream	Internal effort: Person Days per Month 2020								
	03	**04**	**05**	**06**	**07**	**08**	**09**	**10**	**Sum**
FF	2.5	0.8	1	8.6	13	3.1	**29.3**		**58.2**
PM	6.8	2.3	8.2	5.4	**9.6**	4.5	5.1	1.6	**44.7**
I2O2C	3.8		3	**8.8**	1.8	0.3	0.7		**18.2**
SCM	1.3		0.1		2.1	2.6	**4.6**		**10.7**
FICO	5		0.6	**3.1**	0.4	0.1			**10.1**
M2S				0.7	**6.2**	0.5	0.3		**7.6**
SL							1.3	**4.9**	**6.2**
P2P				1.5	**2.9**				**4.4**
MM	**1.4**	0.2			1.3		0.6		**3.5**
LDT				**1.9**	1.4				**3.3**
DM	1					0.5	**1**		**2.5**
R2R	**0.3**								**0.3**
Sum	**22**	**3.2**	**12.9**	**29.9**	**38.6**	**11.6**	**42.8**	**6.2**	**169.6**

Tab. 1: Effort in person days (1 PD = 8 hrs) by work stream and month

3.5   Compiled Data Grouped by Person (anonymized)

The anonymized roles of project members can be assigned to the following roles in the project:

- PM – Project Manager (Head of ERP-Team)

- SCM – SCM Manager, head of logistics

- M2S – Project core team member for M2S

- P2P – Head of Purchasing

- I2O2C – Project core team member for I2O2C, reporting to SCM Manager

- FI – Head of Accounting

- CO – Head of Controlling

- MM – Head of Planning and Material Master Data

- ERP 1 – ERP project core team member (junior)

- ERP 2 – ERP project core team member (senior)

Stream	Internal effort: Person Days per Month 2020								
	03	04	05	06	07	08	09	10	Sum
PM	6.5	2.5	3.3	6.5	10.0	3.0	**12.0**	5.8	**49.5**
SCM	3.0		1.0	3.7	**3.8**	2.3	6.6	0.1	**20.5**
M2S	1.4		0.9	**2.4**	5.5	1.5	5.0		**16.7**
P2P	0.3	0.3	0.9	1.9	5.2	1.0	**4.8**		**15.1**
I2O2C	3.3		1.4	**5.7**	3.7				**14.0**
FI	2.5		0.8	3.1	**2.0**	0.6	4.2		**13.6**
CO	2.0		0.8	3.6	1.1	0.6	2.6	**0.3**	**11.4**
MM	2.1	0.5	0.9	1.3	**1.9**	1.0	2.5		**10.9**
ERP 1			2.5	0.8	3.8	0.3	4.0		**11.3**
ERP 2	1.0		0.5	**1.0**	1.7	1.4	1.2		**6.7**
Sum	**22.0**	**3.2**	**12.9**	**29.9**	**38.6**	**11.6**	**42.8**	**6.2**	**169.6**

Tab. 2: Effort in person days (1 PD = 8 hrs) by project member and month

The noticeable drop of internal resources spent on the project in April and May is due to a project-pause and then restart ordered by the project sponsor caused by the Austrian COVID-Lockdown and reduced working time at "Company" during wave 1 of the SARS-COV-2 pandemic of 2020 when all remaining internal effort of the company was allocated to short-term damage limitation and most essential business processes. This project pause right after the kick-off month was an immense setback for project progress and caused a substantial delay of the planned project end date.

The noticeable drop of internal resources spent on the project in August is due to the planned summer vacation time when less project progress and less resources were expected.

The maximum of resources spent on the project in September 2020 is due to 4-hour use case presentations by each of the then 7 competitors with subsequent discussion and scoring in mostly full attendance of the project core team while finalizing the requirements description in the same month.

Many project team members contributed to many work streams. Therefore, sums of persons responsible for certain work packages do not necessarily equal sums of the respective work streams. For instance, all project members took part in project core team meetings, time allocated to the PM-stream. All project members took part in video conference reference visits, time allocated to the Fact-Finding stream. The project manager took part in many of the requirements workshops in the different work streams, time allocated to the respective work stream.

Project member ERP 1 joined the company mid-project in May 2020. The project member responsible for the warehouse management (LDT) was not able to keep records of time allocated, so this data is to be considered missing.

4   Conclusion

Finding a vendor to replace the legacy ERP system in a in medium-sized enterprises with a discrete manufacturing business model is a long-term binding decision with strategic impact and deserves allocated effort to find the right software and partner and guarantee transparency and comparability of effort drivers between the different bidding competitors. Tracking internal resources by our project members allocated to the work streams of the evaluation project provided us with a clear indication of how much effort ran into the different streams and how much resources we are generally capable to put into ERP-renewal efforts within our organization. This provides valuable data for reasonable planning of the implementation project.

We note that roughly one third of the whole project effort could be allocated to each of the respective high-level tasks of

1.   Fact Finding about the current ERP market

2.   General Project management and coordination

3.   Requirements definition in the work streams

We note that the single project team members from non-IT departments allocated a project-span average between 1.4 and 2.9 PDs per months. When filtering on only the high productive months of the project (June, July and September) these values rise to between 1.9 and 4.7. The maximum values of PDs spent by single non-IT project members were between 2.5 and 6.6.

The project manager role allocated 6.2 PDs on average through the measured project time.

The project month of September when each project member spent an average of 4.8 PDs brought the organization to its limit of allocating internal resources to a project as complaints arose that time allocated to the project lead to noticeable effects on progress in daily business. The project-pause in Apr/May 2020 required efforts on its own to re-initiate the project work that resulted in a project delay of significantly more time than only the duration of the project pause. Pausing the project for 1.5 months resulted in an effective delay of 3 months to the project end.

5 Future Work

We will continue to gather data in the evaluation project and the subsequent ERP replacement project and will be happy to share the insights with the scientific community.

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