Design Principles for an Enterprise Systems Chartering Method

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Abstract. Our research follows a design science approach to develop a method that supports the initialization of ES implementation projects – the chartering phase. This project phase is highly relevant for implementation success, but is understudied in IS research. In this paper, we derive design principles for a chartering method based on a systematic review of ES implementation literature and semi-structured expert interviews. Our analysis identifies differences in the importance of certain success factors depending on the system type. The proposed design principles are built on these factors and are linked to chartering key activities. We specifically consider system-type-specific chartering aspects for process-centric Business Intelligence & Analytics (BI&A) systems, which are an emerging class of systems at the intersection of BI&A and business process management. In summary, this paper proposes design principles for a chartering method – considering specifics of process-centric BI&A.

Keywords: Enterprise System Implementation; Chartering Phase; Critical Success Factors; Process-Centric BI&A; Design Science

1 Introduction

Early project activities are highly relevant for enterprise system (ES) implementations – not necessarily leading to success but likely to failure in case of gaps. The initial phase before the official start and funding of an ES project is commonly called *chartering phase* where organizations spend considerable effort. In the chartering phase, decisions are made whether, why and how to do an ES implementation – including objectives, scope, budget, and resources [1]. The term chartering is coined by the ES Experience Cycle process theory of Markus and Tanis [1]. This framework adds the chartering phase to the process theory of Soh and Markus [2] that explains ES business value as a series of three linked models representing the three subsequent phases after chartering: the project phase, the shakedown/use phase, and the onward & upward phase. The result of each phase is an entry point for the next and the ES success might vary depending on the phase in which it is measured. While Markus and Tanis [1] are much-cited regarding problems and motivation of ES implementations, their call for more chartering research remains unanswered to a large degree. The reason might lie in the fact that these activities are often done informally and remain internal.

External support – including research – is requested only after official project start. Therefore, our paper seeks to contribute to ES chartering research.

Success factors and success criteria might differ a lot between projects due to different project scope, uniqueness, and complexity [3]. Hence, with respect to ES chartering across the different ES types, there might be common as well as context-specific factors. Current ES implementation literature relates mostly to Enterprise Resource Planning (ERP) [4]. However, the heydays of large ERP implementations are over and therefore we aim to study chartering in a highly relevant and emerging context: Business Intelligence & Analytics (BI&A). While the importance of BI&A is widely accepted, literature lacks rigor BI&A success studies [5]. Thus, we study ES chartering with focus on BI&A and aim to contribute to BI&A success research.

Initially, BI&A concentrated on strategic and tactical decision support based on historical data [6]. Therefore, traditional data analysis and provisioning is not or is only loosely coupled to the process execution and not available for day-to-day decision making. Currently, BI&A moves to overcome these limitations by embedding analytic information into operational business processes within so called *process-centric BI&A* systems [6]. These systems are "an emerging class of analytics that provides visibility into business processes, events, and operations as they are happening" [7] and can be placed at the intersection of BI&A and Business Process Management Systems (BPMS). The importance of integrating state-of-the-art analytics in BPMS is confirmed by analysts such as Gartner [8] and TDWI [7]. These projects have different characteristics than ERP implementations (e.g. differentiation vs. standardization or short increments vs. huge projects), which should be considered in the chartering phase.

The ultimate goal of our research project is to develop an artifact supporting ES chartering. Thus, our research follows a design science research (DSR) approach. DSR aims to solve identified organizational problems by creating and evaluating IT artifacts, which can also be in the form of a method [9]. The chartering method will be based on design principles which we present in this paper. These design principles can be seen as propositions about factors that eventually influence ES success. In summary, our study addresses the following research questions:
Which design principles should guide the creation of an ES chartering method? Which specifics should be considered in such a method for process-centric BI&A projects?

2 Research Methodology

To come to rigorous and relevant results, the DSR methodology introduced by Vaishnavi & Kuechler [10] was applied: The phases (i) awareness of problem and (ii) suggestion of key concepts to address the problems are presented in this research-in-progress paper. The steps (iii) development of a solution design, (iv) solution evaluation, and (v) conclusions are subject for future research.

Our research is done in cooperation with SAP SE, which is one of the largest ES software vendors in the world who recently introduced a new process-centric BI&A

solution. Interviews with practitioners in this domain confirmed the need to ease the start of such projects. To create awareness of the problem in the first research phase, we conducted seven semi-structured interviews and a one-day-workshop at the headquarters of our industry partner (2 product manager, 1 application consultant, and 4 project manager were interviewed). In the second research phase we derived well-grounded design principles based on a systematic review of BI&A and BPMS literature. In addition, studies about ERP – the poster child ES – were considered for identification of generic chartering aspects. In order to ensure a thorough analysis of the literature, the *Grounded Theory Literature-Review Method* was adopted[1]. 82 publications fulfilled our quality criteria. We used the qualitative data analysis software MAXQDA to support the coding process of these publications and the expert interviews.

3 Systematic Literature Review Results

The identified success literature is dominated by research about *critical success factors (CSFs)*, which are important conditions that influence the project success – typically measured against objectives and PM's "iron triangle" (costs, time and quality) [11]. However, it has to be considered that CSF studies often lack theoretical underpinning as well as empirical evidence [12], which we also observed – despite our applied quality criteria. The coding result regarding CSFs is outlined in Table 1. It shows the percentage of publications that support a CSF per context.

Unfortunately, a relatively low number of 7 publications (column C3) explicitly address questions of the early project phase by differentiating CSFs along their importance for the different implementation phases. To the best of our knowledge, we are aware of only one other study [13] focusing exclusively on the chartering phase. Due to the limited literature, we decided to additionally ask our interviewees to assess the CSFs in a five-point Likert scale. The results are listed in column C4 – it indicates how many interviewees "strongly agreed" that a success factor is critical in the chartering phase. This assessment is not representative but it enriches our perspective on the relevance of the identified CSFs. Informed by our literature review and the interviewed experts, we classified seven CSFs in Table 1 as *chartering core CSFs* which are highly important in the initial phase of an ES project.

Further CSFs which are relevant for the project implementation phase might require consideration before project start. In our context we are particularly interested in *process-centric BI&A CSFs* that are more important for the implementation of such systems than for classic ERP: First, *strategic alignment & organizational fit* is more frequently recognized in the analyzed literature as CSF for BPMS or BI&A projects (57%) than for ERP (15%). One reason might be that in the past ERP systems were often adopted for technical (e.g. year 2000) and operational reasons (e.g. cost reduction). On the other hand, BPMS and BI&A projects target to gain business advantages and are more often adopted for strategic reasons [14]. Second, it is not surprising that

[1] Literature review procedure description, detailed analysis results, and full reference list are available at https://madata.bib.uni-mannheim.de/id/eprint/127.

data related factors such as expertise and access to data from heterogeneous sources are more relevant for BI&A. Third, *user involvement & participation* "is particularly important when the requirements for a system are initially unclear, as is the case with many of the decision-support applications" [15]. Fourth, *performance measurement & control* are essential capabilities of process-centric BI&A, which consequently should be considered in such projects. Moreover, *integration* and *legacy systems* are more frequently identified as critical in our context. The reason might be that BI&A as well as BPMS do not substitute existing systems like ERP does – instead they use information from legacy systems to make processes more visible and flexible [14]. Finally, the *implementation approach* is important for BPMS and BI&A projects as their regularly changing scope recommends an iterative planning [5].

Table 1. Support of CSFs in Literature and Interviews by Context

CSF			Literature Review			Interviews
			[C1] ERP Context	[C2] BPMS or BI&A Context	[C3] Chartering Context	[C4] Chartering Context
			N=27	N=28	N=7	N=7
Chartering Core CSFs ((C3>50% OR C4 >50%) AND C3>0)		[CSF 1.1] Top management commitment & support	56%	68%	**100%**	**57 %**
		[CSF 1.2] Goals & objectives definition	33%	32%	**71%**	**100 %**
		[CSF 1.3] Project champion	44%	11%	**57%**	**29 %**
		[CSF 1.4] Team composition & skills	63%	61%	**43%**	**57 %**
		[CSF 1.5] Change & culture	63%	57%	**43%**	**57 %**
		[CSF 1.6] Communication, cooperation & collaboration	48%	25%	**29%**	**71 %**
		[CSF 1.7] Scope Management	30%	14%	**14%**	**86 %**
Implementation CSFs	**Process-centric BI&A CSFs** (C1 < C2)	[CSF 2.1] Strategic alignment & organizational fit	15%	**57%**	0%	43 %
		[CSF 2.2] Data related factors	30%	**43%**	0%	0 %
		[CSF 2.3] User involvement & participation	15%	**39%**	0%	57 %
		[CSF 2.4] Performance measurement & control	33%	**39%**	0%	0 %
		[CSF 2.5] Integration & alignment of systems	22%	**32%**	0%	14 %
		[CSF 2.6] Technology infrastructure & legacy systems	22%	**29%**	0%	14 %
		[CSF 2.7] Implementation approach	11%	**25%**	14%	29 %
	ERP CSFs (C1 > C2)	[CSF 3.1] PM	**63%**	36%	14%	29 %
		[CSF 3.2] System & process adaption	**59%**	25%	0%	14 %
		[CSF 3.3] Training & education	**48%**	21%	0%	0 %
		[CSF 3.4] Software package selection	**41%**	0%	29%	43 %
		[CSF 3.5] Business plan & vision	**30%**	14%	43%	43 %

Besides project success, post-implementation impacts of ES also largely depend on the system type. ERP systems, for instance, are associated with standardization in regards to industry best practices and cross-organizational process alignment. In con-

trast, BPMS aims more at process differentiation and flexibility [16]. Additionally, ERP benefits are to a large degree on enterprise level, whereas BI&A benefits are distributed and depend on "local entrepreneurial managerial actions" [17]. Therefore it is essential that a vision is established from business side rather than from IS.

4 Discussion of Design Principles for a Chartering Method

In this section, we derive design principles for an ES chartering method based on our literature review. The identified design principles are mapped against the aforementioned CSFs and clustered along chartering key activities (Table 2). Specific design principles for our context of process-centric BI&A are highlighted in Table 2. The analyzed publications recognize different chartering activities, which we aggregated by using the terminology from the PMBOK [18]. We excluded the activity software package selection as our interviews indicated that chartering is regularly done under the constraints of pre-selected software. The often used term business case is intentionally avoided due to its ambiguity – reaching from simple cost-benefit calculations to almost all chartering activities.

Table 2. Design Principles (DPs with grey background are particularly important for process-centric BI&A and not equally important for ES in general)

Chartering Activity	*Design Principle (DP)*		*Related CSFs*
Purpose and Objectives Definition	[DP1] Alignment with Strategy and Business Processes	A chartering method shall … … enable the project sponsor to define objectives that are linked to organizational strategy as well as business processes.	1.1, 1.3, 2.1
	[DP2] Measurement of Success	… enable the project sponsor to measure implementation success as well as system success.	1.1, 1.3, 2.4
	[DP3] Top Management Involvement	… enable the project sponsor to involve top management and ensure their support for the implementation project.	1.1, 1.2, 1.3
High-level Requirements Specification	[DP4]End-user Involvement	… involve process participants with appropriate means to understand the business process and discover decision support requirements (such as real-time information needs and process KPIs).	1.6, 1.7, 2.3
	[DP5] Integration Requirements	… create transparency about the complexity of the required integration in terms of data types, sources, volume, and quality.	1.7, 2.2, 2.5, 2.6
Resource & Milestone Planning	[DP6] Iterative Approach	… plan resources & milestones according to an iterative implementation approach.	2.7
	[DP7] PM Methodologies & Tools	… support widely adopted PM methodologies and corresponding PM tools.	2.7, 3.1
High-level Risk Determination	[DP8] Risk Mitigation	… identify and mitigate risks coming from deficiencies in CSFs (such as team composition & skills as well as change & culture), deficiencies in success dimensions (such as system, information and service quality), and external events and conditions (such as competition and economic changes).	1.4, 1.5

Purpose and Objectives Definition

Goals & objectives definition (CSF 1.1) as well as top management commitment & support (CSF 1.2) are identified as most important CSFs for the chartering phase by our literature review and our interviews. As process-centric BI&A is of strategic importance, the strategic alignment & organizational fit (CSF 2.1) of the project objectives with the organization's strategy, vision and business needs is also critical for the success of such projects [14]. In addition to defining clear goals and objectives, measures should be put into place to monitor project and system success. Regarding success measures in process-centric BI&A projects one interviewee stated firmly "the project objective is usually to improve a very specific KPI … where snapshots can be compared before, while and after the project". Hence, objectives of BI&A initiatives should be business-driven, which favors top management initiation and continuous support [15].

In addition, our systematic literature shows that the appointment of a project champion (CSF 1.3) is a highly important CSF for project chartering. Unfortunately, definitions of the project champion role vary and it is not clearly stated who assumes it. Traditional PM literature on the other hand does not mention this role, but stresses the importance of the project sponsor for chartering [18]. However, the notions of project champion and sponsor show a lot of commonalities and can be defined generally as the person promoting the ES project, obtaining the resources, overcoming resistance, and involving stakeholders [19]. In practice, the chartering documentation might be delegated to a project manager even though it is issued under the authority of the sponsor [18]. Consequently, design principles DP1 to DP3 (Table 2) are derived for the chartering activity purpose and objectives definition.

High-Level Requirements Specification

Confirmed by our interviews, a sound scope management (CSF 1.7) is essential at the beginning of project. Based on the defined objectives a high-level requirements specification should be created including details of the business process [14]. In this regard, one interviewee claimed that "one thing you can really do wrong is to have too many or too high stakeholder expectations". ES literature identifies misunderstanding and changing requirements as one of the biggest project challenges [20]. A commonly proposed mitigation is early user involvement & participation (CSF 2.3), which has been recognized in our literature analysis as particularly important for process-centric BI&A. The primary purpose of any kind of BI&A system is the integration of data 'silos' to improve decisions and actions based on analytics [5]. Accordingly, our literature review identified data related factors (CSF 2.2) and integration & alignment of systems (CSF 2.5) as critical for the non-functional requirements specification of process-centric BI&A systems. These technical requirements are affected by the increasing complexity of business process regarding involved data types (e.g. unstructured), data sources (e.g. external), data volume, and data quality [21]. Therefore, we propose design principles DP4 and DP5 (Table 2).

Resource & Milestone Planning

ES implementations require considerable resources such as funding of hardware, software and human capital, which are typically scarce in such projects and require

top management commitment. Resource requirements need to be determined and secured early in the project, because the inability to do so may doom project efforts. However, regularly changing scope recommends following an iterative implementation approach (CSF 2.7) for milestone planning [5]. This is underpinned by our interviews, were multiple experts recommended to start with providing visibility into one business process before approaching the next. Furthermore, a chartering method should be aligned with the well-established PM approaches PMBOK [18] and PRINCE2 [22], which according to our interviews are also intensively used in the context of process-centric BI&A. Thus, we suggest design principles DP6 and DP7.

High-Level Risk Determination
Risks are uncertainties that might have effects on one or more objectives [18]. The analyzed literature examines risks largely with the aim to categorize risk factors. Additionally, success of the IT use as well as external events and conditions have to be taken in consideration to achieve project objectives [1, 2]. Therefore, we propose design principle DP8 (Table 2).

5 Conclusion

The research presented in this article outlines the current state of our work on the design of an ES chartering method. To that end, we derived eight design principles from insights we gathered through a systematic literature review enriched by expert interviews. Our analysis identified differences in the importance of certain factors between process-centric BI&A and ERP. Accordingly, some design principles are particularly important for process-centric BI&A (DP1, DP4, DP5, DP6), while others do not relate to specific context aspects and are more generally relevant for chartering of ES projects (DP2, DP3, DP7, DP8).

This paper is subject to specific limitations: First, the limited amount of BPMS related literature might bias BPMS related findings. Second, insights from the expert interviews are not representative and have to be handled carefully due to the limited number of interviews. Moreover, the process-centric BI&A projects discussed with interviewees involved only one particular software vendor. Despite the mentioned shortcomings, we perceive the presented work as valuable for both, research and practice. Our literature analysis, especially the identified CSFs and the derived design principles, extends the existing body of knowledge about ES chartering as well as about BI&A success. The derived design principles are propositions regarding project and system success. Accordingly, our insights can guide practitioners during the charting phase of an ES project.

In future research, we will leverage the outlined design principles to create a chartering method including tool support and corresponding templates. In cooperation with our industry partner we plan to evaluate and refine the artifact within multiple projects – focusing on process-centric BI&A projects.

References

1. Markus, M.L., Tanis, C.: The enterprise systems experience-from adoption to success. In: Zmud, R.W. (ed.) Framing the Domains of IT Management. pp. 173–207. Pinnaflex Education Resources, Inc, Cincinnati, OH (2000).
2. Soh, C., Markus, M.L.: How IT Creates Business Value: A Process Theory Synthesis. ICIS 1995 Proceedings. pp. 29–41 (1995).
3. Wateridge, J.: IT projects: A basis for success. Int. J. Proj. Manag. 13, 169–172 (1995).
4. Shaul, L., Tauber, D.: Critical success factors in enterprise resource planning systems. ACM Comput. Surv. 45, 1–39 (2013).
5. Yeoh, W., Koronios, A.: Critical Success Factors for Business Intelligence Systems. J. Comput. Inf. Syst. 50, 23–32 (2010).
6. Bucher, T., Gericke, A., Sigg, S.: Process-centric Business Intelligence. Bus. Process Manag. J. 15, 408–429 (2009).
7. Russom, P.: Operational Intelligence: Real-Time Business Analytics from Big Data. TDWI Checkl. Rep. 1–8 (2013).
8. Gao, X.: Towards the Next Generation Intelligent BPM – In the Era of Big Data. In: Daniel, F., Wang, J., and Weber, B. (eds.) Business Process Management. pp. 4–9. Springer-Verlag Berlin Heidelberg, Berlin Heidelberg (2013).
9. Peffers, K., Tuunanen, T., Rothenberger, M.A., Chatterjee, S.: A Design Science Research Methodology for Information Systems Research. J. Manag. Inf. Syst. 24, 45–77 (2007).
10. Vaishnavi, V.K., Kuechler, W.: Design science research methods and patterns: innovating information and communication technology. Auerbach, New York, NY, USA (2007).
11. Ika, L.A.: Project Success as a Topic in Project Management Journals. Proj. Manag. J. 40, 6–20 (2009).
12. Ram, J., Corkindale, D.: How “critical” are the critical success factors (CSFs)?: Examining the role of CSFs for ERP. Bus. Process Manag. J. 20, 151–174 (2014).
13. Dawson, J., Owens, J.: Critical Success Factors in the Chartering Phase: A Case Study of an ERP Implementation. Int. J. Enterp. Inf. Syst. 4, 9–14 (2008).
14. Ravesteyn, P., Batenburg, R.: Surveying the critical success factors of BPM-systems implementation. Bus. Process Manag. J. 16, 492–507 (2010).
15. Wixom, B.H., Watson, H.J.: An empirical investigation of the factors affecting data warehousing success. MIS Q. 25, 17–41 (2001).
16. Reijers, H. a.: Implementing BPM systems: the role of process orientation. Bus. Process Manag. J. 12, 389–409 (2006).
17. Shanks, G., Bekmamedova, N.: Creating Value With Business Analytics In The Supply Chain. ECIS 2013 Completed Research. pp. 1–12 (2013).
18. Project Management Institute (PMI): A Guide to the Project Management Body of Knowledge (PMBOK Guide). Project Management Institute, Newtown Square, Pennsylvania, USA (2013).
19. Esteves, J., Pastor, J., Casanovas, J.: Clarifying leadership roles in ERP implementation projects. (2004).

20. El-Masri, M., Rivard, S.: Towards a Design Theory for Software Project Risk Management Systems. Thirty Third International Conference on Information Systems. pp. 1–11. , Orlando (2012).
21. Isik, O., Jones, M.C., Sidorova, A.: Business intelligence success: The roles of BI capabilities and decision environments. Inf. Manag. 50, 13–23 (2013).
22. Cabinet Office: Managing Successful Projects with PRINCE2™ 2009 Edition. TSO (The Stationery Office) (2009).