UNIVERSITY ERP IMPLEMENTATION IN GERMANY: QUALITATIVE EXPLORATORY CASE STUDY OF ADMINISTRATIVE STAFF EXPERIENCES

by

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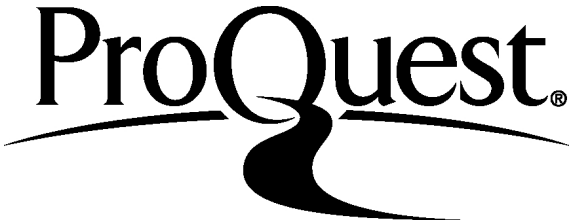

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ABSTRACT

Enterprise Resource Planning (ERP) implementations are expensive, time-consuming, and often do not lead to the expected outcome of integrated IT systems. Many German universities are implementing ERP systems as Campus Management Systems (CMS) and a solution to any problem, need, or requirement the organization has. This exploratory case study describes cases of CMS implementations in administrative departments in German universities. Thirteen non-managerial staff members in the registrar offices of two universities shared their experiences about critical factors during and after a CMS implementation. The interview questions focused on (a) implementation experiences, (b) implementation leadership, and (c) impact on daily work processes. The interviews were held, transcribed, and analyzed in German. The inductive analysis of the interviews revealed three main themes: (a) communication, (b) system customization, and (c) team composition and resources. The predominant subject in the theme communication was lack of internal and external communication regarding the CMS project. The overarching system customization theme was the complexity of administrative requirements and continuous and rapid adaptation needs requiring increased CMS team support. The focus of the team composition and resources theme was to employ knowledgeable employees thorough and beyond the end of the project to react to changing requirements. These themes are concurrent with previous research but are unique in that previous research did not focus on CMS in Germany. The themes differ because sub-categories are stakeholder group specific and highlight CMS implementation phase dependencies.

Keywords: Enterprise resource planning systems, Higher Education, success and risk factors, Germany

DEDICATION

I dedicate this dissertation to my grandparents: Bruno and Brigitta Thelen and Grete Engels; for inspiring me to reach higher. I know you are watching from above, cheering, and celebrating with me at this special stage in my life. To my parents Karl Thelen and Hilde Krieger for encouraging me to explore and grow. To my husband Luis who gave me the chance to start this journey and the freedom to finish. For his love, support, and reminders that the journey of a thousand miles start with the first step and to finish all I had to do is to take the next step and then the next. To my sister Sarah and my friend Ursula Kania for supporting me through all the phases of this journey. For my friend and mentor Laura Haase, for encouraging and supporting me through the final phase of this process. I am grateful to all of you!

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Chapter 1

Introduction

Enterprise Resource Planning (ERP) and Customer Relationship Management (CRM) systems enable organizations to achieve effective relationships with customers and improve activities along the organizations' value chains by using information systems (Alsène, 2007; Greenfield, 2008). Depending on the size of the corporation and organization, ERP system implementations have different user-numbers, functionalities, and cost-levels. Organizations implement ERP systems as standardized software tools. Combination of modules within the ERP system creates specialized solutions for different groups of organizations. The problem for organizations is ERP implementations are expensive, take a long time to implement, and do not lead to the expected outcome of integrated information technology (IT) system (Bensberg, 2009; Dixit & Prakash, 2011; Fryling, 2010; Pearlson & Saunders, 2010; Tarafdar & Sufian, 2010). To achieve effective relationships, improve value chain activities, and create a successful ERP implementation, organizations have to align the IT system implementation with expected outcomes.

Organizations implement an ERP system as a tool to increase competitive advantage, vital for most jobs, and for organization survival. Davenport (2011) highlighted the importance of matching technology and IT-tools to the work as well as to the type of worker or worker group who uses the system to create a successful ERP implementation. ERP implementation processes present a chance for the organization to change and innovate (Klapper, 2011). Processes are adapted and changed to fit organizational and IT requirements, and technology is upgraded to be future-ready (Schiesser, 2010). The organization's goals, expectations, and experience present an important factor for a successful implementation of an ERP system.

Universities present a unique subgroup of small- and medium-sized organizations (Cobarsí, Bernardo, & Coenders, 2008; Pollock, Williams, & Procter, 2003; Toens, 2009). Universities are influencing and influenced by politics, legislation, business, culture, and internal fragmentation leading to constant change and adaptation of processes and (IT) tools used (Alt & Auth, 2010b; Klapper, 2011; Toens, 2009; Welsh, 2010). Universities are unique organizations and use specialized software for their day-to-day business processes (Alt & Auth, 2010b; Pollock & Cornford, 2004). In addition, universities serve a diverse group of stakeholders, including students, teachers, researchers, and administrative staff. The stakeholders differ in requirements and expectations from other stakeholder groups in the business world (Pollock & Cornford, 2004). The uniqueness of universities in the ERP software environment creates a niche market for ERP vendors and consultants, and challenges for university management.

German universities belong to an organizational and cultural subset of organizations with special requirements regarding stakeholders, business demands, and legislative influences. Public universities in Germany are under the pressure of adapting to legislative, organizational, and financial changes. Implementing a new IT system offers universities possibilities of reorganization, restructuring, streamlining, and financial optimization in addition to a technological upgrade of legacy IT systems to an ERP system (Bensberg, 2009; DUZ, 2010; HIS, 2010b; Pollock, 2003; Sprenger, Klages, & Breitner, 2010b; Thomas, 2010). An ERP implementation is not only highly visible, but also an organizational and political project. Each group of stakeholders may follow their own agenda during the analysis, development, and implementation of a university-special ERP system, and can foster or hinder the success of the project. The differences in perspective, aim, and requirements may also lead to a different perspective of project success between stakeholder groups. Aligning requirements and

expectations of the university and of stakeholder groups with each other and with the vision of the organization supports a successful project.

The purpose of this study was to explore cases of campus management system (CMS) implementations in German universities, specifically in administrative departments, and to identify group-specific critical success and risk factors (CSRF) from experiences of non-managerial administrative staff who were stakeholders. A CMS is a highly customized and specialized IT system for higher education institutions (HEIs) or may be a modular ERP system adjusted for university requirements. The exploration and analysis of interviews with university non-managerial administrative staff provided a comparative view to CIO and management perception, two groups previously focused on to identify CSRF. Identified factors that foster a successful project outcome differed from previous research because of the new stakeholder focus. The results of the study improved the breadth of knowledge regarding CSRF because of the focus on different stakeholder groups and university specific factors. Results of the study combined with previous research focused on perceptions of managers and CIOs of local United States government and mid-size organizations (Dues, 2010; Khatib, 2010), and HEIs (Graham, 2009; Pollock, 2003; Pollock, et al., 2003; Pratt, 2007; Sullivan, 2009), may improve ERP implementations at universities and possibly other institutions.

Chapter 1 includes the problem statement of enterprise resource planning (ERP) systems and their challenges of delivering on project goals, expectations, and implementation timeframes and budgets. The chapter provides an overview of the purpose and significance of the study regarding German CMS implementation success and risk factors, as well as the alignment between the study question and the research design. The background of the study introduces research of HEIs in the United States and United Kingdom as early adopters of ERP systems,

and how German HEIs are searching for highly specialized and customized IT systems to cope with political, organizational, educational, and IT changes. The study question aligned with the purpose, research question, and research design before the scope and limitations are highlighted. The theoretical framework leads to the research method, including an explanation of the case study approach used and the population under investigation.

Background of the Study

ERP systems are IT-systems for organizations of different sizes, focusing on the business demands of the organization, and are highly customized (Alsène, 2007; Greenfield, 2008). Wang, Li, Warfield, and Xu (2006) noted companies implementing ERP systems are looking to achieve efficiency, competency, and competitiveness. The focus of ERP implementation is to integrate enterprise-wide resources with functions of customer relation, manufacturing, human resources, finances, and IT system relationships to suppliers (Wang, et al., 2006). The integration of multiple functions and resources and expectations of efficiency, competency, and competitiveness are often challenged with ERP implementation problems including rising costs, project plan time overruns, and not achieving the expected outcome (Bensberg, 2009; Carton, Adam, & Sammon, 2008; Dixit & Prakash, 2011; Parr & Shanks, 2000; Tarafdar & Sufian, 2010).

Universities are presenting a subset of organizations with special requirements regarding features, IT-implementation, and calls for organizational change (HIS, 2010b; Masrek, 2007; Thomas, 2010). In Germany, political, educational, and technological changes since 1999 led to an increase in IT-projects of specialized higher education ERP systems, CMS (Alt & Auth, 2010b; HIS, 2011; Ringleb & Thelen, 2006). The Y2K problem and IT benefits for university administration were the reason for the introduction of the first generation of CMS. A second

wave of university IT systems started to emerge when 29 European countries signed the Bologna Declaration in 1999. The declaration initiated a process to create a comparable and compatible area of higher education (European Commission, 2010) and initiated a change process in treaty-countries, including organizational and administrative aspects of higher education, standard development, and quality assurance. Within Germany, universities started to look at their IT system and make strategic decisions for implementing CMS. The increased interest in CMS and services allowed new CMS providers to enter the university market and created competition not seen before 2006.

Higher Education in Germany is going through a rapid organizational and legal change after the Bologna Convention of 1999 (Gaston, 2008; Toens, 2009), advancements in IT and IT services, and process orientation (Degkwitz & Klapper, 2011). IT systems became an everyday tool for many university stakeholders. University stakeholder groups include staff, faculty, students, funders, and private actors (Okunoye, Frolick, & Crable, 2008; Whitworth, 2012). Subgroups of stakeholder groups are for example, the group of staff includes subgroups of researchers, administrative staff, IT staff, and many other groups with individuals often belonging to multiple groups. Stakeholders access IT infrastructures daily, using multiple systems, interfaces, databases, and files and data of varying quality using differing logins. System and database administrators organize access and storage on multiple systems and have to maintain large diverse infrastructures (Bischof, Hengstebeck, & Grzemski, 2011; Sullivan, 2009). Users demand new features, more access rights, security of data, process-automation, and automatic workflows. System administrators and IT departments often lack resources to keep up with user and organizational demands (Bologa, Bologa, & Sabau, 2009; Graham, 2009; Klapper, 2011). New expectations and requirements challenge IT departments and the lack of resources

may lead to tensions within the university and possibly to uncontrolled developments in peripheral departments.

Maurer (2011) highlighted CMS as part of the complex of software necessary for HEIs. HEIs have to react to the changing higher education environment and changing administrative and political requirements. Many German universities use architectures of mixed IT systems to reduce the reaction time, to implement quickly new requirements into IT systems, and to support the differing demands of university divisions of education, research, and administration. Such mixed IT systems include self-developed components, commercial off the shelf (COTS) software, products of a German pre-CMS vendor, and CMS systems (Böhm, Held, & Tröger, 2007; Maurer, 2011). The end-of-service-date in 2014 for a pre-ERP software suite (Paulsen, 2008) pressured a majority of HEIs in Germany (HIS, 2010a) to search for new or partial replacement IT solution with the focus on campus management administration and the student life cycle (Alt & Auth, 2010a). Though this end-of-service-date was revised to 2020 to reduce pressure on universities and the vendor (Paulsen & Schlüter, 2012), universities gained momentum to search or develop future IT systems, and are interested to learn about implementation experiences and best practices, for example, through conferences and research groups. Multiple authors (Alt & Auth, 2010b; Bauer, 2011; Pollock & Cornford, 2004; Sullivan, 2009) highlight the technical complexity of university CMS implementation projects, including the university specific requirements, the divisions' demands, and the different definitions of success by stakeholder groups. For universities about to start a CMS implementation process was of interest to understand multiple, implementation-influencing dimensions, including stakeholder influence and depth of stakeholder participation in the decision and implementation

process. Research about and integration of stakeholders into the process may lead to an increase of the project scope but may also lead to a better understanding of the expected outcome.

Problem Statement

The general problem of ERP implementation are high expectations in multiple organizational dimensions, including process reengineering, time savings, improved communication and data dissemination, reduced resource requirements, high and swift return on investment (ROI), and increased productivity. High hopes and expectations of ERP system implementations are often not met, because ERP projects have a failure rate of 40-70%, do not deliver on their promises, and overrun their time and budget (Carton, et al., 2008; Dixit & Prakash, 2011; ERP IT Toolbox, 2007; Parr & Shanks, 2000). Organizations implementing an ERP system take an investment risk and need to consider significant recurring maintenance costs (Fryling, 2010). Success and failure of ERP implementations is largely dependent on the implementation process, acceptance, involvement, and engagement of people (Davenport, 2005; Dues, 2010; Graham, 2009; Ifinedo & Nahar, 2007; Pratt, 2007; Shah, et al., 2011). Success and usability become important factors for the justification of expenses as medium and small businesses as well as nonprofit and public organizations are looking into implementing ERP systems (Pollock, 2003).

Researchers found the same general problems small and medium business have apply to university ERP implementations (Pollock & Cornford, 2004; Sullivan, 2009. Risk and costs are evaluated similarly by universities aiming to implement ERP systems but unique university characteristics and expectations have to be included into the decision making process (Sprenger, Klages, & Breitner, 2010a). Stakeholders put high expectations on higher education ERP implementations, implementation projects challenge financial and personnel resources, and may

lead to stakeholder disagreements on successful project completion (Baltzan & Phillips, 2009; Pollock & Cornford, 2004; Sullivan, 2009; Tsang-Kosma, 2010). Researchers (Degkwitz & Klapper, 2011) and multiple conferences (for example the Workgroup Campus Management by ZKI (2013) and the Campus Innovation Hamburg conference by Multimedia Kontor Hamburg (2013)) emphasized the focus of CMS on the student life cycle, processes and requirements close to core functions of HEIs. HEI as well as CMS vendors have to peg the dimensions, features, and functionalities of their implementation and services out to manage stakeholder expectations.

ERP implementation projects are people-intensive and sensitive projects. People and their perception, expertise, requirements, and collaboration influence the implementation project (Graham, 2009; Shah, Khan, Bokhari, & Abbas Raza, 2011; Tsang-Kosma, 2010). Some stakeholder groups perceive CMS as the "Swiss Army Knife," the solution for everything, and the mind-reading tool that provides answers to any organizational question (Ringleb & Thelen, 2006). The specific problem was administrative staff members who work with the essential features for the student-life cycle on a day-to-day basis were not included into the implementation and research process (HIS, 2010b; Konopka, 2007; Okunoye, et al., 2008). Researchers showed active involvement in the implementation process and expectation management of IT teams, IT managers, CIOs, and higher management but missed the stakeholder group of employees working with the system and its functionalities.

Gap in Literature

Previous studies focused on major English-speaking areas, such as the United States and the United Kingdom, on major ERP vendors, and on the perception of CSRF of CEOs, CIOs, and IT managers. The aim was to identify risk and success factors as seen through the eyes of the CIOs and management, especially in local government and mid-size organizations (Dues, 2010;

Khatib, 2010) and HEIs (Graham, 2009; Pollock, 2003; Pollock, et al., 2003; Pratt, 2007; Sullivan, 2009). Esteves and Bohorquez (2007) and other researchers' called for additional research to understand stakeholder perspectives within ERP implementations and how different types of ERP implementations issues stakeholder groups experience. Okunoye, et al., (2008) called for additional research on experiences of multiple stakeholder groups regarding CMS decision-making, development, implementation, and use. Ghosh and Skibniewski (2010) highlighted the need for longitudinal analysis of ERP implementation experiences whereas Sullivan (2009) called for further research in other countries. Summarizing, researchers called for additional research regarding different locations, languages, systems, and stakeholder groups to confirm and expand CSRF theory regarding ERP implementations.

The study distinguishes itself from previous studies because the author focuses on a set of administrative non-managerial stakeholders in the student services departments and universities in Germany, a geographic region not analyzed previously. Additionally, the author did not focus on the type of implementation, the expense, the time to implement, and the success ratings but the views of non-managerial administrative staff regarding the implementation process. The design of an exploratory multiple case study provided the benefit of confirming previous research results in a new geographic location with a different stakeholder group and offered the possibility to expand previous results with new findings. Staff`s answers lead to a fuller picture of success and failure factors, processes, participation, and problems of a CMS implementation at German universities. The results of this study not only aid the understanding of stakeholder involvement and CSRFs in CMS implementations but also engage the administrative staff group and support the successful implementation of the CMS in the university because of increased engagement and communication.

Purpose of the Study

Understanding the ERP implementation process used in German universities and sharing CSRF for the stakeholder groups of non-managerial administrative staff may increase the likelihood of a successful university ERP implementation and the perception thereof by more stakeholder groups. The purpose of this qualitative exploratory multiple case study was to describe and identify group-specific CMS implementation related CSRF from a non-managerial administrative point of view within multiple university cases in Germany to improve future CMS implementations by addressing the newly identified group-specific CSRFs. Non-managerial administrative staff included employees and service staff in the registrars and student services department. HEI non-managerial administrative staff's perception and description of CSRF was not a focus of previous studies. Preceding research focused on CSRF by managers and IT staff of local government, mid-size organizations, and HEIs with a focus on the United Kingdom and the United States (Dues, 2010; Graham, 2009; Khatib, 2010; Pollock, 2003; Pollock, et al., 2003; Pratt, 2007; Sullivan, 2009). The research of Pollock (2003) and Tsang-Kosma (2010) included administrative staff of a university in the United Kingdom and the United States but did not focus on administrative staff. Authors Pollock (2003), Pratt (2007), Sullivan (2009), and Tsang-Kosma (2010) identified gaps in research regarding multiple universities in different geographical areas, the lack of knowledge about different stakeholder-groups' perception and involvement in the implementation process, as well as different ERP system implementations outside of the United States and the United Kingdom as a research gap. The lack of available research and the call for a detailed understanding of different stakeholder groups were reasons to pursue a qualitative exploratory multiple case study.

The study was conducted at two German public universities to reflect a homogenous university type and provide the opportunity to generalize results found. In this thesis, professional perceptions of non-administrative employees in registrars' offices of two universities in Germany during and after a CMS implementation were described and analyzed using an exploratory multiple case study approach. The focus of the study was the staffs' descriptions regarding the implementation process, staff, and actions affecting the process, and process improvement recommendations. The descriptions identified and explored group specific CSRF. The exploratory multiple case study design allowed gathering in-depth knowledge from multiple universities, replicating a single case study design in multiple locations with similar groups. The design offered the possibility to compare and contrast the findings between each case and with previous research findings and possibly, to generalize results. The results of this study lead to group-specific CSRF for higher education ERP implementations. These group-specific CSRF factors may help other (German) universities and ERP vendors successfully implement a university ERP system.

Research Questions

The implementation of ERP systems at universities created challenges because of high costs and bottlenecks of human resources for the design, implementation, and post-implementation phase. Often it is not technology that is the problem within ERP implementations but people and their involvement or non-involvement (Graham, 2009; Shah, Khan, Bokhari, & Abbas Raza, 2011; Tsang-Kosma, 2010). Composition and perception of the administrative department as a main user of the CMS affect ERP implementation success, as administrative departments are power users of the system regarding the student life cycle. The focus of this study is HEI employees and their experiences with CMS implementations to find

common themes from this stakeholder group influencing the CMS implementation. The guiding research question of the study is:

> What are the group-specific experiences of non-managerial administrative staff during and after CMS implementations at German universities?

The research question guides the interview questions (APPENDIX I) that aim at an in-depth description of staff's experiences to identify group-specific CSRF. Identifying group-specific CSRFs may lead to improved CMS implementation success.

Significance of the Study

The study of ongoing and successful university ERP implementations in universities may provide insight into the process leading to successful project completion (DUZ, 2010; Pollock, 2003). Understanding success factors, change strategies, pitfalls, and risks of HEI ERP implementations in addition to internal organizational understanding can increase understanding of processes and functionalities needed, support the IT implementation strategy, and improve the vision for the project. Identification of CSRF information can support university leaders in making an informed decision for or against an ERP implementation, involve the right people and subject areas identified, as well as learn from the experiences made. This knowledge within the decision process in turn may increase the chances for success of ERP implementations and university ERP implementations.

Previous studies focused on risk and success factors seen through the eyes of the CIOs and management, especially in local United States government and mid-size organizations (Dues, 2010; Khatib, 2010) and HEIs (Graham, 2009; Pollock, 2003; Pollock, et al., 2003; Pratt, 2007; Sullivan, 2009). Limited research was available about German CMS implementations, including an overview of CMS concepts, vendors, and functionality (Alt & Auth, 2010b), a cost-

benefit analysis for the selection, migration, and operation of a CMS (Sprenger, et al., 2010a), and praxis oriented case descriptions regarding process orientation of HEIs (Degkwitz & Klapper, 2011). Researchers like Okunoye, et al., (2008) and Esteves and Bohorquez (2007) called for additional research on experiences of multiple stakeholder groups regarding CMS decision-making, development, implementation, and use. Ghosh and Skibniewski (2010) highlighted the need for longitudinal analysis of ERP implementation experiences whereas Sullivan (2009) called for further research in "other countries or regions due to differences in culture, IT knowledge and infrastructure, and economic challenges" (p. 43), to compare with previous research and possibly transfer CSRF.

This study offered a unique approach to the problem of ERP implementation success because a) a different country and with it a different lingo environment was studied, b) a new group of ERP vendors was introduced through the cases, and c) a different group of stakeholders and users contributed specific experiences and processes to the cases. The results of this study combined with previous studies provided an insight into CSRF in general and stakeholder groups specific CSRF of ERP implementations in universities in Germany and other countries. The results depicted known impact factors but highlighted stakeholder groups specific sub-factors and foci to support success in specialized ERP implementation projects. Knowledge and understanding of these sub-factors may result in higher success rates of university ERP implementations in the future. Future studies may use the results of this study to create a framework for the analysis, design, and implementation of a CMS at any type and size of educational institution in a standardized way. Such a tool could ease the selection and implementation process, reduce the time needed for implementation, and therefore lower costs of consulting and adjustment services (Rowland, 2007; Sullivan, 2009).

The study provides leaders with insight into how a specific group of stakeholders perceived an ERP implementation. The results could lead to new approaches on managing and leading a specialized ERP implementation at a university, for example, the differentiation of stakeholders in various steps of the implementation process. Leaders could use the results of this study to create specific communication and engagement strategies, to find ways to mitigate risk factors for each stakeholder group, and to invest into and focus on areas and factors identified to support success. Understanding the differences in perception between groups of employees could support the implementation process if the knowledge leads to stakeholder specific strategies for the implementation process.

Alignment of Study Question, Purpose, Research Question, and Research Design

Research focused on ERP efficiency and effectiveness (Allen, 2011; Tsai, Chen, Hwang, & Hsu, 2010), project complexity and success (Dues, 2010; Fryling, 2010; Ghosh & Skibniewski, 2010; Sullivan, 2009), and performance (Hofmann, 2008; Kansal, 2008; Yang & Su, 2009). Authors like Cobarsí, et al., (2008), Krakowsky (2008), Marterer (2008), Okunoye, et al., (2008), Sullivan and Porter (2006), and Zornada and Velkavrh (2005) focused on ERP or IT implementations and related topics in higher education in the United States and the United Kingdom. Higher education ERP and IT implementation research from countries like Saudi Arabia, Spain, and Thailand were available (Aldayel, Aldayel, & Al-Mudimigh, 2011; Cobarsí, et al., 2008; Vathanophas & Stuart, 2009). The limited research available on German higher education ERP implementations included CMS concepts, vendors, functionality, cost-benefit analysis, HEI IT case studies, and best practice descriptions focused on higher education processes (Alt & Auth, 2010b; Degkwitz & Klapper, 2011; Sprenger, et al., 2010a). Previous

research was lacking inside on university stakeholder experiences for CMS implementations in different regions, cultural areas, tongues, and IT systems used.

This research study focused on the unique aspects of German CMS development and administrative staff experiences during and after a CMS implementation. German HEIs intensified the use of the term campus management system (CMS) for specialized ERP systems for HEIs since 2006 (Degkwitz & Klapper, 2011; HIS, 2010b; Thomas, 2010). The study question evolved out of the context of the reason to coin a special term in the European higher education environment. European universities perceive themselves as unique and ERP systems had to be highly customized or specially fit to the institution's requirements. Stakeholder groups at universities reacted in different ways to the introduction of a new IT system (Hossler, 2006; Pratt, 2007; Sullivan, 2009; Tsang-Kosma, 2010). Within international and German research, the stakeholder groups of administrative university employees have been absent. The internal HEI perspective of uniqueness as an organization and environment could lead to unique success and risk factors for HEI ERP/CMS implementations.

The guiding research question of this study aligned with the findings of Okunoye, Frolick, and Crable (2006), Pollock, et al., (2003), Sullivan (2009), and Tsang-Kosma (2010) that higher education ERP systems have additional and sometimes different focus than traditional ERP systems. This qualitative exploratory case study offered a fitting approach to answer the research question with in-depth interviews about participants' experiences. The multiple exploratory case study design replicated the interviews with not only different participants at one HEI but also with multiple HEI CMS implementations. Multiple exploratory cases provided possibilities for comparative analysis of the findings and a wider description because of differing administrative experiences, HEI organizations, HEI cultures, and CMS software.

Scope

HEIs in Germany include public and private institutions. Institutions differ by their type of education and research. German HEIs include universities with and without the right to award doctorates, universities of applied science, teaching and religious universities, as well as art and music universities (HRK, 2012). Public universities face different challenges than private universities when implementing a CMS system. Differences include finances, strategy, governance, administrative and educational staff levels, size of student body, and others. The scope of this study was limited to public universities in Germany with the right to award doctorate degrees, to create a homogeneous research environment. Public universities' employ specific structures and have different needs, for example in the areas of education, research, financing, management, governance, and size of IT implementation. Excluding smaller German HEIs and private HEIs limited the generalizability of the study.

Previous research focused on HEI ERP-implementation experiences of CIOs and management without evaluation of other stakeholder experiences. Compared to previous studies, this study focuses on a different group of HEI stakeholders, the administrative staff in the registrar`s office. Limiting experiences of CMS implementations to administrative staff in higher educational institutions in Germany lead to a single stakeholder focus that may not be generalizable to additional stakeholder groups. Finding additional or special HEI CSRF for the stakeholder groups of administrative employees could lead to additional research for other stakeholder groups.

ERP existed in many aspects of business including, manufacturing, finances, and retail. ERP in higher education environments has existed since 1995 in the United Kingdom and the United States. Because of different IT developments, the establishment of CMS in higher

education in Germany started in the late 1990 and developed on a different scale because of political, cultural, and language differences in comparison to the Anglo-American ERP market. The differences in the market highlight the question for applicability and comparability of research in ERP systems of the Anglo-American market to the German CMS market. The results of this study were limited in study size and narrow focus on large universities in Germany and are not generalizable.

ERP research leads from preparation, to implementation, to post-implementation phases and subsections include technical and IT aspects, strategic analysis, organizational changes, and success and risk factors. Each phase and area provided a focus for research in the higher education context. Because the German higher education system was in a change process regarding restructuring and reevaluating their degree systems, universities were engaging in organizational and technological changes. These changes took place since 2004 (Bauer, 2011) and some universities lead the way in developments whereas others are more slowly adopting changes. The universities who were ahead in their IT change process provided excellent examples and best practices for those transforming at a later point. This research study discovered CSRF in the (post-) implementation phase allowing knowledge transfer to other universities engaging in change processes. Participating universities were at different points within the implementation or post-implementation process. The timing may influence participants' experiences and make findings not fully comparable because projects plans and resources were adapted to circumstances, and according to interview participants, project members changed during the timeframe of the implementation.

Several studies focused on the IT side of implementations: Questioning IT personnel and CIOs for their view of the ERP-phases success factors, presenting differences of IT-systems, and

analyzing best practices in terms of technology and processes. In addition, researchers connected stakeholder theory and ERP implementations at universities with an emphasis on IT related experiences, opinions, and best practices. Research focused on CIO's and management experiences in ERP implementations but lacked a focus on employees, power users, and data owners of the system. An in-depth study at a single university, including all stakeholder groups' experiences did not offer generalizable results because of the multiplicity of the (German) higher education environment. Therefore, a specific stakeholder group, the administrative staff in student affairs offices and registrar`s offices was interviewed in multiple university cases to achieve more generalizable results.

The focus on administrative staff with registrars' functions and in direct contact with the students was a very limited view. Restricting the experiences collected to administrative users and power users could introduce new CSRF to make the CMS implementation a success. The selection of several universities with advanced ERP implementations allowed evaluation of several IT-system-implementation-experiences as well as several organizational structures. The variety of data collected could provide useful for other universities and possibly also for other HEIs. Additional research on other stakeholder groups could follow a similar design of this study or include quantitative elements to cover greater numbers of participants and groups. A broader scope on all administrative staff or even all stakeholders would not present a focused look on specific CSRF of stakeholder groups within a case study. The scope of this study therefore included several cases at German universities, including multiple CMS, multiple CMS-project progress states, and multiple groups of administrative employees faced with registrars' job descriptions because of differences in university administrative structures.

Assumptions

For this study, three assumptions were important. The researcher assumed the selected sample was representative of other German HEI registrar's offices going through a CMS implementation. The researcher assumed CMS implementation and the selection for project team members were similar in other HEIs. The final assumption of the researcher was participants would answer the interview questions from their personal experiences and with honesty to the best of their ability and not provide false information.

Limitations

Creswell (2009) spoke of the importance to express and acknowledge limitations in research studies. The first study limitation was the exclusion of smaller and private German HEIs. Excluding smaller and private HEIs created a more homogeneous research group but also limited the generalizability of the study results, a limitation also incurred by the exclusion of HEIs not engaged in an integrated CMS implementation process. The third limitations of the study related to the small sample size. The number of stakeholders interviewed within each sub-case study and the number of universities participating was small. Though saturation was the goal for a case study (Schreiber & Asner-Self, 2011) the results were limited to the availability and participation of employees, their experiences, the number of participating universities, participants heterogeneity of structure, IT systems, and project management. The sampling of the group for the research was very specific and purposeful aimed at registrar's office or student service employees with direct student contact. Excluding middle and upper management and CMS team members to gain specific stakeholder experiences was another limitation of the study. Personal experiences and researcher bias may have limited the design of the study. This limitation did not occur from the researcher's perspective as the respondents' experiences varied

and participants chose words and expressions from their vocabulary and not from the initial questions. Further limitations during the interview process included the possibility interviewees initially feeling uncomfortable with the fact-to-face interviews, with the interviewer, or the gender of the interviewer (Berg, 2009; Broom, Hand, & Tovey, 2009). A limitation and assumption for the interview included that participants answered questions honestly. These limitations lead to limitations regarding validity because of the instruments used in this study. Because of the limitations, some results were only limited generalizable to other (German) universities whereas other results confirmed previous researchers' results and were applicable to international CMS implementations.

Delimitations

The criteria of large public German HEIs awarding doctorate degrees and having started or completed a CMS implementation past 2010 was set to reduce heterogeneity of the sample. The study had limited generalizability to other HEIs in Germany and in other countries because of the differences in structure, size, culture, and IT. The researcher limited this study to participants in administrative non-managerial staff positions, specifically the registrar's office and student services with direct student contact to research experiences of a stakeholder group not analyzed before. Results may be limited generalizable because other stakeholder groups may focus on different implementation related instances and processes as well as have different experiences depending on the phase of the CMS implementation.

Theoretical Framework

The field of ERP systems has been a developing field since the 1950s to achieve efficiency, competency, and competitiveness through integration of resources, functions, and new technologies (Wang, et al., 2006). The complexity of ERP implementations and the

differences in expectations from ERP implementations often led to rising projects costs, project plan time expansions, and failing to meet the expectations (Bensberg, 2009; Dixit & Prakash, 2011; Fryling, 2010; Pearlson & Saunders, 2010; Tarafdar & Sufian, 2010). Researchers and practitioners are searching for ways to remedy such developments in multiple areas including software implementation strategies, CSRF theory, organizational theory, leadership theory, and stakeholder theory. The theoretical framework for this multiple exploratory case study flows from ERP systems and implementation projects to CSRF theory to stakeholder theory and includes organizational theory research regarding HEIs.

ERP Systems and ERP Implementation Projects

The broad theoretical area under which this study falls is information systems (IS) and information technology (IT) because ERP systems present packaged software solutions to integrate business processes and user functions (Klaus, Rosemann, & Gable, 2000). Stephenson and Sage (2007) highlighted ERP systems as a single integrated hardware and software solution to provide solutions for diverse organizational requirements, increasing the complexity of the model to include the organization, its stakeholders, and its processes and functions. This all-encompassing perspective of ERP systems is also the difference Kroenke (2011) perceived between IT systems and IS: IT systems are only "products, methods, inventions, and standards" (p. 19) that can be bought whereas an IS consists of the "assembly of hardware, software, data, procedures, and people that produce information" (p.19). ERP implementation projects aim at implementing an ERP system not as an IT system but as an IS to achieve competitive advantage. An abstract ERP model therefore includes people, technology, and processes (Stephenson & Sage, 2007).

Understanding achievable goals of an ERP implementation lays a foundation for the software implementation strategy but also for CSRF within the ERP implementation and the awareness how stakeholders influence the implementation project (Dues, 2010; Okunoye, et al., 2008). In addition, the ERP implementation team should consider organizational knowledge and self-perception, vendor and software selection, and alignment of the IT selected with organizational characteristics and culture (Pollock, 2003; Pratt, 2007; Sprenger, et al., 2010a). The type of development as well as interaction between ERP vendors, consultants, and the implementation project team may influence the customization and implementation success of the project and the experiences of employees involved in and confronted with the ERP system (Guntamukkala, Wen, & Tarn, 2006; Sullivan, 2009). Best practices and previous research regarding CSRF present a partial solution for the controversy of time constraints to begin the implementation process and the need for preparatory work. Best practices offer insight into how an organization achieved a successful IT implementation in a specific area and offer strategies for organizations implementing similar systems in the future (Aldayel, et al., 2011; Graham, 2009). Best practices and knowledge of CSRF, however, do not guarantee success nor literal transferability to another organization. Organizations need to invest resources to gain knowledge and experience, foster critical success and reduce critical risk factors, and follow sound project management principles.

Critical Success and Risk Factor Theory

Implementing CSRF theory into ERP project management had its origins in "other industries and areas, including general project management, manufacturing systems, and reengineering" (Sullivan, 2009). CSRF theory aims to find explanations and remedies for failures, delays, and resource overruns (ERP IT Toolbox, 2007; Hawari & Heeks, 2010) by

analyzing previous projects, differences between organizations and industries, and perspectives of top and middle management, project team members, and IT personnel. Ifinedo and Nahar (2007)`s model of ERP project success includes six dimensions: (a) information quality, (b) system quality, (c) individual impact, (d) organizational impact, (e) vendor/consultant quality, and (f) workgroup impact. Most success factors can also be perceived from the risk factors perspective. Scott and Vessey (2002) model of risk factors in enterprise systems implementations includes (a) the environment, (b) the organizational context, (c) the information systems context as well as (d) project specific elements. Furthermore, success and risk factors can be analyzed base on implementation-related and ERP specific factors (Gattiker, 2002) as well as based upon short-term and long-term factors (Ghosh & Skibniewski, 2010). Success and risk factors to analyze include management and leadership, the environment, project complexity, team composition, communication, software selection, training, resources of finances, time, and personnel, current and future IT as well as expectations (Dowlatshahi, 2005; Gattiker, 2002; Ghosh & Skibniewski, 2010; Graham, 2009; Omerzel, Biloslavo, & Trnavčevič, 2011; Pratt, 2009; Sprenger, et al., 2010a; Tsang-Kosma, 2010).

The organization interested in implementing a new IT system can learn of other experiences, products of vendors, and services of consultants, and compare them to the requirements of the organization to find the best fitting and best supporting tools and services. Vendors, consultants, and employees with knowledge of the organization, processes, and environment can increase the speed and success of an implementation (Li, Liao, & Lei, 2006) because of experiences and knowledge of similar organization and environments. CSRF theory is a tool to introduce, match, and compare previous knowledge of projects and research with the project at the organization, a way to learn and apply experiences of other projects of similar

intent, and to create risk mitigation strategies (de Millo, 2005). The challenge with the implementation of new information technology systems arises because of differences in organizational hierarchy, culture, management, and leadership perspective. Organizational and system knowledge as well as understanding organizational needs cannot guarantee ERP success but authors (Chen, 2009; Li, et al., 2006) see them as critical success factors for successful ERP projects. Best practices and the understanding of success and risk factors may support positive project outcome.

To apply CSRF theory to a specific project and to create project-specific solutions, a definition of project success has to be created (Aldayel, et al., 2011; Frantz, Southerland, & Johnson, 2002). A success definition includes measurable outcomes such as return on investment but can also encompass subjective definitions that may differ between projects, organizations, and stakeholder groups (Frantz, et al., 2002; Sedera, Gable, & Chan, 2004). Many projects and studies focus their CSRF analysis on the managerial and IT level (Dues, 2010; Graham, 2009; Lapham, 2009; Pollock, 2003; Pratt, 2007). Studies encompassing non-management employees as subjects were rare (Khatib, 2010; Sullivan, 2009) and do not perceive this employee group as having an important influence on project success though some research hints the end user makes or breaks the system (Dredden & Bergdolt, 2007). Stakeholders and their influence within CSRF theory were therefore an important element of project success.

Stakeholder Theory

Stakeholders are organizational internal or external groups or individuals "who can affect or is affected by the achievement of the organization`s objectives" (Freeman, 1984, p. 46). Definition of stakeholder groups, their name, size, objective, and its members depends on the organizational environment, understanding, and perspective of research or project analysis.

Sedera, et al., (2004) used stakeholder cohorts of strategic, managerial, technical, and operational whereas Mitchell, Agle, and Wood (1997) highlight stakeholder groups' attributes of power, legitimacy, and urgency to create a stakeholder topology. Stakeholder groups may also be specific to types of organizations or industries. Pollock and Cornford (2004) highlighted stakeholder groups' employment perspective regarding education, research, and administration in addition to students and multiple external groups within the higher education environment. Lockwood (1985) and Pollock and Cornford (2004) expanded stakeholder attributes from Mitchell, et al., (1997) with a focus on higher education regarding purpose, function, form, structure of authority, outputs and measurability, autonomy and dependency from wider society, and internal fragmentation (Lockwood, 1985; Pollock & Cornford, 2004).

Sedera, et al., (2004) and Mitchell, et al., (1997) findings lead researchers like Ifinedo and Nahar (2007), Kuratko, Hornsby, and Goldsby (2007), and others to highlight the importance of understanding and evaluating the needs of stakeholder groups within IT implementation projects, leading to complex decision making processes for the implementation process. Complexity of IT systems may increase with the number of stakeholder groups identified, introduced into decision processes, and using the system. Stakeholder groups may introduce similar, differing, and even opposing perspectives, objectives, and demands into the IT implementation project and require project management decisions (Ifinedo & Nahar, 2007; Sedera, et al., 2004). Multiple stakeholder groups, their perspectives, and needs may also lead to group specific definitions of success (Frantz, et al., 2002; Sedera, et al., 2004). Stakeholder theory identified the group of employees interviewed for this study and enabled the comparison of this groups' perspective of IT implementation to findings from previous studies.

Higher Education Institutions and Higher Education Information Systems

Previous research called for additional qualitative inquiry and this study builds upon organizational theory applied to HEIs. Pollock and Cornford (2004) called the university a "unique organization" because the internal structure and organization leads to tension within, and with it to challenges in university-wide processes and projects. Tension grows out of the distinctive institutional rights to be an "autonomous place in society [that has] the right to choose its members, settle its aims, and operate in its own way" (Balderston, 1995, p. 2). Lockwood (1985) wrote common facets of universities are a complex level of purpose, challenges to measure results, the autonomy and dependency from the environment, scattered authority, and disunited departments. The difference between universities and general organizations was not the possession of these characteristics but the combination and intensities of these characteristics, unique cultural characteristics, the decision making processes, and multiple unique stakeholder groups (Pollock & Cornford, 2004; Rabaa'i, Bandara, & Gable, 2009; Wagner & Newell, 2004; Weiss, 2010). Differences lead to a unique understanding of the university as an organization, to differences in operation and design compared to general businesses, and with it to different needs for information systems and designs of ERP systems (Heiskanen, Newman, & Similä, 2000; Rabaa'i, et al., 2009).

Nature of the Study

Knowledge gaps present areas for research. To fill knowledge gaps research must be systematic and ask relevant questions to find answers (Leedy & Ormrod, 2010). Black (1999) highlighted the researcher as the decision maker; based on her belief system and the ideas she has for the study, she will decide on the approach to achieve results that are robust and yield accurate prognoses. The wording a researcher uses to ask the research question determines the

use of a qualitative or a quantitative study. Quantitative studies employ numbers and statistics to find relationships, connections, and generalization. Qualitative studies employ interviews, critical thinking, and inductive reasoning to find patterns, trends, needs, motivations, and their explanations (Leedy & Ormrod, 2010). The goals of qualitative analysis was to (a) understand events, circumstances, and experiences and their meaning, (b) understand how action is influenced by context and experiences, (c) find phenomena not expected, (d) define and understanding the process by which actions take place, and (e) to develop explanations (Maxwell, 2005).

A qualitative study approach was chosen because the phenomenon was analyzed in different environments and with different stakeholders but for the stakeholder groups in question the depth of research could not be achieved using a quantitative study. A quantitative study is based upon previous research and the availability of representative sample sizes – neither was available for the stakeholder groups of non-managerial administrative staff. The size of the population is an additional reason for selecting a qualitative study: there were not many CMS implementations in Germany at an advanced stage and therefore the sample size would have been small and results not generalizable. Previous research focused on experiences and CSRFs identified by management, CIOs, and IT staff and was not necessarily transferrable to non-managerial administrative staff. Finally, a quantitative study would not support the research question to identify and explore possible group-specific CSRFs in CMS implementations but provide evidence and statistics of previously known factors. A quantitative study may have obscured or missed group-specific critical success factors because previous research findings would have been generalized and used for the study questions, the sample size may not have been large enough, or group-specific perspectives not adequately elicited. A qualitative design

allowed answering the research question with in-depth information and group-specific perspectives.

Shank (2006) divided qualitative analysis into four phases "(1) defining the type of analysis to use, (2) classifying the data, (3) making connections among different classes of data, and (4) presenting the results of the analysis" (p. 146). The first step a researcher needs to take is to decide between different types of qualitative data analysis, including phenomenological, grounded theory, ethnography, historical research, thematic analysis, content analysis, and case studies (Hsieh & Shannon, 2005; Sathe, 2011). Each type of analysis includes presuppositions about the real world, expertise, and beliefs (Shank, 2006). A case study included a single or multiple-case designs and the focus of a multiple case design is duplication instead of sampling increases (Tellis, 1997). Multiple-cases can lead to an in-depth analysis of a selected few, leading to a multi-step analysis to achieve a deeper understanding of the cases (Gerring, 2007).

Case Study Design

The research method consisted of an exploratory case study of the experiences of administrative staff at two German universities in connection with the introduction of a specialized ERP system. A qualitative study was appropriate because there was not enough research available and it enabled the groundwork of knowledge for future studies (Leedy & Ormrod, 2010; Willis, 2007). To achieve high standards of rigor, a case study needed to employ generalizable theories, non-biased case selection, disciplined research designs, strong empirical leverage (few variables and saturating cases), objective conclusions, and be replicable (Gerring, 2007). A case study should not become "an all-purpose excuse, a license to do whatever a researcher wishes to do with a chosen topic" (Gerring, 2007, p. 6) but provide the base for future research.

Creswell (2009) expressed the importance of listening to study participants, asking open-ended questions in peoples work environments, and searching for patterns within the collected data to gain a better understanding of the situation. The interviews consisted of open-ended-questions to give participants the chance to express themselves freely and openly without interviewer influence and bias. Because of the limited number of participants no pilot study was conducted but the first two participants were asked to provide feedback to the interview, the questions asked, and any other feedback they had. The feedback led to adjustments to some of the interview questions wording but no other changes. The transcripts of the interviews were used to analyze and to code themes and categories. A comparison of themes and categories found to findings of previous studies took place. Generalization of results was limited because of the small sample size.

Population Under Investigation and Sample Size

Gerring (2007) noted researchers have to choose between superficially observing a large number of cases and detailed observation of a few cases. He recommended creating a combination study observing multiple cases and some in more detail. Previous studies focused on major English-speaking areas, including the United States and the United Kingdom, on major ERP vendors, and on the perception of CSRF by CEOs, CIOs, and IT managers. This study proposed a different perspective to the problem of HEI ERP implementation success: The study took place in Germany within a different cultural and language environment than previous studies. The study focused on German higher education CMS systems and with it a new group of CMS vendors. The introduction of a group of stakeholders not previously focused on provided a group-specific focus on CSRFs and sub-factors differing on the phase the implementation-process were in.

Selection of the population under investigation occurred by purposeful sampling German universities to create a homogenous group of size and staff level as well as a similar environment for CMS implementation. The study excluded universities of applied science, private universities, teaching, and religious universities as well as universities of the arts to focus on common aspects of larger HEI CMS implementations and not specific requirements of these types of universities. CMS implementation type and status were criteria for the university selection process. The study did not include any universities with CMS implementations completed before 2010 to capture the newest standardized CMS software for universities and recent implementations. The focus of this study was the implementation of standardized CMS software and therefore excluded universities with individual developments or multiple software systems. During the progress of the study, the researcher found that participating institutions' public relations pages presented the CMS implementation in a more advanced status than participants perceived the implementation. Because of the small sample, the researcher did not exclude the interviews with participants form a university using multiple pre-CMS software systems but integrated their experiences into the study.

Three out of 10 selected universities agreed to participate and offered a point of contact to provide information about possible participants and support the researcher on site. Participant acquisition at one university was through the point of contact who provided a list of possible participants. The websites of the two other universities identified registrar's offices and solicitation emails were send to all employees or to the standardized email-addresses provided on these websites.

Five to ten employees per university were to be interviewed and additional interview partners were to be solicited using the snowball technique if saturation was not reached.

Employees of the registrar's office with two or more years of work experience at the university were the focus for the sample group, excluding managerial employment levels. The focus of this study were the stakeholder groups of administrative employees in student services who use the CMS implementation daily and have experienced the changes from the previous system to the new system. Interviews with staff members were individual and face-to-face. Interviews were the preferred data gathering procedure; however, e-mail replies to the solicitation e-mail were used were they provided information. In case face-to-face interviews were not possible or if follow-up questions needed to be asked, a phone interview was conducted. Non-participants were asked to forward a recruitment letter to employees in student related services, however no additional participants were found.

Data Collection and Presentation

These data were collected through face-to-face and telephone interviews in the native language at two participating German universities following the interview protocol (APPENDIX H). The interviews were to take about 30 minutes to one hour, were audio-recorded, and included the interview questions in APPENDIX I and J. The recordings were transcribed in German using *NVivo 10* and send for validation and possible editing to the participant. Each university case was to include five to ten participants or until saturation was reached. Gathered data were explored and presented as rich descriptions to answer the research question. Interviews were analyzed in German to preserve meaning and expressions. Results were then translated to English. A German-English linguist was included in the translation process to reduce researcher bias, mitigate translation mistakes, and increase study dependability. Data triangulation used multiple sources, including the feedback information, within and between sub-

cases, using publicly available data, and previous research findings of different stakeholder groups.

Contribution to Knowledge

The study provided factors that support the successful implementation of a CMS from a different viewpoint than previous studies. The focus of this study was on administrative employees of universities implementing or have implemented a CMS at the time of the study. Administrative employees represented one of the largest groups of CMS-users. The field is lacking knowledge of CSRF of administrative employees before, during, and after a new IT system was implemented. It was important to understand administrative employees` perception in the change process to develop strategies to increase acceptance, involvement, and strategies for success.

German universities were going through a change process at the time this study took place and many German HEIs decided to implement or were in the process of implementing new CMS. The CMS-implementation environment in German HEIs, at the time this study took place, was offering multiple states of project phases, including the design (pre-implementation), implementation, and post-implementation phase. This provided the possibility to receive input not only from multiple German HEIs but also from different project phases, project groups, and participants. This exploratory case study provided new knowledge regarding CMS implementation experiences of administrative staff in different universities in Germany in different stages of the implementation process. Focusing on a group of power-users of the new system, administrative staff from the registrar`s office were interviewed. The results provided insight into critical success factors regarding administrative staff, administrative processes, and CMS implementations. Universities going through or starting the change process benefited from

the identification of these factors. Their knowledge may increase the rate of implementation success and reduce influence of common risks.

Summary

Relevant scholarship for this study included literature regarding ERP and IT implementations at public organizations and HEIs. Chapter 1 provided an overview of the problem and the purpose and significance of the study. The study background provided the first insight into the subject area of ERP systems and their connection with higher education IT developments. ERP systems for HEIs in the United States and the United Kingdom are customized and modularized systems. Within Germany, few international ERP vendors are present compared to multiple German vendors highly specialized on the German HEI market. German HEI ERP vendors do not label their system as an ERP system but as a CMS with a focus on the student life cycle, processes, and services surrounding it. The study question aligned with the qualitative case research design. The research design connected scope and limitations. The contribution of new knowledge regarding success factors with special employee groups during a CMS implementation at a university presents an opportunity for learning and future success of CMS implementations.

Chapter 2 includes a detailed look at the background of the study. The higher education field in Europe and Germany presented a changing environment because of European and global changes regarding education, politics, mobility, and IT in use. Leaders and managers of German HEIs made decisions for unique organizations. The IT infrastructure plays an important role to support the HEI in its goals and HEIs are deciding to upgrade their systems to integrate more functionalities, processes, and data (Klapper, 2011). ERP implementations in large HEIs lead to

challenges similar to ERP implementations in organizations and chapter 2 offers an overview of such challenges called CSRFs.

Chapter 2

Literature Review

The purpose of this study was to describe cases of CMS implementations in administrative departments in German universities and to identify group-specific CSRF from experiences of non-managerial administrative staff. Chapter two provides a review of the literature guiding the study including, an overview of the documentation used, ERP systems and their historic development, the higher education field with a focus of German universities, and CSRFs in regard to ERP implementations. The literature review included multiple articles regarding ERP implementations and CSRFs. Literature regarding university ERP implementations is available for several countries including, the United Kingdom, the United States, Australia, Romania, and Saudi Arabia. However, research of German ERP implementations; especially with a focus on CSRFs from stakeholder-groups other than management and CIO level is not available.

Chapter 2 includes the literature review. A literature review is an important part for a research proposal (Klopper, 2008) and generates a deeper understanding of the topic in question. The results of the literature research play an additional role in qualitative and especially in case study research: the results can be used for methodological analysis, data triangulation in the analysis of findings, and the presentation of results (Bowen, 2009). The results of this literature review offer a deeper understanding of HEI ERP implementations and general ERP implementation CSRF. Identified CSRF offered a framework to compare to and triangulate experiences and findings of the interviews in Germany.

The literature review is laid out in the following way: The first section provides an overview of resources, search topics, and general documentation. The second section offers a

historic overview of the development of ERP systems, the HEI ERP market in the Anglo-American area and in Europe, and the Bologna Process, an educational reform in Europe. The third section consists of findings of ERP vendors and ERP system developments, and a description of educational IT and HEI ERP developments. The German system of higher education is the focus of the following sections including aspects of culture, leadership, and management, the Bologna Process, and IT changes toward higher education ERP systems and services. IT changes include the merge toward CMS, which describe as a special set of ERP systems with a focus on the student life cycle and specific vendors in the German-speaking education area. The literature-section on risk and success factors of IT and ERP implementations includes a review of CSRF models, a definition on how to measure success, and descriptions of several factors presented within the CSRF models. Before the presentation of the gaps in research, including possible CSRF specific to HEIs occur, the most important terms are defined. The literature conclusion and summary follow.

Documentation

Relevant scholarship for this study included literature regarding ERP and IT implementations, especially focused on organizational and IT developments in higher education and European and German higher education. The study incorporates research materials acquired through University of Phoenix Library, University of Stuttgart Library, and additional Internet search engines including EBSCOhost, ProQuest, ACM Digital Library, IEEE, SciVerse, ScienceDirect, and Google Scholar. Materials include books, dissertations, articles, and proceedings of international conferences as well as press releases and websites. IT related search topics included enterprise resource planning (ERP) system, best practices, and critical success factors and risk factors in IT. Leadership and management related search topics included

strategy, structure, success, and risk factors in project management, and stakeholder theory. Search topics for the subject area of higher education and IT projects within HEIs included organizational theory, HEI stakeholder theory, ERP systems, and CMS at HEIs, the German HEI system, and the Bologna process. ERP systems and implementation projects, CSRF theory, stakeholder theory, and organizational theory with a focus on HEIs are the main theoretical frameworks influencing this proposal. In addition to the search, articles of interest and their references lead to additional resources. The purpose of the following sections is to present the historic and current state of research of ERP systems, higher education and higher education information systems, and CSRF theory. The literature review offered a foundation for the case study, highlighted gaps, and references presented to validate findings of the study.

Historical Overview

The study of higher education ERP implementations draws on the historical development of ERP systems from materials and manufacturing planning systems to ERP systems, stakeholder theory, and HEIs and their IT/IS requirements because of organizational, cultural, and political changes. ERP developments occur because of changes in industry focus, new technological developments, as well as changes in management and leadership demands. Regional, industry, and organizational differences influence developments and create expectations and differing ERP implementation strategies and systems. With broad implementations, new areas of implementation, technological advancements, and integration of new systems however come also challenges for the implementation process.

ERP is a developing field since the 1950. ERP systems evolved from material requirements planning (MRP) systems to integrated IT systems used in almost any industry and service direction. The MRP system and later manufacturing resource planning (MRP II) systems

expanded into computer integrated manufacturing (CIM) systems, to ERP systems, fostering advances and experiencing change itself through developments in transaction processing, decision support, and management information systems. Klaus, et al., (2000) concluded ERP systems are multi-disciplinary and multi-faceted tools for company support. Conghua (2002) research added ERP systems provide internal resources and options to optimize internal processes without the implementation of outside sources. Klaus, et al., (2000) and Conghua (2002) presentations are predecessors of Haag and Cummings (2008) understanding that ERP systems have integrated additional systems like enterprise resource management (ERM), SCM, e-collaboration functions, and knowledge management. This inward development of functions toward one integrated system aims for a service-oriented architecture (SoA)-enabled ERP infrastructure (Haag & Cummings, 2008). The development and increased implementation of ERP modules in new and innovative areas is advancing IT-systems and inherent organizational and process knowledge. The evolution of ERP expanded through multiple industries, functionalities, and organizational types to include services and business intelligence. ERP systems evolved not only based on organizational ideas and processes but also based on user growth and user requirements. ERP systems started out as manufacturing systems with few specially trained employees, and they evolved to user-friendly, network-spanning systems: ERP systems are no longer only used within the supply-chain but also in customer relationship management (CRM) and associated processes (Dowlatshahi, 2005). Researchers highlighted ERP systems move to becoming web-based systems, accessed through a browser, and providing all organizational users with access to information (Alt & Auth, 2010; Dues, 2010).

The Anglo-American higher education market entered the ERP vendor business at an early stage whereas most German speaking countries either did self-develop individual

university solutions or used a standardized product by the HIS organization (Hochschul Informations System GmbH, Higher Education Information Systems organization). The HIS was a creating of the German HEIs need to use advanced software for their administrative systems and the idea to support the public educational infrastructure by a publicly founded organization. In 1969, HIS provided several educational-administrative systems. Until 2008, HIS supplied 75% of German universities with products for administrative management (students and employees), time planning for lectures and rooms, facility management, and financial management (HIS, 2010a). HIS products were expanded, new modules for new services added, and web-services developed, creating multiple complex levels of interacting systems if universities engaged in implementing and supporting them. Multiple reasons, including, the Bologna Process, legislative changes, IT developments, and the slow reinvention of HIS created a marked for new CMS vendors in Germany in the 2000s.

The Bologna Process

Historically, educational reforms within Europe have been slow and confronted with a historic view of university and education. Changes of the European education system are speeding up with the closer connection of European countries and increasing globalization. A conference of European politicians in Sorbonne, France in 1998 gave birth to the idea to harmonize the framework of the European Higher Education system. The education ministers of France, Germany, Italy, and the UK agreed and signed the Sorbonne declaration (Welsh, 2010). The Bologna Declaration to create a comparable and compatible European Higher Education Area was signed a year later in 1999 in Bologna by 29 European countries. The agreement started a process of change toward united European standards and quality assurance in higher education (European Commission, 2010). The Bologna Declaration is not only fixed in time but

also an expanding and evolving concept, including new member states and new subjects of agreement over the course of more than 10 years. From the start, 29 countries signed the declaration and by 2010 membership grew to 47 countries, including non-European ones (Benelux Bologna Secretariat, 2010). The Bologna Declaration is evolving through regular conferences and agreements labeled by the city the meetings take place. Meetings follow a topic plan, including the social dimension of education, qualifications frameworks, international openness, mobility, recognition of degrees and previous education, reporting on the implementation of the Bologna Process, and transparency mechanisms (Benelux Bologna Secretariat, 2010). Regular changes have transformed the first declaration into a process and because the process started in Bologna it was coined the Bologna Process. The process initiated a wide variety of organizational and administrative changes in the treaty-countries (European Commission, 2010; HIS, 2010b) such as the introduction of a common terminology and standard of comparable degrees of undergraduate and graduate. Individual countries legislative and educational systems carry out the integration of the Bologna Declaration and adapt policies to local politics, requirements, and cultures requiring implementation time. The differences in regional implementations allow treaty countries to keep their educational heritage and legislation while adapting to a wider educational market requiring specialized IT systems to support the HEIs aims.

In Germany, legislative and educational changes introduced Bachelor`s and Master`s degrees in exchange for the traditional Diploma and Magister degrees. The federal structure of Germany and the federal sovereignty of the education environment mandated that each federal state within Germany had to implement the changes in their own speed and system. Some countries adopted changes quickly whereas others implemented the changes only by 2010 – the

mandatory implementation date set by the German government. Within Germany, individual federal states can create their own interpretation of the Bologna guidelines, including study time for each degree. Legislative and fiscal changes influenced German higher education: As local government structures changed so did their perspective on tuition and educational fees leading to the introduction of tuition fees followed by the reintroduction of the free cost-free degree (Welsh, 2010). These are some examples for legislative and educational changes ongoing in Germany and highlight the need for universities to adapt to new requirements on a regular basis.

Current Findings

HEIs are not immune to IT changes (Pratt, 2007) and react with organizational changes as well as adaptations to the new IT environment. The developments do not only shape the technological outlook but also the social use of new media functionalities, including websites, blogs, news, as well as social networks. Increasing use of IT by younger generations fosters additional changes in education and learning, social activities, and sharing of information and knowledge. The review of findings includes ERP vendors and system developments, educational IT and HEI ERP developments, a perspective of the higher education system in Germany, CMSs as a special subset of ERP systems, and risk and success factors in ERP implementations. The findings are the basis for a set of definitions followed by a section on gaps in research analyzed.

ERP Vendors and ERP System Developments

Enterprise resource planning is a field that has been developing since the 1970s out of the first material resource planning systems (MRP) introduced in the 1950s. Mayor international MRP players entered the software market in the 1970s, including SAP, Lawson Software, J.D. Edwards, Oracle Corporation, the Baan Cooperation, and IBM. With beginning of the 1980s, producers overhauled software and hardware, and new systems labeled as manufacturing

resource planning II (MRP-II) systems. New ideas and theories of management, product and process quality by Demming, Juran, Crosby, Ishikawa, and Drucker (Hoopes, 2003; Jacobs & Weston Jr., 2007) influenced technological developments within ERP systems. ERP vendors derived the need to provide upper and division management with appropriate information extracted from and presented in the ERP system. Further advancements in IT and new hardware products lead to processes automation and creating modules supporting globalization strategies of the 1990s. IT systems emerged with wider application areas and in the early 1990s the Gartner Group coined the term enterprise resource planning (ERP) systems. The main international ERP players include SAP, Oracle (including PeopleSoft), and Baan (Conghua, 2002). In addition, regional ERP and CMS players exist and specialize on regional markets, cultures, and requirements.

The broad range of functions ERP systems perform can be applied to industry and for-profit organizations but also to service and nonprofit organizations. ERP system fit within new business environments depends on the initiative of the ERP vendor, the size of the market, and the involvement of the organizations implementing new ERP modules. In addition to the development of relevant technology, ERP developments need to be up-to-date and all-encompassing for the new business area (Dowlatshahi, 2005). Both, the ERP vendor as well as the organization implementing the ERP system challenged as developments cost time and money on both sides of the relationship. To master the challenge, both sides need not only to agree on their involvement and commitment, but they can also increase their success rate by understanding critical success factors, including management commitment, employee engagement, and training as well as the need for clear goals.

The goal of ERP development and introduction is to achieve a service-oriented architecture that introduces an integrated technology system and software product for company-wide use throughout all organizational functions (Haag & Cummings, 2008; Klapper, 2011). To achieve this goal, the system has to supply information to all users, follow rules to derive information like statistics and trends as well as to offer (real-time) control over processes and operations. Legacy systems do not provide the needed connectivity for new ERP systems and therefore replaced to ease implementation processes and to standardize software and hardware throughout an organization. Migrating data to an integrated ERP database may increase data sharing, reduce communication requirements, and reduce time because fewer systems need to be accessed (Dowlatshahi, 2005). The difficulty lies in the "level of integration necessary to design and implement ERP systems across various functional areas [and identifying] practical challenges" (Dowlatshahi, 2005, p. 3747). The spectrum of ERP implementation depth lies between full integration of all IT components and using the ERP system to integrate (legacy) IT-systems into a connected infrastructure of best-of-breed systems (Rabaa'i, et al., 2009) (Figure 1).

Empowerment through access to information leads to the need of continual improvement (Badrakhan, 2010) to keep-up integrity and actuality of an ERP system. The function of improvement is dependent on the foundation of people, processes, and technology within the organization (Stephenson & Sage, 2007). Leadership has responsibility for improving the organization, leading people, and ultimately responsibility for a successful ERP implementation (Dues, 2010; Mehlinger, 2006; Pratt, 2007). The challenge for leadership during and after an ERP implementation is to engage the employees into processes and create incentives to create a successful ERP project outcome with long-lasting success and improvement.

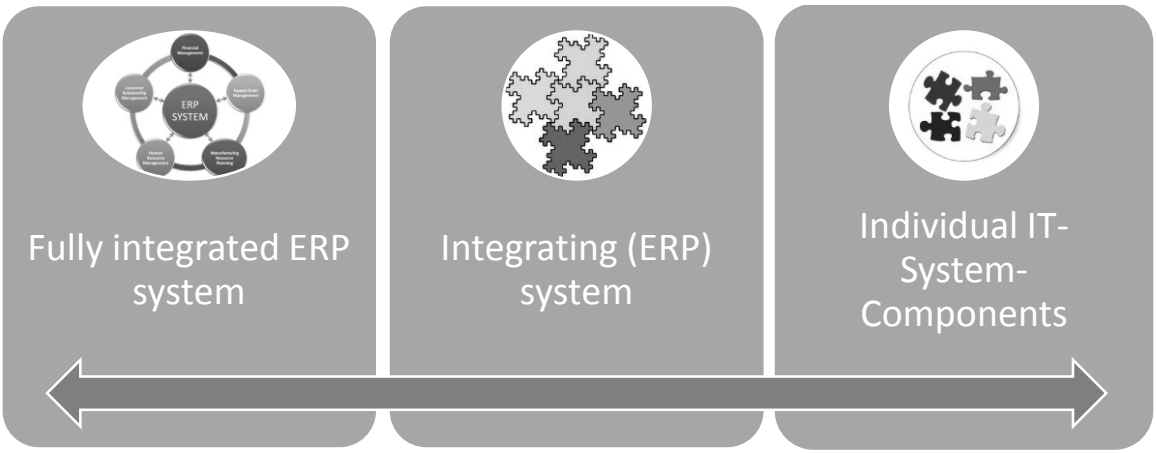

Figure 1: Spectrum of IT integration from individual IT components to integrating systems to fully integrated ERP system

Educational IT and HEI ERP Developments

Developments in education and educational information technology connect to IT developments and political changes. Three influences on the educational IT environment include the 2000 (Y2K) software challenge, the developments within the European Union more specifically the Bologna Process since 1999, and the developments in Web technology. The Y2K problems as well as new technology advancements addressed within the higher education area through software updates and new IT implementations. In the United States and the United Kingdom, these software changes included the introduction of educational ERP implementations (Pollock, 2003; Sullivan, 2009; Vathanophas & Stuart, 2009). The challenges by Y2K and first generation Web technology also affected the German educational IT market. Self-developed university IT-systems were implemented or updated, the main university-software-vendor HIS updated its products which were installed at a majority of universities, and additional software-vendors entered the German higher education IT market. Changes in the IT landscape of universities fostered and increased through political changes in Europe. The Bologna Process

slowly induced new challenges for HEIs and Web 2.0 technologies and advancements in IT use require HEIs to adopt new IT related services.

ERP systems with implementations in higher education developed since the late 1990s (Pollock, et al., 2003; Rabaa'i, et al., 2009). While IT support within HEIs has been around since IT evolved, some of the first providers of HEI-specific solutions derived from an ERP system were PeopleSoft in the United States (Klaus, et al., 2000), SAP in the United Kingdom (Pollock, 2003), and a university-development of best-of-breed ERP and other IT solutions in Australia (Rabaa'i, et al., 2009). Researchers later analyzed early HEI-specific developments. D. Allen, Kern, and Havenhand (2002), for example, reflected on the higher education market in the UK, the feasibility of implementing ERP systems in HEIs, and advantages and impediments of the implementation process. Descriptive evidence of the adoption and evolution of Australian HEI-ERP implementations was gathered by Rabaa'i, et al., (2009), reaching back to the late 1990s and included descriptions of the selection process, customization, integration, and consultant engagement. The subject area of HEI ERP implementations gained speed in the UK, and in 2003, Pollock (2003) coined the term campus management module that later was rephrased to CMS. Pollock (2003) witnessed and analyzed the installation of SAP software as a campus management installation at several universities in the UK (Pollock, 2003; Pollock & Cornford, 2004; Pollock, et al., 2003). By 2012, the main international players in the English-speaking HEI ERP field included Campus Management Corp., SAP, Oracle/PeopleSoft, and IBM as well as smaller university developments and best-of-breed implementations.

Differences in language, culture, and focus create an environment for multiple HEI ERP competitors using different approaches to customizing functionality, implementing background IT systems, focus on study types, supported languages as well as differing introduction

strategies. To date no unified or general ERP for HEIs has been developed and this development is contrary to most business ERP developments in which management and organizational literature, practices, strategies, and modules are merging to more common grounds or are combined in reusable modules (Klaus, et al., 2000). The idea of business ERP systems is to standardize as many functions and processes as possible, which is difficult to achieve for the variety of university strategies and needs (Pollock, et al., 2003). Differences of universities, organizations, as well as differences in geographical location and languages make HEI ERP more likely developed in a localized fashion. This enables software vendors to be closer to the individual culture, legislative changes as well as to provide consulting services and support in strategy and critical success factors in the local environment. In addition, regional HEI ERP providers may profit from regional closeness of HEIs as more features may be reusable and communities of practice may develop (HIS, 2010a; Pollock & Cornford, 2004; Rabaa'i, et al., 2009).

German System of Higher Education

The German system of higher education presents a unique organizational environment. A culture of free scientific research and education financially supported by the state and countries, and at the same time an independent development and internal structure within each university. The Hochschulrektorenkonferenz (German Rectors' Conference, HRK) listed 386 institutions consisting of public, private, and parochial universities with and without right do award doctorates, higher education schools, universities of applied sciences as well as art and music universities (HRK, 2012). The number of HEIs is growing (BMBF, 2011) and each institution is developing an individual profile, culture, structure, and strategy. Changes to the area of education are coming from the inside, for example strategic changes, as well as from the

outside, for example the Bologna Process, political requirements, and agreements of the HRK, and create a dynamic and evolving type of unique organization. These changes, together with other environmental changes, create a dynamic and evolving type of unique organization (Pollock & Cornford, 2004; Weiss, 2010). Pollock and Cornford (2004) and Lockwood (1985) highlight the uniqueness of HEIs as specifics of the internal structure and organization, complexity of purpose, and differing structures of authority and autonomy in connection with multiple stakeholder groups. Analyzing the elements of organizational culture and leadership and management as two organizational dimensions by Malloy and Lang (1993) will further the understanding of the uniqueness of German universities.

German higher education culture. German higher education has evolved since the German education model began by Humboldt in 1810. The principle of "Freiheit von Forschung und Lehre" (freedom of scientific research and education) and unification of research and education is at the base of the model and implemented as a German law (Grundgesetzt Bundesrepublik Deutschland). Freedom does not only include the freedom to teach and research but the independence of the university from the political and organizational system. Humboldt`s (1851) idea was to separate the state and the university but engage the state in the funding of the university to care for the intellectual wellbeing of the people.

The ideal of separation of university and state and non-influence of the state into research and education is still in place. Changes in political, industrial, and social views however have created a closer bond between the educational system, organizations, and political parties. Research and education is not only following the ideal of being a necessity in itself anymore, advancement is a social need to progress in the job-economy. Quapp (2010) and Welsh (2010) noted, the German government has noticed the importance of education in the global knowledge

economy and government and institutions are looking for possible improvements but universities are slow to change.

Changes within Germany include new quality assurance levels and founding of additional educational institutions increasing competition. The Bologna-Process introduced the idea of external quality assurance of degrees. Within Germany, accreditation organizations were founded to survey universities, their degrees, curricula, and processes increasing the institutions need for technology to collect, control, and present necessary information (Quapp, 2010). Need for additional education facilities and degrees has encouraged the installation of additional institutions of higher education (BMBF, 2011) including universities, universities of applied sciences, universities of art, and the universities of theology and pedagogy (HRK, 2012). The different levels of universities and types of funding, public or private, create a competitive environment yet each type of university has their focus and structure to distinguish itself from others. Between 2005 and 2012, the German government encouraged universities to apply for multiple founding rounds for graduate schools, clusters of excellence, and future concepts for expanding excellent research, purposefully creating competition between HEIs. The so-called "Exzellenzinitiative" (Excellence Initiative) did not only produce higher education ideas and change but increased competition of reputable universities to carry the title excellent (BMBF, 2012).

The different university types and funding areas create a heterogeneous higher education environment in Germany. Institutions follow the government-mandated structures but each creates a unique culture and strategy around the laws. Differences within university culture exist in three main dimensions: education, research, and administration and shaped by regulations, resources, leadership style, power display, and other features. The administrative side of HEI

presents a bureaucratic organization following rules and regulations (Okunoye, et al., 2008; Shah, et al., 2011). Research and education, on the other hand, foster knowledge creation and exchange, open access, and often laissez-faire processes (Omerzel, et al., 2011). Fullan and Scott (2009) described education as emphasizing a transformational approach in spite of observation that university professor's love themselves hinting to a hierarchical approach. Differences in transactional and transformational leadership styles lead to a diverse set of communication strategies between the differing cultures within universities (Franz-Balsen & Heinrichs, 2007). Work patterns, styles of communication, use of IT, and new processes need to be implemented and adapted to different needs of groups creating a complex IS environment. Pollock and Cornford's (2004) presented diverse cultural demands of an ERP implementation project at universities included a reasoning of why universities are unique organizations, its struggle to restructure processes, and find fitting standardized software. HEIs need to implement their unique communication and social culture between different areas of a university into the IT system (Ghosh & Skibniewski, 2010) and not only accepting default processes and features (Dowlatshahi, 2005; Pollock, et al., 2003). However, such cultural changes are often slow within the higher education environment (Weiss, 2010) and therefore need to be approached with a fitting strategy.

The implementation of campus-wide information systems does support management, administration, and user engagement. The decision of a university to engage into a change process from a multitude of systems toward a standard, global EPR system can have implications on features and organizational design that in turn can shape principles and relationships in ways wanted and ways not intended (Pollock, 2003). The goal of this change is for the university to become more efficient, flexible, and modern. Blümel, Kloke, and Krücken (2011) summarized

the developments under the term "professionalizing of higher education management." The reasons for the change included: financing is not growing with student numbers, staffing is too low to fulfill students and teachers requirements, money for education and research is cut by government and states, and the generational change of employees and researchers fosters a new view of services and quality (Alt & Auth, 2010b; Behrenbeck, 2011; Pollock, 2003; Rietfort, 2010; Welsh, 2010). On the opposite side are standards, laws, and a slow-moving organization because of internal differences in perspectives and requirements (Welsh, 2010).

Change is a needed process, however historical status and pre-IT processes still hold true for many university decisions. Pollock (2003) described the university as being "ambivalent about change" (p. 103). The organizational development of the university is a growth of technology and society in direct relationship and includes technological decisions and non-decision (Pollock, 2003. The coproduction of technology and society creates new organizational forms and a change in stakeholder perception, requirements, and jobs. Universities do not have a choice about many changes; legislative requirements or organizational immobilization may move the university out of the competitive market. Stakeholders can influence the speed, timing, and intensity of the changes taking place. Directing the ambivalence about change is therefore an important skill of university leadership.

Leadership and management in German higher education. Leadership in higher education is similar to leadership and management in the business world. Vision, mission, strategy, political alliances, influence, change, communication, and active participation are tools of HEI leadership to make the institution and themselves effective (Katz, et al., 2004; Lapham, 2009). HEI leaders see themselves as part of the institution instead of a part of a functional business unit as business leaders do (Katz, et al., 2004). Focusing on the area of IT and

leadership in HEIs, Whitworth (2012) presented the term academic power to describe the leadership and power systems of the professorial body coded into university structure. University culture permits independent units within the university leading to differences in leadership and a diverse internal structure. Independence, individual missions of units, and a diverse structure lead to individual, sometimes competing, leadership structures, and IT developments (Pirani & Salaway, 2004; Pratt, 2007). Such differences in leadership affect communication and cooperation between units and leadership of the university.

Though working for less than their industry counterparts, HEI leaders show institutional loyalty, long-term commitment, passion for the HEIs mission, and transformational leadership styles (Katz, et al., 2004). Compared to private HEIs and businesses, German public HEI leadership and management have to not only function within a diverse and loosely coupled system but also have to be inventive in the type of incentives they set. Monetary rewards and incentives are either not available because of lack of resources, not allowed or restricted because of labor regulations, and often only accessible to research and education and not for administrative staff (Arbeitgebervereinigung der Bundesländer, 2013; Franck & Opitz, 2000; Kieser, 2010). The employee, leadership, and management trait of loyalty, commitment, passion, and willingness to work for less to achieve a stable long-term work environment highlights the point of difference between HEI and business leadership and management.

Leadership in higher education has a threefold focus: administration, research, and education. This focus is not easy to combine but balanced to achieve the outcome wanted. If the administrative side is not adequately equipped, they cannot support the research and education side by providing services in time or by providing additional needed services. If the teaching area is not equipped, students fail more often or complain, putting a bad reputation on the

university and dis-attracting researchers that would increase the visibility of the institution. Within a thin layer of balance, leadership of a HEI has to understand differing demands of internal units and stakeholder groups and find ways to be productive and innovative.

Internally, the three areas of education, research, and administration are engaging in politicking through their representation in various committees and leadership roles. Departments and divisions engage in internal and external politics. Internal politics include the relationship and exchange between departments, divisions, and schools. External politics include university-to-university politics, internationalization (Welsh, 2010), as well as state engagement and competition through research and educational projects and initiatives, for example the excellence initiative (BMBF, 2012). Stability, however, plays an additional role in HEI leadership. Within Germany, each HEI develops their own governance structure based on national and federal state educational laws. Regulations on selection of governance members, elections, timeframes of service and responsibilities are developed and lead to unique university structures, culture, and politics. Election cycles of three to five years and following them changes in leadership shift institutional memory, experience, and political balances (D. Allen, Kern, & Havenhand, 2002; Katz, et al., 2004; Whitworth, 2012). Governance structure may lead to fluctuation, disillusion of employees and managers, and leadership misalignment. Switching leadership positions too often can lead to organization and employee confusion and the idea of "sitting out a development or back-off until the next election takes place." The latter response can lead to increasing costs, stall developments, and hinder innovation. Politics and leadership have to understand their influence not only on organizational strategic and IT decisions and the selection of a fitting IT or ERP system for a university but also on the political balances and work orders of the decision and implementation process.

D. Allen, Kern, and Mattison (2002) showed how UK universities are adapting to a more competitive and market-focused environment and adjusted their management efforts, including their IT strategies, to survive in the educational market. Similar developments are happening in German public HEIs and are leading not only to organizational changes but also to the search for IT developments, for example ERP or CMS systems, to support the university as a business oriented endeavor (Alt & Auth, 2010b; Degkwitz & Klapper, 2011; Sprenger, et al., 2010a). Within HEI-IT leadership, Katz, et al., (2004) highlighted traditional roles of employees and leadership cannot support the higher education environment and its changes. New competencies and directions are necessary to lead the organization into the future (Katz, et al., 2004).

Changes include advancing IT developments, legal and organizational changes of HEIs, and change of leadership and management personnel because many Baby Boomers will retire (Shah, et al., 2011). Katz, et al., (2004) presented an additional change dilemma where IT leaders with effective and transformational leadership profiles were working in conditions not contributing to innovation. The trends will either lead to the departure of leadership potential, which as stated above is uncommon, or will lead to changes in the university structure and IT environment.

In regards to implementing ERP systems, Dues (2010) found a relationship between types of ERP systems, perceived ERP success, and leadership style. Leadership in the case of IT implementations and changes should be a catalyst or agent of change and enable workers through adequate strategies (Malloy & Lang, 1993). Transformational leadership styles increase the outlook of success for an IT implementation (Dues, 2010; Kim, Lee, & Gosain, 2005). Administrative departments of universities on the other hand often represent transactional and bureaucratic leadership styles (Shah, et al., 2011). Differences in leadership styles need to align

and support the implementation of a campus spanning IT system to create a successful outcome for the campus as a whole.

Nahavandi (2006) noted relationship and influence of the leaders or managements' strategy influences the culture of the organization and in turn influences the leader and the management team. Within this relationship, important success factors during IT implementations are strategy and communication of strategy to employees (Gattiker, 2002; Holland & Light, 2003; Shah, et al., 2011). Within the German higher education sector, strategy presents a multi-facetted area integrated into leadership and politics: the president and executive committee set university strategy itself; internal institutional strategy within areas, departments, and institutions is set by division chiefs, professors, and team leaders, and these strategies in turn have to align or accommodate national and federal state governmental strategies. The strategy of a university includes guidelines for areas of research, education, administration, and IT. In turn the exploitation of a strategy in one area, for example IT can have an effect onto other areas like education. Cobarsí, et al., (2008) provided an example: they focused indirectly on the IT by searching for the strategic viewpoint of the educational institution concerning student attraction. They proposed the type of IT system employed would affect who is attracted to the university. Understanding strategy in relation to different areas of a university is important for upper management and leadership with IT implementation decisions to support successful projects regarding focus and goals.

HEI strategies for IT system decisions and implementations are challenging and may occur in different HEI divisions to follow differing goals. Advancement of information systems may come top down but also bottom up. Most ERP initiatives are motivated by top management and not by the chief information officer (CIO) or the business units while many previous IT

activities were led by bottom-up level needs and initiatives (Ifinedo & Nahar, 2007; Kumar & Van Hillegersberg, 2000). This aligns with the importance of a strategic decision during system acquisition. Reed called for caution of oversimplification and fast strategic decision-making by executives in a complex and uncertain environment. "[S]peed and decisiveness in decision making, so valued at the tactical level, [may not] work to the detriment of good decisions at the strategic level" (Reed, 2006, p. 12). Okunoye, et al., (2008) had a similar perspective, noting the value of time when deciding on a strategy; a fast decision may lead to challenges down the implementation road that were avoidable if more time was devoted to the selection process. It is important to carry the strategy through once the decision for an IT system is complete, but it is important to prepare the decision throughout and employ as many resources and engage as many stakeholders as possible. HEI management and leadership have to be actively involved, understand differing needs, and engage the organization and stakeholder groups to participate actively in the decision and implementation processes.

IT changes toward higher education ERP systems and services. While legislative and educational changes were and are taking place, German universities need to change their administrative organization and technological services, commit to quality assurance, and initiate internal and external change processes (Gaston, 2008; Toens, 2009). Organizational and administrative changes trigger and in turn foster changes in information technology in HEIs leading education institutions in Europe to change and update their educational technology infrastructure (Cobarsí, et al., 2008; Degkwitz & Klapper, 2011; Hübner, Duda, Merz, Natusch, & Weckmann, 2008; Lacurezeanu, Buchmann, Bresfelean, & Mares, 2011; Pollock & Cornford, 2004). Within Germany, Kleimann and Schmid (2007) found that in 2006 24% of German universities were planning to implement new IT systems to support the increased administrative

workload of the Bologna Reform and improve service levels for students and staff. Sprenger, et al., (2010a) added the increasing numbers of students and the advancements in IT development concerning campus management (CM) systems as reasons to implement an HEI ERP system. Alt and Auth (2010b) highlighted the dimensions of politics, strategy, organization, and technology as reasons and benefits to implement ERP systems. HEI management and leadership believe, IT developments offer a way to cope with complexities and rapid changes within the higher education environment.

With changes and technical literacy development, focus on media conscious customers increases. Masrek (2007) indicated the importance of user satisfaction with web portals and functionality and highlighted satisfaction to be applicable to all stakeholder groups of HEIs. The implementation of a new HEI ERP has to address functional requirements of multiple stakeholder groups, including students and administrative staff. Understanding factors guiding user satisfaction in different groups can influence the success of a new IT system. One focus of universities to implement an ERP solution is the idea of increased self-services. Developments in electronic-commerce and information technology foster increased availability and use of self-services (Pollock, 2003). However, the users of such self-services have to define the environment. Pollock (2003) expressed the need to interweave users' abilities, skills, rights, features, and choices in the environment of the self-service technology. Pollock's (2003) experiences of an ERP implementation at a UK university highlighted implementation of new IT require a clear definition of services, users, and their rights. For self-services to function, the university is called for to agree upon rights, responsibilities, and functions for stakeholder self-services as well as to define explicit user groups of stakeholders. This agreement on definition and change is a critical point within the ERP implementation process at HEIs as Pollock noted.

In his case, the university was “ambivalent about change” (Pollock, 2003, p. 103), did not move forward to provide new services, and with them did not create an organizational change process toward increased self-services. Changing services toward IT self-services presents a way to reduce administrative work, empower students, give control over personal data, and increase the feeling of responsibility, ownership, and actions within research, education, and administration (Pollock, 2003). Reluctance to define or accept such self-services may clash with stakeholder requests or specific self-services (Pollock, 2003; Rabaa'i, et al., 2009).

The idea of knowledge and data within an ERP system is to share it throughout the different parts of an organization (Dredden & Bergdolt, 2007). In addition to data sharing, German universities want to provide further services for the non-administrative divisions but require user groups to take ownership of additional functions and data, including entering grades, thesis titles, coursework information, and more (Degkwitz & Klapper, 2011). The step of adding IT-modules for non-administrative purposes requires not only an enterprise-wide integration of the system and knowledge about processes but also elements of knowledge management within each of the areas of responsibility. Knowledge and data are the lubricant of an ERP system. Only if the system contains the right amount, the right type, and cared for on a regular basis, the system will be running the way expected. Knowledge management (KM) introduces routines to capture, develop, share, and utilize knowledge. A postulate for knowledge is to be up-to-date and correct. Developments, changes, or errors can overtake the best data, rendering it useless. IT systems promise the integration or reduction of legacy systems, a one-database-system that will include all information and all functionalities needed, reduction, or elimination of multiple input and media-breaks as well as access to data throughout the organization. The result is a system presenting complete, accurate data, in a fast way, in all the right locations of an

organization. Speed and throughput should increase while error rates reduce and overall customer satisfaction is increased. Information shall be available to whoever asks for it and not be restricted to particular functions. The right processes to collect and distribute knowledge lead to increased re-use of knowledge and can increase efficiency and effectiveness of workflows connected with the knowledge (Stephenson & Sage, 2007). Content management features like databases, data warehouses, document management systems, data mining tools, visualization tools, group support systems, bulletin boards, and multimedia systems offer stakeholders not only access to data but also to resources to evaluate data and create new opportunities, for example to design new degrees. However, CMS are in their infancy in some of these areas and ERP vendors are building new modules for basic but unique HEI needs.

New IT systems are mainly web-based; browser accessed, and provide multiple access possibilities to information (Alt & Auth, 2010; Dues, 2010). ERP implementations empower managers to view more and new information and check on the actions of their employees (Sia, Tang, Soh, & Boh, 2002). This can lead to changes in power and control, whereas the perception of tight employee supervision may in turn lead to the non-acceptance of an ERP system. Goal of ERP development and introduction is to achieve a service-oriented architecture that includes and combines technology systems and software company-wide (Haag & Cummings, 2008). This requires technology and people understanding in leadership (Frantz, et al., 2002) and applies at university levels where several stakeholders and with them different levels of education and experience access and use the IT system. Understanding previous research findings regarding acceptance of new IT systems at HEIs leads to the question how the different levels of stakeholders support during the implementation project. Each stakeholder group may have a different idea of the implementation, support, and training process. HEIs need to be aware of the

differences of stakeholder groups, their needs, and their positive and negative perspectives about such all-encompassing IT systems.

Campus Management Systems as a Special Set of ERP-Systems

HEIs label both, integrated information systems, where one system fulfills all functionalities, and integrating information systems, connecting multiple systems with different functions to one system, as CMS (Alt & Auth, 2010a; Pollock & Cornford, 2004). HEI perception of features differs between those provided by ERP systems and those provided by CMS (Degkwitz & Klapper, 2011; Thomas, 2010). HEIs decide based on their needs and knowledge to implement a CMS or a ERP system with the options to customize the software, build new system modules, build or connect separate software solutions, or reengineer processes within the organization (Pollock, et al., 2003). Universities and companies are developing CMS and specialized ERP modules to support the student life cycle or to support a university resource management system, including all stakeholders and resources of the university (Cobarsí, et al., 2008; RS3G, 2009; Thomas, 2010). Within Germany, the name CMS is favored to highlight differences of universities from for-profit and non-profit business ERP systems. CMS are similar in scope of implementations, functionalities, and cost in comparison to ERP and inventory control systems (Alt & Auth, 2010a, 2010b). In addition, within the German system of higher education, the term CMS describes information systems specialized to support the student life cycle and services surrounding administration, learning, and research (Figure 2) (HIS, 2011; Thomas, 2010).

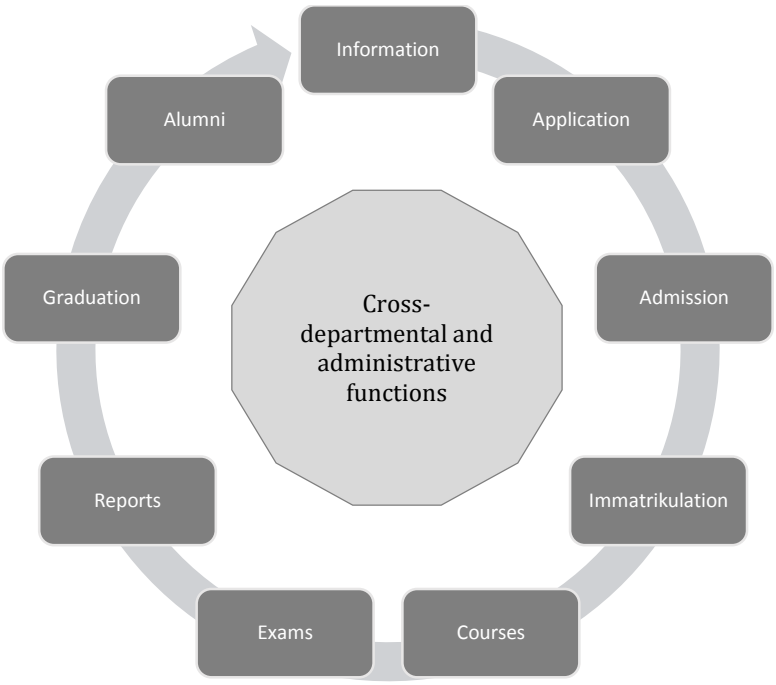

Figure 2: Basic model of the student life cycle (SLC) (based upon Alt & Auth, 2010b; Degkwitz & Klapper, 2011; Sprenger, et al., 2010a)

The focus of CMSs is the academic environment, it`s requirements, and need for adaptations to the changing environment such as the Bologna process, increasing numbers of national and international students as well as new technological developments (Alt & Auth, 2010a; Sprenger, et al., 2010b). At the heart of a CMS is the focus on the student life cycle. CMS characterized by

- focus on higher education information systems,
- academic stakeholders, including students, researchers, administrators, and teachers are seen as customers and use (self-) services,
- principles of integrated systems,
- use of standard software customized, parameterized, and possibly expanded by individual software,

- and focus on all operational functionalities (horizontal integration) as well as all planning and control functions of a university (vertical integration).

Student life cycle as the focus of CMSs. Bess (1977) first used the term "student life cycle" (SLC) and focused it on the teaching relationship. Parmar and Trotter (2004) used the term to describe students' study-stages, focus of retention activities, and critical points in a student's education. In connection with student information systems, German universities started to use the term SLC around 2008 (Hübner, et al., 2008). In the German system of higher education, CMS is an information system specialized to support the student life cycle and all services, including administration, learning, and research from first contact with a HEI till graduation and becoming an alumni and researcher (see Figure 2) (HIS, 2011; Hübner, et al., 2008; Thomas, 2010).

The SLC has the following functionalities that all should take place in a single integrated or integrating information system (see Figure 2):

- Student administration: save and use student data in connection to registration, matriculation, fees, all the way to alumni services
- Degree maintenance: module and lecture data, degree structure, and study plans
- Administration of exams, organization and documentation of exams, dates, and results as well as generation of certificates and diplomas
- Planning and organization of lectures and evaluation of these
- Business-Intelligence functions to the support decision making process
- Integration of cross sectional functions, including document management systems and identity systems (Alt & Auth, 2010a)

The support of the full student life cycle is the underlying idea for the development of CMS. CMS should reduce media brakes, allow for instant communication and knowledge exchange, improve services, and support any requirements the customer student may have. CMS need to employ a variety of ERP modules customized to the specific requirements of the SLC of each university because of the universities wide span of functions, differences in processes, and needs. Focus of CMS providers on administrative functionalities within education research and resource management connections expands to learning management systems (LMS), data warehouses, and decision support systems. Focus is to integrate other systems in partial or full or to develop communication ports and interfaces for integrating systems (Alt & Auth, 2010a; Radenbach, 2009). The CMS becomes a central data provider, receiver, and presenter for data and services within the university and for the SLC.

German language higher education CMS. The University of Berlin was the first German university to look for alternatives to state-provided solutions from HIS in 2004, creating a new market for CMSs (Bauer, 2011). The new CMS market created a more competitive environment for the state-owned HIS and in 2007, HIS started to re-engineer its IT modules into a modular web-based CMS, integrating old functionality. HIS engages in a continuous improvement and customization process of their software and is as of this writing still migrating functionality of their old systems to their new CMS (Hübner, et al., 2008). German universities started to become more aware of integrated CMSs in 2008 when nine technical universities tasked a group of experts to analyze the four main CMS vendors in the German language market (Breitner, Klages, & Sprenger, 2008). The study by Breitner, et al., (2008) encouraged university leadership and management to have a closer look at the market of CMS providers and lead to the introduction of many university IT projects.

In Austria, the process of centralized software development for several universities emerged from a successful university IT production at the Technical University of Graz in 1998. The product environment of CAMPUSonline expanded to include human resources, organizations, buildings and rooms, degree and course programs, lectures, administrative functions, a research database, publications, evaluations and discussions, and calendar functionalities. CAMPUSonline is used in 33 educational institutions in the German language area, including Germany and Austria (TU Graz, 2012a).

Three additional vendors, namely the Datenlotsen, SAP, and CAS, entered the CMS market after new technological and legislative developments took place at the end of the 1990s. In 2003, the Datenlotsen Informationssysteme GmbH presented CampusNet and introduced it at the first university in 2006 (Datenlotsen, 2012). Datenlotsen has acquired more than 40 contracts with public and private HEIs. SAP announced their campus management entrance in the U.S. in 2003 (SAP Press, 2003). In 2009, SAP and their consulting partner VEGA embarked on the process of implementing s software at a university of applied science in Germany (Thomas, 2009). The university and VEGA entered a co-development partnership still ongoing. The third German vendor is CAS Education and provides CAS Campus software since 2001 with 11 systems running or in the process of implementation.

Whereas the German HEI ERP market provides multiple CMS vendors, universities have a common foundation of requirements regarding standardized software. Each university, on the other hand, has its own culture (Pollock & Cornford, 2004), formal causes (Malloy & Lang, 1993), and style of IT implementation framework (Ibrahim, Sharp, & Syntetos, 2008). These differences make universities a type of unique organization and foster differences in standardized CMS design and availability. Within the German CM market, vendors who design CMs are

distinguished by (a) the organizational and structural requirements focus on either a centralized administrative organization or a decentralized administrative organization; (b) the software features to support differing degree need and specialties, for example Bachelor, Master, and state examinations like education, medicine, and law; and (c) the level of functionality out of the box, before the CMS is implemented and customized. Depending on vendor experiences, systems may offer differing functionality, go through different services and upgrade cycles, creating a split between up-to-date functionality, requirements, and system stability. University leadership has to understand internal culture, processes, resources, and systems as well as the change opportunity to evaluate the different systems and decide on a matching one for the individual university's demands.

Risk and Success Factors in ERP Implementation-Literature

As Carton, et al., (2008), Dixit and Prakash (2011), and (Parr & Shanks, 2000) highlighted, ERP systems often overrun cost, time, and do not deliver on expectations such as improving processes, reaching ROI, and others. Previous research about project processes and helpful strategies supporting projects success in one project define strategies in other projects to improve success rates. Sullivan (2009) noted, to create a successful ERP project, goals should be defined and measureable. Since introduction of the first ERP systems, organizations engaged in calculating benefits as well as costs of systems as return on investment (ROI). Organizations, especially nonprofit organizations may have difficulty expressing the (future) value of their ERP system in monetary terms because their organizational focus is nonprofit and it is difficult for the organization to link benefits to explicit monetary gains. If monetary factors do not define success, additional factors play a role to define success of an ERP implementation. Achieving a successful project outcome may depend on a previous definition of what a successful project

completion should look like, what benefits are expected, and how to measure these benefits but also the understanding of project strategies to improve success and reduce negative effects. Perceptions of successful project outcome, in the end, are often linked to successful project-time factors, while running, and are both called critical success factors (CSF). CSF theory emerged from "other industries and areas, including general project management, manufacturing systems, and reengineering" (Sullivan, 2009, p. 38) and aims to improve outcome of projects. CSFs are factors, experiences, and processes applied during and after the implementation. Organizations without well-defined ROI measurements may employ a continuous process or factor evaluations to determine if a project is successful or compare evaluation results in time-intervals over the course, at the end, and after the end of a project.

CRSF of industry IT implementations are a popular research subject. The focus on these factors emphasized by repeated reports of high ERP implementation failures. Researchers aim to find explanations, for example, for failures, delays, and resource overruns (ERP IT Toolbox, 2007; Hawari & Heeks, 2010). Success and risk factors of ERP implementations have been analyzed and categorized through different lenses, including

- type of study used, for example quantitative correlational, grounded theory, case study, phenomenological or ethnographic study, or mixed method studies,
- location and culture of the ERP implementing institution, for example United States, Europe, Asia,
- type of institution analyzed, including smaller and midsize nonprofit and for-profit organizations, local government, federal and educational institutions,
- type of industry or service

- subjects included in the study, for example senior management, CIOs, CEOs, project team members, employees,
- and time of the study in relation to the ERP implementation initiative, for example during implementation or post-implementation.

Although it is good to understand ERP implementation success factors, the knowledge of special risk factors (RF) before the start of an ERP project can also increase the likelihood of success. Awareness about possible RFs during an ERP implementation and introduction of a risk assessment and risk management strategy together work with a strategy of risk avoidance and control present important factors to foster successful project outcomes (de Millo, 2005). The following subsections divide into a literature analysis of models of CSRF research and a definition on how to measure success.

The literature analysis came from eleven studies published between 2003 and 2011. Each of the studies selected for the following literature review highlighted elements of CSRF of ERP implementations. The studies institutional research focus included type of institution, research timing, location of study, as well as type of methodology and design researchers used. APPENDIX A summarizes the selected qualitative and quantitative studies, the subjects of study, and the focus of each study, including the time setting of the research regarding the implementation phases by each author. The final subsection presents a categorized overview of success and risk factors in ERP implementation research developed from models and research.

Models of critical success and risk factors. Pearlson and Saunders (2010) highlighted four project management success dimensions: resource constraints, customer-impact, business success, and preparation for the future. Expanding the four general project success dimensions for IT projects enables a detailed project and success view for IT projects. Ifinedo and Nahar

(2007) developed an ERP success factor model for project success dimensions taking the general view to a more specific IT view of ERP models. The dimensions of ERP project success related to the general organizational dimensions of project management success but focus on specifics of IT implementations. They combined research from Gable, Sedera, and Chan (2003) and Ifinedo (2006) into the six ERP success dimensions: (a) information quality, (b) system quality, (c) individual impact, (d) organizational impact, (e) vendor/consultant quality, (f) workgroup impact (p. 26-27). The first four dimensions were also highlighted by Sedera et al., (2004; 2002) and presented together with work group impact the internal organizational factors that may be influenced. Most research focused on the analysis-perspective of CIOs, CEOs, management, and leadership. Analyzing the effect of multiple implementations amongst stakeholder groups along various dimensions allows for improving understanding the differences of stakeholder perception and requirements.

Gattiker (2002) highlighted, CSRF are special in ERP projects and depend on the level of integration and level of standardization. He divided CSRFs into the category of implementation-related factors and ERP specific factors. Implementation-related factors include top management involvement, link to business strategy, software selection, user involvement, and pre-existing data and systems. ERP-specific factors are package standards and process standards. Gattiker's (2002) division in related factors and IT factors is similar to Scott and Vessey (2002) division in internal contextual areas and external business context, which equals to the aggregation of Ifinedo and Nahar's model. Gattiker's (2002) model focusses on success and risk factors whereas Scott and Vessey's (2002) model focusses on risk factors, and Ifinedo and Nahar (2007) define success factors but summarized them as "impact" factors, neither positive nor negative. Scott and Vessey's (2002) model is very detailed in risk factors through multiple organizational

as well as project layers and with multiple stakeholder groups, including organizational context, information systems context, and enterprise system context. Their model presents a detailed perspective of Ifinedo and Nahar's dimensions but from a negative perspective and includes organizational context, information systems context, and enterprise system context, each introduced with multiple individual risk factors as internal contextual areas. Ghosh and Skibniewski (2010) used specific CSRF to create a model of ERP CSRF complexity types that match or summarize some categories of Gattiker (2002) and Scott and Vessey (2002). Ghosh and Skibniewski's (2010) literature review and exploratory study combined both CSF and RF and distributed the factors into one or more of four complexity-categories consisting of structural, directional, temporal, and technical complexity. The four abstract categories and the ability to categorize a factor into multiple categories enable the project and leadership team to evaluate factors in different complexity areas. Developing short-term and long-term success and risk factors analysis and strategies in the four categories may foster success.

Models presented in this literature analysis are similar in their outcome of identifying CSRFs. The classification of CSRF is different because of structural differences within the models. The presentation of CSRF depends on the model`s focus on environment, IT, management, complexity, and other factors. At this point, there is no specific model is selected for this study. Using an inductive approach, the results of the study guided the focus of selecting appropriate models to evaluate the data of the research.

Measuring success. Frantz, et al., (2002) explained the diverse perception of success of an ERP implementation. Diverse organizational groups and stakeholders make it difficult to assess differing perceptions of success. Aldayel, Aldayel, and Al-Mudimigh presented an example for perception differences where the "customer organizations (…) aim to provide the

optimum solutions for business problems and ERP vendors (…) prefer a generic solution applicable to a broader market" (2011, p. 2). Perception of success also can be different from management to employee. Baltzan and Phillips (2009) provided Stanford University's ERP as an example; the university's perception was they work inefficiently compared to before the ERP implementation and support costs are much higher than estimated. The vendor and implementation team saw the ERP implementation as a success because the ERP system was running. The perception of employees and university management may be more neutral to negative regarding new work procedures, implementation, and support costs. The example indicates the importance to create a unified understanding of success, engage all stakeholders, and make success and goals measurable.

For an organization, it is important to define the elements of success and success measurement. Definition of success should happen before engaging into the ERP implementation and possibly even before selection phase, and evaluate project success. Sullivan (2009) noted the need for a pre-implementation definition of project success so that the definition of success does not change over the course of the ERP project. Success factors and their measurement vary between industries, services, and organizations (Pollock & Cornford, 2004; Sullivan, 2009). Success measurements may include ROI, higher number of customers, higher satisfaction levels, increased process speeds, higher outputs, and many others. A development can be a success for one organization whereas it creates a no-change situation for another. The project success definition and elements resembling success should be an element of a project implementation plan to identify project success objectively later during or at the end of the project.

Success factors of ERP implementations. Ifinedo and Nahar (2007) developed a set of six ERP success dimensions: (a) information quality, (b) system quality, (c) individual impact, (d) organizational impact, (e) vendor and consultant quality, (f) workgroup impact (p. 26-27) based upon project management success and IT success dimensions (Gable, et al., 2003; Ifinedo, 2006; Pearlson & Saunders, 2010). Depending on researchers focus, success factors divided into categories and presented at more abstract or more granular levels. Categories found in literature include management and leadership, organization, individual, and stakeholder groups, external entities and environment, internal divisions, IT environment, project complexity as well as processes and procedures. Each of these top-categories can be divided into multiple individual factors. Success factors for IT implementations include but are not limited to (Bingi, Sharma, and Godla, 1999; Dowlatshahi, 2005; Ghosh & Skibniewski, 2010; Graham, 2009; Holland & Light, 2003; Ifinedo & Nahar, 2007; Metrejean & Stocks, 2011):

- commitment of top management,
- resource investment,
- selecting a fitting IT system,
- developing an organizational strategy and organizational support,
- integration of systems,
- engagement, morale, and training of the individual as well as expectations, perceptions, values, believes, and the influence and engagement of organizational members,
- selection and support through outside entities like consultants and software vendors,

- reengineering of work organizations and work groups that align to the outcomes of the IT implementation,
- worst-case preparations,
- communication strategies,
- change strategies.

Analyzing specific success factors further leads to more detailed success factors. The system selection, for example, includes factors such as depth of organizational analysis and definition of requirements, involvement of stakeholder groups into the analysis and selection phase, leadership and management support, and others. Specific factors influencing an organization and influence direction depend on many factors, including the organizational culture, structure, environment, knowledge, stakeholders, and many more. Several categories of success are the focus of the following sections.

Management and leadership. Multiple authors found evidence that top management understanding and support for an ERP implementation project increases project success (Bingi, et al., 1999; Gattiker, 2002; Ghosh & Skibniewski, 2010). Gattiker (2002), Ghosh and Skibniewski (2010), and Weiss (2010) noted, ERP projects aligned with a business plan and following a vision for the organization support a positive project outcome. Leadership should have a vision for achievements of an ERP implementation and a mission as a business plan in how to pursue it (von Urff Kaufeld, Chari, & Freeme, 2009). Management and leadership need to understand, plan, and live the three levels of business: operations, tactics, and strategy. A "leader needs to shift his/her skills and focus within each of the business levels, from the teams' skills, to individual skills and ambition or drive of the firm respectively" (von Urff Kaufeld, et al., 2009, Abstract). Developing the vision and business plan for an ERP project through these

the levels of operation, tactics, and strategy enables employees to understand the connection the ERP system has with their everyday business and how their business may be changed in the future according to the vision.

Another reason for the importance of top management in ERP implementation projects is top management can fund and support a project with adequate resources, highlight organizational commitment, encourage engagement and use of the system, set incentives, and empower employees. In addition, employees are watching top and middle management to see if they 'walk their talk'. Employees are reluctant to engage and support a project if direct managers are not actively involved in the implementation process and do not present a positive mindset (Gattiker, 2002). This can lead to a bottom-up failure because not achieving acceptance throughout the whole organization whereas acceptance is an important outcome for ERP projects.

Environment. The environment includes the external environment and the internal environment. The external environment consists of competitors, suppliers, delivers as well as the country the organization is in, works in, or is engaging in business with. The internal environment includes the organizational divisions and structure as well as stakeholder groups. The environment influences the implementation of ERP projects because of legal requirements, organizational requirements, language, culture, stakeholder groups' needs or requests, shifting environment, and other factors. Environmental influences and changes are often outside the control of the ERP project team but rapid adaptation is necessary for the organization to survive (Ghosh & Skibniewski, 2010; Omerzel, et al., 2011). Understanding the environment and preparing for risks and changes allow the project team to react to changes and adapt plans (Sprenger, et al., 2010a). Developing a knowledge base, identifying internal knowledge holders,

and evaluating the external environment offers organizations the chance to understand and document this layer of complexity.

The internal environment presents the utilization area of the ERP system and stakeholder groups who use the EPR system. The ERP system should have complete integration into the organizational infrastructure (Ghosh & Skibniewski, 2010). An environment evaluation needs to be prepared for an effective use of the ERP system and its features. The internal environment is therefore the direction of communication of the project team. In turn, the internal environment has to deliverer knowledge and information necessary for the ERP implementation. The ERP implementation should fit to the needs, requirements, and culture of the internal organizational environment as it is influencing the organization at all levels (Dowlatshahi, 2005; Ghosh & Skibniewski, 2010). Evaluating the environment is therefore an important step for the ERP system to integrate into the organization.

Complexity. Tsang-Kosma (2010) highlighted the size of the organization and the range of the functions to be implemented across the organization as an implementation influence factor; if larger the more difficult it is to implement the IT system because complexity increases. ERP projects are often big or complex projects. Complexity arises in ERP projects because they consist of many varied interrelated and interdependent parts. Ghosh and Skibniewski (2010) distinguished four dimensions of complexity: structural, directional, temporal, and technical. Success but also risk factors connect to at least one of these dimensions and sometimes to more. Complexity can be a success factor because it allows the organization to discover its structure, direction, time constraints, and technical demands. Evaluating the different dimensions of complexity allows an organization to understand itself and its demands better. The result is that the organization engages into an ERP implementation process with prior knowledge and a

strategy for implementation and organizational development. Prior knowledge can lead to improved project design, risk management, resource allocation, IT selection, and overall a better project plan.

Team composition. The composition of department staffs within a university influences the change engagement process of departments before, during, and after an IT change, including an ERP implementation project (Pratt, 2007). Ghosh and Skibniewski (2010) highlighted the importance to involve users, created a well-composed and competent project team, and compensate adequately. Graham (2009) included the following factors that influence team composition success: "functional and departmental representation, team composition, group dynamics, training on how to work as a team, group cohesiveness, individual characteristics, empowerment, leadership, problem solving strategies, group norms, social strategies, individual diversity, and organizational support" (p. 38). Dowlatshahi (2005) noted the dependency of the organization and the project on skills of employees and with it the need to engage and empower employees. Gattiker and Carter (2010) encouraged finding project champions and encouraging their influencing behavior to increase intra-organizational commitment to projects. Designing a project team equipped with project relevant competencies and connections into all involved business divisions (Lapham, 2009) can be a success factor because the team is representing and pushing the project into the organization. This may also include adaptation of the project team with temporary or permanent employees when the project moves forward into a new phase or hits challenges.

In addition to internal resources, the team and the governance structure should include external consultants. External engagement and an external perspective may support developing an organizational clarity about the project and consultants may ask challenging questions to

improve the outcome of the project. Using consultants as teachers for internal staff during the implementation allows the organization to create internal knowledge and skills to work independent from vendors and consultants after the implementation project ends (Sullivan, 2009). Ghosh and Skibniewski (2010) added external entities like vendors and consultants should be part of the governance process to include product and consulting knowledge for a successful IT implementation. External resources can provide the organization with valuable knowledge and skills and can support the implementation and governance process. It is important for the organization to find a consulting partner that understands the internal organizational culture and can communicate effectively. Organizations need to be aware that consultants do not have knowledge and skills about every detail of the software, implementation process, and the organization (Sullivan, 2009; Weiss, 2010). Leadership and management have to be aware of external skills, level of engagement, and the level of external influence on internal processes.

Communication. Channels of communication are an important success factor and connected with trust, user engagement, and management support (Dowlatshahi, 2005; Ghosh & Skibniewski, 2010; X. Huang, Gattiker, & Schwarz, 2008; von Urff Kaufeld, et al., 2009). Management is involved to find adequate channels to communicate important and regular information about the project status as well as requirements and requests for engagement. Different types of communication channels are available, including face-to-face presentations, general and specific meetings, e-mail, websites, newsletters, and others. Using multiple communication channels can address and involve different stakeholder groups and should encourage feedback (Weiss, 2010). Using only a hierarchical communication pattern may impede the flow of information as information may get lost on the different levels (Tsang-

Kosma, 2010). Providing open and accessible communication and feedback channels supports the success of an ERP project because information about the system and the project arrives at all stakeholder groups and feedback flows back to the project team.

Implementing an ERP system often includes the goal of productivity increases, ubiquitous information availability, and reducing communication time. While these are some goals of implementing an ERP system, the process requires communication about the requirements and directions. Every department and function of an organization has to integrate into the ERP system to "make the lines of communications as easy to use and as transparent as possible" (Dowlatshahi, 2005, p. 3754). Employees, user groups, and stakeholder groups bring their beliefs and expectations into the project and influence the direction of the project. The project team is involved in expectation management, understanding and evaluating beliefs of groups and users, and developing strategies to handle challenges and ideas.

Communication with the ERP vendor and consultants is a necessity. Communication at the top level may include involvement of vendors and consultants into the governance structure of the organization implementing an ERP system (Ghosh & Skibniewski, 2010). Communication at the team level should enable knowledge exchange and development of organizational skills to foster long-term independence from vendors and consultants (Sullivan, 2009). Organizations need to be aware that consultants do not have knowledge and skills about every detail of the software, implementation process, and the organization (Sullivan, 2009; Weiss, 2010). An open and structured communication approach with vendors and consultants enables knowledge exchange, understanding, coordination, and cooperation.

Software selection. The software selection presents a success factor because the right package and process standards allow an organization to improve its profitability and to integrate

various functional areas to reach its goals (Dowlatshahi, 2005; Gattiker, 2002). To arrive at the best fitting software with the greatest potential for the organization, a selection process is necessary to include the different functional areas and stakeholder groups. Ghosh and Skibniewski (2010) highlighted software compatibility includes the general feeling, compatibility with work practices and work style, experiences and expectations of IT as well as systems in use, their functionality, and the perception about them. Gattiker (2002) found a relationship between the level of ERP integration and the level of ERP standardization. Fryling (2010) went a step further and noted, "it is rare that an organization can implement a purely out-of-the-box system with no customizations but the likelihood of implementation success is directly related to the extent to which the product is customized" (p. 21). Functionality of ERP systems is achievable in multiple ways from creating an integrated system with full functionality to an integrating system that includes interfaces to other software and databases apart from the ERP implementation (see Figure 1). Software modules, software modifications, and customization offer additional adaptation of the software to the organizations needs whereas process and organizational redesign offer adaptations of the organizational structure and functions to the software. Organizations need to select a fitting ERP system and decide on the level of integration of the system into the organization as well as on the level of standardization and change the system will introduce to the organization.

Training. Training employees on the ERP system, its customized features, and upgrades is an important success factor (Dowlatshahi, 2005; Ghosh & Skibniewski, 2010). Types of training include vendor-led training, classroom training, train the trainer, and Internet-based training (Dowlatshahi, 2005). The importance of training consists of understanding the system interface, processes, and interdependencies for each user's job description. Training can also

reduce stress and anxiety of employees who are associated with the implementation of an ERP system and with the reorganization of the organization or processes (Khatib, 2010). Training is dependent on the employees' skills and knowledge (Dowlatshahi, 2005) and therefore has to be adapted to different job functions, skill and knowledge levels as well as to different levels of learning. Sending employees to training may have a temporary negative impact on the organization because of time spend away from their job and possible complications of possessing less time for core tasks (Sprenger, et al., 2010a). The negative impact is temporary because training will enable employees to use the ERP system and its integrated features efficiently and effectively in the end. Communication and training increase the level of acceptability of the new system and with it the success of the ERP implementation.

Risk factors of ERP implementations. Researchers emphasize a variety of risk factors for IT implementation projects, depending on the organizational environment, the research method chosen, and the population in question. Many researchers separate factors leading to a negative outcome of an ERP implementation project into four categories: resource risks including finances, time, and personnel resources, current and future IT systems, organizational and political risks, and the human factor including expectations (Gattiker, 2002; Ghosh & Skibniewski, 2010; Sprenger, et al., 2010a). Other researchers such as Scott and Vessey (2002) prefer a more detailed categorization between internal and external risk factors or differ between structural, directional, temporal, and technical complexity types and risk factors (Ghosh & Skibniewski, 2010; Scott & Vessey, 2002).

Resources: finances, time, and personnel risks. The cost of ERP implementations is a risk factor researchers indicated for more than a decade (Dowlatshahi, 2005; Frantz, et al., 2002; Ghosh & Skibniewski, 2010) including the point of no return once the ERP implementation has

begun (Bingi, et al., 1999; DeCarlo, Lewis, & Wysocki, 2004). Investment risk is a two dimensional risk factor, including risk of increasing costs over the course of the project based on misassumptions in the project plan as well as risk of selecting a more expensive solution based on under-information (Sprenger, et al., 2010a). Scheer and Habermann (2000), for example, estimated the implementation of an ERP system costs five times as much as the software itself. Dowlatshahi (2005) noted costs of ERP implementations include modifications, adaptations, updates, opportunity costs, and costs for training and consultants. Metrejean and Stocks (2011) wrote consultants "milk the clients" (p. 10) highlighting consultants often charge a steep price for their services and do not support creating internal organizational knowledge. Over the project-cycle of selection and implementation, the organization is required to fund the project adequately with financial resources as well as human resources and transfer the project to *normal work status* after completion.

The timeline of an ERP implementation depends on size, scope, reorganization, and customization requirements of an organization. Smaller projects complete within a few months while large implementations take often two to four years and followed by multiple upgrade cycles. The project team has to keep management and leadership but also employees in spirit and provide regular communication. Failure to communicate timely may increase the risk of disinterest, non-acceptance of the system, missed timelines, and overall inadequate control of change management (Dowlatshahi, 2005; Ghosh & Skibniewski, 2010). Milestones and reviews at certain intervals may be necessary to adhere to the contract and payments. Delay of project-sections may delay the project end. Costs may increase because of additional internal and external resource requirements to complete a project.

After the ERP implementation is completed, larger organizations often require five years or more to achieve a positive return on investment (ROI). The timeframe to achieve ROI depends on how efficiently the ERP system implementation is and how it aligns with operations (Allen, 2011; Dowlatshahi, 2005). Achieving a positive ROI is not the only challenge an organization faces but includes the difficulty on how to measure the ROI. Ghosh and Skibniewski (2010) as well as Dowlatshahi (2005) introduced qualitative benefit descriptions to explain success or failure because of the difficulty to measure certain types of ROI or the inability to measure ROI explicitly. Baltzan and Phillips (2009) presented the example of the Stanford University, which at the time of their writing was still working more inefficiently by their own perception compared to the time before the ERP implementation. Management and leadership need to be patient to see results of the ERP implementation project yet need to be aware of where and when they can influence the outcome in a positive manner.

Current and future IT risks. Gattiker (2002) highlighted that ERP system implementation never takes place in a vacuum as pre-existing data and systems will need to be analyzed, integrated, and migrated. Underestimating systems acceptance, system landscapes, functionality as well as data migration requirements can lead to reduced acceptance, increased costs, and increased resource requirements (Lapham, 2009; Okunoye, et al., 2008). Sprenger, et al., (2010a) created a software analysis model to visualize differences of systems and to analyze the current IT system and possible future ERP systems. They used a radar chart to present software risks for each system, including quality, degree of maturity, processability/overview/statistics, functional range, usability/operability/user interface, manageability/optionality, readability/comprehensibility (intelligibility)/learning curve, suitability (adequacy)/base functions, data privacy protection/role model, data security, database

model, availability/stability, modulation capability/adaptability, performance/speed, and efficiency/work flow (Sprenger, et al., 2010a, p. 227, elements of figure 7). Before selecting, the project team should create a risk analysis for each of the systems in question. Including an analysis of the system in use offers the opportunity to compare the expected software functions with ones the ones in use and highlight specific IT risk factors.

During and after the implementation phase, many ERP systems pose a structural and technical complexity challenge to the organization because various functional areas should be integrated, the size and the scope of the application grow over time, regular updates are required, modules need to be customized or newly created, and data has to be migrated (Dowlatshahi, 2005; Ghosh & Skibniewski, 2010). Organizations often rollout new IT systems in phases, keeping the old system working and successively replacing old modules with modules from the new system. The project team has to find a path to reduce old IT systems successively and fully migrate to the new system as reluctant users may otherwise keep using old systems leading to data inconsistencies (Sullivan, 2009). Training users on the new software is an important step when reducing old-system use and functionality and migrating to new system modules and functions. Inadequate training, including too few employees, low frequency, differing from user-preferred training-styles, with not enough depth increase the risk of non-acceptance and project failure (Ghosh & Skibniewski, 2010; Khatib, 2010). This also includes the possible regret about making a decision for a specific system instead of for another and regret about implementing a new system – keeping both to a minimum.

Organization and political risks. Multiple researchers highlighted ineffective strategic thinking and planning together with ineffective project management and bad managerial conduct having negative effects on ERP implementation projects (Gattiker, 2002; Ghosh & Skibniewski,

2010; Grabski, Leech, & Schmidt, 2011). Effects of ineffective leadership and management become visible in non-supportive behavior, attitude, and language. Employees about their perception and actions toward ERP implementations closely observe leadership and management on all levels. Employees may take on the perception and actions of their direct managers. They may express behaviors of not taking the ERP implementation seriously and negative language may lead to a self-fulfilling prophecy of implementation failure.

Whitworth (2012) cautioned political developments around IT implementations and noted systems might become political artifacts dependent on the organizations political landscape and strengths. Stakeholders and stakeholder groups engage in politicking to struggle for power to direct the implementation toward their requirements, goals, and values (Ifinedo & Nahar, 2007; Palonen, 2003; Rowland, 2007). The organizational structure can increase political struggles if governance structures are not clear or seats within such structures or only periodical election of complete committees. Reelection or temporary appointments may lead to temporary deadlocks and diversion of resources for political reasons. ERP implementation projects not following a clear vision and strategy with a long-term commitment may change course or be delayed by such political changes.

Organizational culture includes internal politics and politicking, forming another type of resistance risk. Ross, Vitale, and Willcocks (2003) noted that in

> many organizations, it has become politically incorrect to speak of a technological imperative, so most managers involved in ERP system implementations talked instead of how the system would 'enable' change. However, the daily experience of persons actually using the system was that a computer was dictating how they would do things (Ross, et al., 2003, sec. 4.5).

Such resistance is a risk that project management has to address, for example, through change management sessions that train "people not only on systems and processes but also on how they will feel" (Ross, et al., 2003, Section 4.5). Employees may behave disengaged and powerless if they are not involved into their areas of expertise. An organizational culture not including employees and developing a project cooperation and communication structure with employees may have difficulty implementing an organization-wide ERP system (Ghosh & Skibniewski, 2010).

Human factor and expectation risks. Often, technology is not the problem within ERP implementation projects but people and their perception, expertise, requirements, and collaboration, make it a people-intensive project (Graham, 2009; Shah, Khan, Bokhari, & Abbas Raza, 2011; Tsang-Kosma, 2010). Sprenger, et al., (2010a) noted forcing standardization and centralization of processes and serviced on personnel resulted in reduced acceptance of systems and may have negative influence on the project. Acceptance is tightly connected with open communication about the ERP project (Ghosh & Skibniewski, 2010), user engagement in the different project phases (Gattiker, 2002; Gattiker & Carter, 2010), and adequate training on the new system (Dowlatshahi, 2005). Reluctance to adopt the new system may lead to an adoption life cycle out of alignment with the project life cycle (Ghosh & Skibniewski, 2010). Reluctance to make decisions as well as lack of expertise may influence the project outcome and the timeline negatively (Pollock & Cornford, 2004; Sprenger, et al., 2010a).

Leadership, management, employees, and other stakeholder groups set expectations for an ERP implementation. Fryling (2010) wrote, "most institutions have found that the time and resources required to maintain ERP systems far exceed original expectations" (p. 1) whereas "there is an increasing expectation to do more with less" (p. 3). Managing expectations therefore

becomes a critical factor for an ERP implementation project and for a long-term IT development plan. The later may be influenced for example by management decisions to initially customize the system instead of reengineering processes, following user requests, and leading to resistance to business process redesign in later stages because users are not used to the required changes. . Expectations of internal stakeholder groups create pressure to implement group-specific models, customize, or add additional software to satisfy functionality gaps and product functionality expectations. Expectations and objectives of external stakeholder groups like vendors and consultants include time and resource expectations and need to be considered as they can influence a project (Dixit & Prakash, 2011). Failure to meet expectations and the human factor of acceptance go hand-in-hand and can create a negative spiral for a project.

Summary success and risk factors. Multiple studies of success and risk factors in ERP system implementation exist. The focus of studies varies on methods used, depth of previous research on the subject area, country location, institutional type, study participants, and project-timeline focus of studies. CSRF theory and models for ERP implementations use previous experiences and research on general project management and expand on specific IT related factors. Understanding CSRFs is an important factor to lead a project to a positive completion. Organizations should be specific from the start of a project what they define as success and how they can measure success because definitions and expectations may change over time. Multiple stakeholder groups may have a different perception of CSRF. CSRF include areas of management and leadership, internal and external environment, dimensions of structural, directional, temporal, and technical complexity, team composition, communication, software selection, training, financial, time, and personnel resources, current and future IT systems, organization and politics as well as human factors and expectations.

Definitions

Campus Management System

The bases for CMS are the concepts of higher education information systems (IS), academic IS, university IS, and ERP systems (Alt & Auth, 2010a). The term CMS is often used in the United Kingdom and the German-speaking environment and describes a highly specialized university IT system (Alt & Auth, 2010a; Pollock, et al., 2003). HEIs perceive CMS different from ERP systems (Degkwitz & Klapper, 2011; Thomas, 2010). This perceived difference lead either to building of new or adjusted educational modules within a standardized ERP system, building of HEI specific IT systems either through vendors or HEIs, or adjustment of the organization to a standardized ERP system (Pollock, et al., 2003; Rabaa'i, et al., 2009). Alt and Auth (2010b) highlight the similarity of goals between CMS and ERP systems, including modularized systems used throughout the organization, use of a centralized database, and a single interface for all organizational business processes. Universities and companies are developing campus management (CM) to support the full student life cycle or to support a full resource management system (including all stakeholders, resources, and processes of the university) (Cobarsí, et al., 2008; RS3G, 2009; Thomas, 2010) depending on the depth of their implementation needs and their long-term vision.

In the German system of higher education, the term CMS describes information systems specialized to support the full student life cycle and all services surrounding administration, learning, and research (Figure 2) (HIS, 2011; Thomas, 2010). "The university [in this situation] can be perceived as service provider that serves cross-functional and interdepartmental processes, recognizes students as customers, and provides the means to help for self-help ()" (Küpper and Sinz (1998, p. 3 f.) as cited in Alt and Auth (2010b, p. 187)). The CMS is the IT-

tool to provide these and additional university specific functions. Within this research study the term CMS may be interchangeably used with the term HEI ERP to include the international perspective of products and vendors in the field of higher education ERP systems and specialized CMS systems.

Enterprise Resource Planning

In the early 1990s, the Gartner Group coined the term Enterprise Resource Planning (ERP) system as a software integrating an organization over various functional areas (silos) (Jacobs & Weston Jr., 2007). The definition Gartner provided in 2012 of an ERP system is that of an "integrated suite of business applications (…) [that] share[s] a common process and data model, (…) [and covers a] broad and deep operational end-to-end processes, such as those found in finance, HR, distribution, manufacturing, service and the supply chain" (Gartner, 2012, first paragraph). The focus is on automation and support of administrative and operational processes within an organization and over boundaries. Klaus, et al., (2000) amend the original definition of ERP systems as highly configurable IT systems, generic to fit to a range of industries, packaged with pre-configured templates for specific sectors, and customizable to the organizations requirements. To generalize the two parts of the definition Blackstone Jr. and Cox noted ERP systems present a "framework for organizing, defining, and standardizing the business processes necessary to effectively plan and control an organization so the organization can use its internal knowledge to seek external advantage" (2005, p. 38).

Davenport (2000) highlighted the difference between ERP and other IT system implementations regarding their scope and complexity. Ifinedo and Nahar (2007) added further details to these differences, including technological, operational, managerial, strategic, and organizational elements. System implementation differences and the evolution of the definition

present the merger from an internal support view of ERP system toward a combination of internal and external goals achievable with the introduction of an ERP system. ERP systems focus on the standardization of software in use as well as processes within the organization to improve planning and controlling mechanisms for any type of organizational resources. The style of implementation of an ERP system depends not only on the business area of an organization but also on requirements set by the organization and leadership in regard of what focus an ERP implementation should have.

Integrating versus integrated CMS

Aligning IT projects with and integrating IT systems into the corporate strategy is a recommendation by Luftman (2004). Laudon and Laudon (2008) summarized the assembling and integration of existing software components as component-based development. Integration of resources introduces the seamless cross-connection of systems whereas the systems stay individual platforms. An example for an integration technique is the single-sign-on process, one login in time offers access to multiple resources connected with the single-sign-on process. Integrating multiple customer databases, for example, the account holder database and the trouble ticket database, into a style of customer relationship management (CRM) is another example for an integrating system, assumed a unifying interface is created, and the databases are kept separate but offer data access and data updates to each other (Luftman, 2004). Across organizational lines, cooperating organizations may integrate information exchange through an extranet or specialized communication system as well as use open communication standards such as XML, SOAP, WSDL, and others. The underlying idea of integrating systems is agility and adaptability (Laudon & Laudon, 2008) as changes to each of the systems are easier to achieve than within a single system.

Integrating systems use the "I can do it best or best-of-breed" approach (Rabaa'i, et al., 2009). Focus is either to buy tools that do their job best, to keep legacy systems running to connect their information bases with each other, or use single-sign-on services for ease of access. Portal pages often include this approach: the portal is offering access to different processes and activities but each area connects with the portal and possibly with a finite number of other systems to present the visual idea of a combined system. The main point is communication and interaction between systems (Chen, 2009; Luftman, 2004), which also equals to the main challenge of integrating systems because of the complexity created through multiple systems, databases, and connectors (Laudon & Laudon, 2008; Rabaa'i, et al., 2009). Integrated systems on the other hand, focus on the summary of all functions and data under one roof. The idea is the one-stop service provider (Luftman, 2004), which may also lead to risks because of the tightly connected processes, database, and customization impacting control, automation, agility, and security (Grabski, et al., 2011). Often functionality is collected from outdated systems and summarized in one system with one database in the background. Integrated systems may connect to other stand-alone systems however; this is not their primary function.

An integrated system is often a monolithic system that carries all functionality and all data within an environment and follows clearly defined standards. Advantages include entering data only once, no data exchange between systems has to take place, no need to change code if a part within the system changes, and the system is one cohesive platform. Luftman (2004) highlighted operational integration: internal domains of business and IT are integrated "such that the capabilities of the IT infrastructure support the requirements and expectations of the business' organizational structure and processes" (p. 40). The integration within a single system may lead to cost saving effects (Sprenger, et al., 2010a). Resulting systems include supply chain

management (SCM) and CRM systems, not only allowing the organization to analyze data but also to forecast, assess risk, plan, and schedule using the same IT system. Layout of the system, information within the system, and tools integrated in the system allow perspectives over all products, services, and divisions. A single system allows the system owner to set standards and establish rules on how business partners may interact with the system.

Selecting the type of system is often a difficult process and includes the consideration of time, resource requirements, and demands. Laudon and Laudon (2008) and Rabaa'i, et al., (2009) noted integrating systems are time-consuming, offer many chances for errors, and introduce the need of self-configuration requiring personnel and financial resources apart from problems with human interface designs and system functionality. Integrated systems are often standardized software or commercial off the shelf (COTS) software, leaving little or no room for self-configuration but requiring the software vendor to customize and to program additions in exchange for money. Integrated systems often aim at easing and reengineering processes, standardizing software and databases used, enable up-to-date interface designs, and introduce new technological developments. Organizations cannot only decide between the two extremes, either integrating all old systems or buying or creating an integrated system, but they can chose system integration and development on a continuum between the two (Figure 1). System decisions will include not only hardware and software but also integrate behaviors and processes into the new IT environment (Chen, 2009). Leadership and management will need to align their decision of integrating, integrated, or a mix of integrating and integrated system based on their vision and goals for the project and for the organization.

Risk Factors

Many risk factors (RFs) can describe the opposite of success factors. RFs influence a project in a negative way and may lead to project failure, delay, increased costs, inadequate IT systems or ineffective strategies (de Millo, 2005; Ghosh & Skibniewski, 2010; Ifinedo, 2007). Similar to success factors, RFs may be different between organizations and impacts may differ. Some RFs leading to negative project outlook are no direct negatives of success factors but may derive only from them. Inefficiencies in the IT system or processes, for example, come from minimal customization, inadequate process analysis, or lack of communication. Awareness about risk factors and controlled counteraction, risk assessment, or insurance against the risks may reduce the risk for complete project failure and increase success rates (de Millo, 2005). How much a risk factor influences a project depends on the environment of the project, resources, and culture as well as influencing critical success factors, including organizational engagement, knowledge, and awareness. Project failure does not occur because one critical risk factor occurred but rather because of a combination of them took place and taking no or insufficient counter-actions. Addressing risk factors through a risk management strategy, covering expected and unexpected generic events, technical events, project team events, and business events should be the aim (de Millo, 2005).

Stakeholders

Freeman (1984) defined a stakeholder as "any group or individual who can affect or is affected by the achievement of the organization`s objectives" (p. 46). Sedera, et al., (2004) divided stakeholder groups within an organization into cohorts of strategic, managerial, technical, and operational stakeholders to highlight employment status of users. Stakeholders are not only employed groups who have an economic interest in the organization but also those

without economic interest but influenced by organizational decisions (Kuratko, et al., 2007). Stakeholder groups include investors, managers, employees, customers, suppliers, and the community. The definition of the group`s name, size, objective, and its members depends on the organizational environment and understanding. Understanding needs of stakeholder groups and evaluating decisions, objectives, and impacts for multiple groups creates complex decision processes (Kuratko, et al., 2007) for the implementation of organizational changes.

Employment cohorts and organizational levels, including IT systems and business processes offer differing perspectives about the IT implementation and offer a differentiated stakeholder analysis. Complexity of IT systems may increase with the number of stakeholders identified, introduced into decisions, and using the system because stakeholder groups may introduce similar, differing, and even opposing perspectives, objectives, and demands (Ifinedo & Nahar, 2007; Sedera, et al., 2004). IT systems and especially ERP implementations join multiple functional areas to integrate business processes and functions and are no exception to the level of complexity on the stakeholder and on the system level. To implement an ERP system successfully, organizations need to analyze and understand stakeholder requirements, expectations, and perception of ERP implementation success in a complete and systematic way to arrive at a unifying IT solution and perception of success.

Within HEIs, stakeholder groups are not only present in the four cohorts identified by Sedera, et al., (2004) but also in three university divisions of education, research, and administration as well as external entities forming a loosely coupled system altogether (Alves, Mainardes, & Raposo, 2010; Mudaliar, Garde, & Sharma, 2009; Okunoye, et al., 2008; Pollock & Cornford, 2004). Universities are organized to meet diverse needs of multiple stakeholders (Lapham, 2009; Okunoye, et al., 2008) differing in purpose and function, form, structure of

authority, outputs and measurability, both autonomy and dependency from wider society, and internal fragmentation (Lockwood, 1985; Pollock & Cornford, 2004). Stakeholder groups hold attributes of power, legitimacy, and urgency into university processes (Alves, et al., 2010; Mitchell, et al., 1997), introducing political power-play (Lee & Myers, 2004; Marterer, 2008; Okunoye, et al., 2008) or power of default (Pollock & Cornford, 2004) into the selection and implementation of a university ERP system and functionalities. The complexity of the unique university system highlights the importance of evaluating, understanding, and integrating all university stakeholder groups into the ERP selection and implementation process.

Success Factors

Success is a subjective definition and may differ between organizations participating and stakeholder groups involved (Frantz, et al., 2002; Sedera, et al., 2004). Aldayel, et al., (2011) noted success is dependent on the expected outcome of a project, for example an organization may expect optimum solutions whereas a software vendor my want to develop generic solutions. In their HEI study, Baltzan and Phillips (2009) found differing perceptions of HEI stakeholder groups, when staff saw the IT implementation as unsuccessful because of inefficiencies whereas the IT vendor and the implementation team perceived a running system as a success. Different perceptions of success are not the only difficulty in defining project success. Sullivan (2009) added, perception and definition of success might change over the course of an ERP project. Success is therefore a subjective definition that may vary between industries, services, organizations, and stakeholder groups, and may change over time.

Success factors are elements of project and organizational management that can influence positive outcomes for a project. Understanding the findings of Aldayel, et al., (2011), Baltzan and Phillips (2009), Frantz, et al., (2002), Sullivan (2009), and others leads to two success

factors for project management: expectation understanding and management before, during, and after an IT-project and developing a description of pre-implementation success perception to compare to in later project phases. Additional success factors include specifics in IT, organization, the individual, external entities, work organization and work groups, and influence and engagement of organizational member (for examples see Gattiker, 2002; Ghosh & Skibniewski, 2010). Ghosh and Skibniewski (2010) divided success and risk factors into complexity-categories of structural, directional, temporal, and technical complexity. Specific success factors apply to each complexity-category. The mix and integration of these factors into an IT project will differ between organizations, cultures, stakeholders, and project requirements, leading to a unique mix. Actively supporting success factors during a project may lead to increased project success but does not guarantee it (Gattiker, 2002).

Gaps in Research

Many companies see ERP systems as the holy grail of IT-support and competitive advantage. ERP systems shall provide information, adding value to the company, improve processes, and provide the foundation for improvement in supply and demand chains of the company (M.-H. Huang, Wang, Yu, & Chiu, 2004). Modules of ERP systems include finances, sales, marketing, service, management, inventory, production, human resources, and others. ERP systems should integrate most functions of an organization to achieve effective operations and communications between units of an organization (Dowlatshahi, 2005). Post-implementation, an ERP system should provide data to the whole organization. These data were used as a commodity, as a customized good to create revenue and pay for the cost of the ERP implementation, improve processes, and provides the foundation for improvement in the supply and demand chains of the company (Huang, et al., 2004). These and other rewards of ERP

implementation are organizational-internal expectations of success. ERP systems present an opportunity for integration with ERP systems of business partners to create any-to-any access of virtual business partner information (Conghua, 2002). Expectations raise the interest of large enterprises as well as small and medium organizations to implement ERP systems, including new customers not supplied by specialized ERP software.

HEIs are a group of organizations that believe ERP systems or highly customized CMS can fill their needs of upgrading IT infrastructures, improving processes and self-services, and offering support for educational and legislative changes. Within the European higher education system, the Bologna Declaration presented the starting point for academic redesign. Legislative was and is passing down to universities who have to adapt to changes. Legislative and with them academic changes fostered the need for IT and IT infrastructure upgrades at HEIs in Europe and increased the interest in standardized software packages like ERP systems. The multitude of changes in a short period appeals to the thought that technology is increasing the speed of change in the educational environment. On the other hand, the slow speed of certain HEI developments, including old hierarchical university structures breaking-away slowly, highlight Kuhn`s (1996) thought that change is sometimes only possible once the non-change-embracing generation has passed away. This highlights how HEIs have to split between innovation, change, tradition, and regulations.

Multiple researchers point out there is no success-guarantee for ERP implementations (Ghosh & Skibniewski, 2010; Hawari & Heeks, 2010; Shah, et al., 2011). Risks include cost and time overruns as well as project cancellations because goals such as integration or functionality fail. To achieve success, organizations need to define their perspective of success. It is challenging for HEIs to define success their own way, as most HEIs cannot calculate success

based upon ROI. Previous researchers have not analyzed the perspective of HEI ERP implementation success which may include qualitative descriptions of results, for example to decrease certain process times while the time it takes to achieve a degree stay the same, or to reduce cost per student in administrative areas while educational areas stay the same. HEI can also perceive a higher visibility and up-to-date data, information, and knowledge as successful outcomes of an HEI ERP implementation project. The uniqueness of the organization may therefore lead to HEI-unique success perspectives. Organizations have to invest in an adequate selection and change process to increase the likelihood for success. The concepts of risk and success factors for ERP implementations apply in an adapted form also to HEIs. Like organizations, HEIs have to understand their internal needs, processes, resources, stakeholder requirements as well as success and risk factors for their specific implementation project. CSRF theory applied to HEIs may include unique HEI-factors previous research has not yet identified.

Possible success and risk factors for ERP implementations in universities. "The successful development of an information technology organization that can align with the campus direction depends largely on the application of leadership; yet often, issues surrounding culture and operational process evolve between these two organizations" (Pratt, 2007, p. 9). Pratt`s words highlight how universities have to understand their presence as a unique organization. Hierarchies, power structures, and expertise have developed over years of existence at German universities (Behrenbeck, 2011; Degkwitz & Klapper, 2011; Welsh, 2010). Changes in political influence, globalization, and technology developments together with the change of employees to a younger generation induced a change process in German universities (Davenport, 2005; Kuhn, 1996; Welsh, 2010). Not all employees, especially within the administrative body of the university who followed the rule and regulations daily, did welcome

this process. Employees in different administrative levels can hinder the implementation of a CMS or even promote the failure of the project (in terms of cost or time overrun) by engaging into politicking or by active or non-active engagement. The underlying rationale was often summarized as fear of change, imagined threats, and the possibility of losing one's job, status, revenue, or power (Lapham, 2009; Shah, et al., 2011). The mix of generations engaged into the implementation process created an additional mix of risk and of success factors at different stages of a CMS project.

HEI stakeholders within the ERP implementation processes have differing roles, follow different politics and agendas, and influence changes, adaptations, and successful outcome of the ERP project. Universities can draw on a background of educational tools, research areas, and experienced staff to foster projects. Most universities teach project management methods in different subjects and depths from management to IT project courses. Universities often cannot draw from previous ERP implementation experience but from general project management methods, project knowledge, and best practices in a similar way as early ERP adopters did (Ferratt, Ahire, & De, 2006). The combination of limited but applicable previous experience and specialties of organizational structure of universities possibly introduce different success and risk factors than in other for-profit and nonprofit organizations. Previous research supplies some hints toward special success and risk factors in HEIs. In addition to these HEI specific factors, there may be specific factors for stakeholder groups not previously analyzed. Previous research has described HEI implementations of new IT systems from a perspective of the managerial and leadership levels. A gap in research exists in the involvement and perception of other HEI stakeholder groups regarding the implementation and use of such a system. The following

section presents a description of possible university specific successes and risk factors in university-ERP implementation projects.

Possible success factors for universities. Ifinedo and Nahar (2007) highlighted multiple studies that found organizations could draw on a variety of IT professionals' technical backgrounds. Universities can access internal knowledge regarding IT development, project management, and organizational behavior through research and teaching departments. This theoretical knowledge advantage may be a success factor because the university can draw upon a wide variety of knowledge surrounding the implementation and change process, IT developments, and management techniques. Universities could also engage researchers, teachers, and students into the implementation process by setting-up new study-courses directly related to the implementation project and by engaging teachers and students into the CMS project for credit. Previous research has not identified this internal knowledge of universities as a success factor; however, studies by Pollock and Cornford (2004), Graham (2009), Sullivan (2009), and Rabaa'i, et al., (2009) present several successful higher education ERP implementations that may have benefitted from internal knowledge. Internal knowledge and differences in higher education ERP implementations may also be the reasons for university management declaring ERP implementations a success when stakeholders have a different perspective.

Kansal (2008) presented a connection between success factors and behavior of the UK university. Her research found a connection between business processes, decision-making process, and enterprise-wide information system performance. The success factors directly connect to how business processes are developed and implemented within an ERP system. A clear and well-grounded decision-making process for an ERP vendor can increase the chances of

success. Though the decision-making process in Pollock`s (2003) study was clear, the university was reluctant to embrace the change process needed to make the implementation a success. Such changes include the ERP-philosophy-understanding of self-services for different levels of stakeholders. If a university therefore has a clear decision-making process, a strategy, engages its stakeholders on all levels, and follows the strategy; the CMS implementation should be successful.

Drawing on internal knowledge regarding educational material and teaching can be a success factor regarding training. A well-developed training plan (Dowlatshahi, 2005), communication and evaluation strategies (Ghosh & Skibniewski, 2010), and integration of feedback-cycles from all areas (Shah, et al., 2011) are factors identified in previous ERP success factor research. Universities can use their internal knowledge and resources to test and develop matching methods for training, communication, evaluation, and feedback-integration. Administrative quality departments, teacher education or research method courses for qualitative and quantitative studies may offer support and insight into the intra-university implementation process. Integrating many stakeholder groups into this education and improvement cycle may improve acceptance and integration.

Possible risk factors for universities. Alt and Auth (2010a) referred to the risks of ERP implementations and mirrored them in the academic environment. For the university it is necessary to standardize services and data structures in addition to creating a closer relationship of schools, division, and administration. Developing their own technology and internal organization is challenging for universities. Alt and Auth (2010b) highlighted CMS can only benefit the organization if the organization integrated political, strategic, organizational, and technological dimensions successfully. This relationship of risk and organizational success also

reflected by Sprenger, et al., (2010b) proposed to evaluate the economic impact of the different CMS choices. They noted the choice of a CMS should align with the best outlook of services and system but in alignment with the best organizational and strategic fit.

Dittrich, Vaucouleur, and Giff (2009) defined the ERP implementation process as a new type of ecosystem of participants: the ERP provider (framework and application developers), the ERP implementation consultants (customization and organizational implementation), and the implementation site members (local designers and users). In their opinion, traditional software development tools focus on implementing technology without history. The new view of the ERP-ecosystem presents the challenge to integrate previous social and organizational context into the IT tool, including expertise, understanding of the customers' business and processes, and in-depth knowledge of the entire legacy system. Universities present a special challenge because they do not only employ one social and organizational context but many in terms of a loosely coupled system (Okunoye, et al., 2008; Pollock & Cornford, 2004). The need to implement and merge a multiplicity of systems and cultures into a CMS presents a specific university risk about which management and leadership need to be aware.

Heterogenic educational background of employees is an additional possible risk factor. A span between staffs' levels of education in administration, research, and education exists that can create tension, political power-play, and mistrust (Marterer, 2008; Pfeffer & Salancik, 1974). It may be important to select an implementation team well versed in implementing, communicating, and negotiating with the different stakeholders and levels (Bologa, et al., 2009). The implementation team should be able to generate a plan to take all employees forward throughout the project. Leadership and management may need to equip the team with rights, including new directions for compensation and personal developments for employees of all

levels (Graham, 2009). Engaging all levels of employees and offering a positive employment outlook may turn the risk of educational barriers into successful engagement of all employee levels.

McKeen and Smith (2009) and von Urff Kaufeld, et al., (2009) presented lack of representation and lack of leadership understanding of IT in executive positions and boards as a risk factor. Von Urff Kaufeld, et al., (2009) expanded this position by writing "the lack of support for IT in organizations, coupled with the complexity and pressure of the environment surrounding IT, has led to an increasing outcry for strong and effective leadership within IT" (2009, Abstract). Managing expectations of multiple stakeholder groups for the results of an HEI ERP implementation may add to the challenge of leadership. Pollock and Cornford (2004) noted leadership and management lacked decision-making strength and reverted back to "the power of default," where default values and processes were implemented because no decision by university management was made on changing features. This is aligned with Fryling (2010) finding that "most institutions have found that the time and resources required to maintain ERP systems far exceed original expectations" (p. 1) whereas "there is an increasing expectation to do more with less" (p. 3). Lack of HEI stakeholder expectation management may lead to dissatisfaction and resource constraints with the implementation and production phase whereas lack of leadership may negatively influence university vision, structure, business processes, and overall implementation of a new IT system.

Politics and culture are an important daily influence factor at universities. The separation of the university into administrative, research, and education divisions is not the only point of conflict. Within the research and education area, additional sub-divisions and with it opinions and power plays influence the university`s actions (Marterer, 2008; Pfeffer & Salancik, 1974).

Communication and a good team balance present important countermeasures for the risk of political deadlocks (Bologa, et al., 2009). Politicking can influence the election of the university president and related positions as well as vendor selection and strategic outlook for an ERP implementation (Okunoye, et al., 2008). It is therefore important to have a well-positioned management and leadership team present a valued stake in the project, an objective view, a vision, and a position of decision-power. The challenge is to make the HEI ERP implementation not about politics but about the implementation and the decisions (Pollock, et al., 2003). The risk is political power play, which may influence and hinder the introduction of an HEI ERP system or may lead to a standstill before or during critical phases of the project.

The transformation process of universities may be another risk factor. Mudaliar, et al., (2009) proposed to transform the university from a "cultural" to a "technological university" with the student and his needs in the center as a customer. This view seems valid considering the literature of implementation examples (see Degkwitz & Klapper, 2011; Pollock & Cornford, 2004; Rabaa'i, et al., 2009) and the authors' personal conversations with several employees at German universities. Anecdotal evidence exists that some German universities are going through a difficult long-term transformation, including cultural, organizational, and technological changes. The risk factor of organizational transformation connects closely with the risk factor of time as well as culture and politics because they influence and affect each other.

Literature Conclusions

IT and ERP implementations have evolved since 1950 through multiple hardware and software innovations and expanded into industry and service organizations from large to small. The review of relevant scholarship highlighted the interest of researchers, organizations, and HEIs to implement ERP systems successfully. Implementing an ERP system connect with goals

of accessible information, improving and reengineering processes, automating processes, integrating the full organization into an IT system, and overall adding value to the organization and increasing revenue. Success of ERP implementations occurs based on ROI in for-profit organizations and supported by quantitative key performance indicators. In the review of the literature, nonprofit and government organizations are not necessarily able to calculate a ROI and therefore rely on key performance indicators or qualitative measurements of success such as information quality, system quality, and user satisfaction with the system, data, and processes.

HEIs are unique private and public organizations searching for specialized IT solutions supporting their administrative, educational, and research goals. HEIs started out with developing their own IT systems, but rapid IT innovations and shrinking finances raise the interest for vendor supplied out-of-the-box or modular systems, including ERP and CMS. The literature review revealed several studies since 2003 in the subject domain of higher education, IT and ERP implementations, and success and risk factors. CMS implementations are either standardized ERP implementation modules that need to be highly customized, special ERP software for HEIs with customization features, or integrating systems with best-of-breed solutions. Multiple world-players of ERP systems with educational modules exist however many local CMS players offer specific software solutions to local languages, cultures, and regulations. The decision for an ERP customization or CMS solution depends on the vision, expectations, and organizational understanding of the implementing HEI and can influence implementation success. Previous studies focused on CIO, CTO, and management perspectives regarding success factors, risk factors, best practices, and specific case examples. Difficulties of management consisted of the HEIs challenges to measure ERP implementation ROI, finding fitting systems that stayed within the project, and including all stakeholders into the project.

Multiple gaps in HEI ERP implementation research surfaced in the literature review. Public HEI ERP implementations are only in the focus of few researchers though the area presents a growing nice market for specialized software and services. Private HEIs have not been in the focus of research, possibly because of different financial and organizational structures and different challenges of IT implementations. On a macro-level, studies have focused on countries like the United States, the United Kingdom, and Australia presenting a large language area with English as the main language, offering possibilities for generalization of findings. Other countries and language areas offer only scarce and seldom in-depth research on HEI ERP implementations. This missing research of different countries HEI ERP implementations includes also the missing comparison between different CMS implementation experiences of HEIs and stakeholders, and no generalized findings exist. On a micro-level, previous research has a limited focus on the experiences and perceptions of leadership and management while experiences and perceptions of stakeholder groups like administrative employees, teachers, or students working with the system every day have not been analyzed. HEI`s differ in organization, culture, and multiplicity of stakeholders from regular organizations and therefore offer a multi-dimensional challenge for an ERP implementation. Understanding the micro-level of HEI ERP implementations would broaden awareness about HEI specific CSRFs and possibly increase project success rates.

Summary

Chapter 2 included an overview of the research process, including documents, articles, databases, and what key words and searches used. The historical overview section presented developments of ERP systems and their broad range of functions and expectations of management and leadership, including standardization, optimization, information availability,

accessibility, and profit increase. These expectations also apply to HEI leadership and management perspectives when deciding to implement an ERP system. The historic overview also provided insight into the Anglo-American and German HEI ERP systems market and the Bologna Process within Europe. Following a presentation of the German system of higher education`s historic, cultural, as well as leadership and management perspectives, the Bologna Process in Germany and connected IT changes in HEI environments were described. ERP systems for HEIs are customized ERP modules or specialized ERP systems called CMS. Within Europe and Germany the Bologna Process, IT innovation, focus on student services, and fiscal changes have increased the interest in ERP and CMS leading to an increasing number of ERP HEI modules and CMS implementations. Within project management and ERP implementation projects, the subject of CSRFs is increasing in popularity to improve project success rates. Models of CSRF describe categories of factors explained. CSRFs applied to the HEI environment may offer different categories than in for-profit and non-profit ERP implementations. Such differences are gaps in HEI ERP research and shall be the subject of this study.

HEIs are unique organizations regarding the multitude of stakeholders, HEI and regulation requirements, politics, culture, organization, and governance. HEIs have some unique organizational challenges as well as advantages that may hinder or improve ERP implementation success. Technical, organizational, and research background of the HEI as an institution but also of employees may offer unique support for the project. Stakeholder variety, politics, expectations, and elected leadership and governance structures may pose challenges because of HEI cultural differences. Finding a fitting CMS and implementing it can therefore be a challenge for leadership, management, and the project team. Understanding risk and success

factors from ERP and IT implementations in for-profit and nonprofit organizations can support the project planning and implementation stages in HEIs. Special success and risk factors for HEI ERP implementation may apply as multiple stakeholder groups, culture, and organizational uniqueness influence the project. Due to the differences in cultural environments and stakeholder groups, there is a need for additional studies on CSRF and HEIs.

The literature review presents background information important to develop the research problem and the research question in detail. The research focus narrowed through the literature research from experiences of ERP implementations at German universities toward finding CSRFs as identified by a stakeholder-group not addressed in previous research. Chapter 3 includes the rationale for the research method, the rationale for the design, and the appropriateness of the design. The population, sampling frame, research, and interview questions created the building blocks for the research. The study took place in Germany using German as the interviewing language and required special attention to informed consent, confidentiality, data collection, process of transcription and translation as well as to the analysis process. The chapter concludes by a presentation of the data analysis, a discussion on validity and dependability of findings, and a summary of the chapter.

Chapter 3

Research Method

The purpose of this qualitative research study was to describe non-managerial administrative staff experiences during and after the implementation of a CMS at multiple German universities to identify CSRF groups from an administrative point of view. A multiple exploratory case explored the administrative staff experiences, create categories of success and risk factors, and compare the findings with similar studies. The multiple exploratory case study approach allowed replication of the study in different environments of HEIs in Germany, organizational structures, state in the CMS implementation process, and use of vendor.

This chapter includes the design of the study, the research method, and an explanation of the appropriateness of the design followed by a description of the research process. Additional subsections include population, sampling frame, the research question, as well as the process of informed consent, confidentiality, data collection, and transcription. The final sections consist of the explanation of validity and dependability of this study, the data analysis used, and a summary of this chapter.

Research Method and Design

The research design of an exploratory multiple case study was a decision by the author after careful consideration of all the other methodologies, and underlying logic for a research study. Based on the selected methodology the researcher decided to use a specific method. Moses and Knutsen (2007) recommended pursuing research based on the questions or problems but not based on methods. This focus on the underlying research question therefore presents the need to have an adequate "scholarly knowledge of the object of study in question" (Sayer, 2000,

p. 19). In the following sections, the author describes the selection of the qualitative methodology, the case study method, and the reasons for choosing this research design.

Qualitative Methodology

The focus of qualitative research is the phenomena in question within its natural setting (Schreiber & Asner-Self, 2011). Qualitative research is not necessarily an objective approach because the setting and the phenomena can be explained only through people and their interpretation of their experiences (Schreiber & Asner-Self, 2011). Qualitative researchers therefore focus on identifying and possibly classifying and explaining the specifics and complexities of a particular phenomenon (Leedy & Ormrod, 2010). Asking the "what makes/is/…"-question allows the researcher to engage into an emergent process of exploration (Leedy & Ormrod, 2010). A researcher using qualitative research can therefore explore a phenomenon in depth, find details, and generate theory not found with quantitative methods.

Qualitative and quantitative studies differ in their approach to achieve validity. Quantitative studies achieve validity and information through large numbers and mathematical manipulation (Hall & Swee, 2006). The subject of questions in quantitative studies is often well researched or taken from previous quantitative or qualitative studies in similar areas. Qualitative methods differ from quantitative findings in that they characterize and express aspects that make up a phenomenon instead of settling on the most likely or mean experience of subjects (Polkinghorne, 2005). Qualitative researchers identify "fertile exemplars" (Polkinghorne, 2005, p. 140) to describe and determine the essential aspects of the phenomenon and experiences. These data were presented in attenuated descriptions without statistical focus to assess strength, direction, or form of relationships (Hall & Swee, 2006). In turn, the collection and presentation of data and results differs between quantitative and qualitative research. The more descriptive

and in-depth presentation of qualitative data required a smaller study size in qualitative than in quantitative research. The smaller sample must still allow data saturation to offer the chance for a limited abstraction of the findings of the study through differing points of view (Green, et al., 2007; Schreiber & Asner-Self, 2011).

Case Study Design

A case study is a qualitative method based on a constructivist paradigm. In constructivism, truth is relative and subjective to a participant; however, constructivism does not eliminate objectivity (Baxter & Jack, 2008). Reality in constructivism is a social constructed truth and the agent describes the experience of his existence (Goldman, 1999). A case study merges the perspectives of the performers in the considered case (Tellis, 1997) and integrates collaboration, observation, reconstruction, and analysis for a complete case description (Baxter & Jack, 2008). Using a variety of data sources and exploring the issue through multiple lenses permit researchers the presentation and understanding of the multiplicity of features of an incident (Baxter & Jack, 2008). A case study can describe, explore, or explain a case through different views, including individual, groups or cases, and historic artifacts.

Berg (2009), Merriam (2009), Schreiber and Asner-Self (2011), and Yin (2010) highlight the three case study designs: descriptive, exploratory, and explanatory. Descriptive case studies aim to provide a rich, detailed, thick, and systematic description of the case or cases (Merriam, 2009). Descriptive case studies develop no theory, test no theory, and do not aim for generalization (Rabaa'i, et al., 2009; Willis, 2007). Schreiber and Asner-Self (2011) noted a descriptive cases study focuses on the audit of a case with tribute to already developed theories. Exploratory case studies on the other hand collect “data in order to further refine research questions and hypothesis” (Schreiber & Asner-Self, 2011, p. 204), to “add to [the] theoretical

knowledge base and offer a foundation for applied research" (Schreiber & Asner-Self, 2011, p. 18). Exploratory case studies include descriptive elements, longitudinal perspectives (Merriam, 2009), maps and influence diagrams (Cunningham, 1997), and research questions may be adapted and redefined during and after data collection (Berg, 2009). Explanatory case studies also include descriptive elements but focus on the development of explanations of findings within cases. Such explanations include pattern matching, explanation, and arguments of rivaling explanations (Berg, 2009; Yin, 2010).

In addition to the descriptive, exploratory, and explanatory design, researchers can decide on the case size design. The single case design describes the phenomenon though a single instances or a single group, a single case with embedded units uses sub-units within a larger case offering analysis of differences and similarities between the sub-units, and a multiple exploratory case study offers the replication of the single case study design at multiple locations or with multiple groups at multiple locations (Baxter & Jack, 2008). A multiple exploratory case study design enables the researcher to replicate the study in different but matching fields and to question similarities and differences within a single case and between cases (Baxter & Jack, 2008). Yin (2003) highlighted case selection enables comparison, contrasting, and prediction of cases.

Appropriateness of the Design

A qualitative approach to the research problem was appropriate because previous research findings focus on different groups of stakeholders. Previous research focused on CIOs and management (Dues, 2010; Graham, 2009; Khatib, 2010; Lapham, 2009; Pollock, 2003; Pratt, 2007; Sullivan, 2009). In these studies, CIOs and management provided qualitative and quantitative data to present and evaluate critical success factors from their point of view.

Questioning administrative staff working regularly with the system may provide a different view on CSRFs. Because administrative stakeholder groups may provide a different view of CSRF compared to CIOs and managers, a qualitative study was appropriate to find in-depth information. Previous research allowed comparison to rich information of this qualitative study of administrative views.

A quantitative study would not be able to demonstrate differences and new CSRFs through a standardized questionnaire. The analysis of CSRFs presented by CIOs and management through a quantitative study with administrative staff as the population may present results regarding the known CSRF. A quantitative study cannot explore or identify additional CSRFs administrative staff may perceive. A case study design is highly versatile and allows for a detailed understanding of the situation and activities regarding information systems and their implementation (Cavaye, 1996). The researcher may uncover important information that quantitative techniques may obscure or miss (Tellis, 1997). The approach offers a "holistic understanding of cultural systems of action (…) [more specifically of] interrelated activities engaged in by the actors in a social situations" (Tellis, 1997, p. 5).

The original idea was to conduct an exploratory case study at one university going through the process of implementing an ERP system. Tellis (1997), Pratt (2007), and (Gerring, 2007) noted a single case study design does not allow for generalizability and broad theory development. Using more than one case in a collective case study allows for an improved understanding of the phenomenon in question (Creswell, 2012; Stake, 2000) and the development of a better theoretical framework (Brantlinger, Jimenez, Klingner, Pugach, & Richardson, 2005; Moses & Knutsen, 2007; Sullivan, 2009; Yin, 1994; Yin, 2003). Gerring (2007) recommended the approach of using several cases for a superficial view and zooming into

a selected few or in-depth detail to create a wide and detailed cases study. Further analysis showed each university going an individual route of selecting and implementing an ERP system. Application of single case study results to other universities also presented difficulties because CMS available are in ongoing development in many areas and are still going through change processes. This exploratory case study does therefore not consist of a single university with an in-depth analysis of all stakeholder groups and their perception of CSRF. The scope of this study included several cases at German universities with multiple CMS-project progress states to highlight the variety of project and university developments, and allow for a superficial and in-depth understanding of the cases and experiences, as well as for comparison and possibility for generalization.

The original design of the exploratory case study included a single university case for each of the four software systems. Three of the ten identified universities provided permissions, restricting the selection process, and only represented two of the four software systems as case study possibilities. Because of limited replies, the design was adapted to a multiple exploratory case study design without focus on differences between types of systems implemented. The selection of three different German universities increased the robustness of the results (Tellis, 1997) of CSRFs during the implementation process without a focus on university or software system specifics. The objective of the multiple exploratory case study approach was to understand CSRFs experienced by one stakeholder group during and after a CMS implementation at German universities. The exploratory case study design allowed the description of findings as well as for adding to the theoretical knowledge base within the research area (Schreiber & Asner-Self, 2011). Previous research focused on different geographic locations and different groups of stakeholders highlighting the exploratory focus of the study to

add description and more data about the phenomenon and possibly refining research questions and theoretical knowledge. The number of cases in this study was acceptable as it meet the established objectives (Tellis, 1997).

Case studies heavily rely on interviews to collect data to create an understanding of the event, activity, or process. Qualitative interviews require increased presence and cooperation from participants than quantitative studies (Creswell, 2012) and are therefore more time consuming. Qualitative interviews include open-ended questions to avoid limiting the participants' responses and views (Creswell, 2012; Rubin, 2008) but to assist their exploration of experiences (Polkinghorne, 2005). Travel to the site or sites and interviewing the subjects in person may improve the research process and interview responses because of increased interaction and direct clarifying questions. Previous studies focused on single case studies or quantitative data. This study partially replicated previous studies in a multi-case setting with a different population and in a new location. The primary data gathering method was interviews with administrative staff in the registrar`s and student service offices at two of the three participating universities in Germany. No participants came forth from the third university.

The participants for this research study were a group of stakeholders from German universities administrative staff. Dowlatshahi (2005) used a selection approach for his grounded study. He selected his interview partners based on their positions within the organizational chart and in connection with their job description (Dowlatshahi, 2005). To achieve a fuller picture, he held interviews with at least two individuals who had direct knowledge of the subject (Dowlatshahi, 2005). This approach offered the opportunity to focus on the experiences of administrative staff within a division of the university – specifically the administrative department of the registrar`s and student services office. Because the hierarchical and

organizational structure varies between German universities not only the organizational chart but also the job description creates a pool of possible candidates for interviewing. Interviews with multiple participants per university took place to achieve a fuller picture of experiences within the same environment. Different viewpoints lead to a wider picture but also presented biased experiences. Additional interviews with individuals or a second more specific interview with interviewees were planned in case of unresolved or open questions.

The goal for data collection is saturation. The repetition of specific topics, experiences, and descriptions from a variety of study-participants presents a hint to the researcher that saturation is achieved (Schreiber & Asner-Self, 2011). The exploratory case study may identify additional administrative CSRF through analysis of the interviews with administrative employees. Tellis (1997) suggest using multiple case studies to strengthen the results of a study. To support the conclusions of this study the researcher therefore decided to use a multiple exploratory case design and evaluate three universities employing two different systems. The multiple exploratory case design offered not only multiple sources to achieve saturation, but also data for comparison, contradiction, and evaluation of success and risk factor categories. Comparing multiple results with each other as well as a summary of all case results with previous research offered additional insights. The replication of the study at different universities allowed for maps and influence diagrams (Cunningham, 1997) as well as for "pattern-matching, thus increasing confidence in the robustness of the theory" (Tellis, 1997, p. Case Study Methodology) of CSRFs in HEI IT implementations.

Sample and Characteristics

Population

The target population for this study was student-service administrative employees of German universities implementing or had completed implementing a CMS past 2010. For this research, student-service administrative employees included employees of central or peripheral registrar`s and student service offices. This excluded administrative employees in departments of finances, personnel, maintenance, communication, and other non-direct student related departments. State-run HEIs that implement a CMS and finalized the project past 2010 or are in an advanced state of implementation provided the population. Excluded from the study were universities of art and music as well as HEIs not awarding doctorate degrees.

Sampling Frame and Size

Polkinghorne (2005) noted qualitative research does not focus reasoning on individuals or groups in numbers but on experiences and therefore a purposive selection of rich samples is used. The aim of qualitative research is to develop a comprehensive understanding of an experience or event. To achieve a description the sample should consist of "fertile exemplars" (Polkinghorne, 2005, p. 140) and "information-rich cases" (Patton, 1990, p. 169), which makes random or chance selection of samples not an appropriate choice for qualitative research. The purposeful selection of cases also includes the comparability of cases, the possibility to create aggregated and in-detail views of the participant responses, and the possibility to generalize parts of the findings (Gerring, 2007).

The German higher education system is going through major political, organizational, and educational changes (Degkwitz & Klapper, 2011; Toens, 2009; Welsh, 2010; Wiepcke, 2009). External and internal changes influence university decisions and implementations of new

IT systems to cope with the changes (Alt & Auth, 2010b; Kleimann & Schmid, 2007; Sprenger, et al., 2010a). German researchers and HEI staff have a growing interest in these IT changes, their management, and how changes affect groups of stakeholders (Degkwitz & Klapper, 2011; HIS, 2012; ZKI, 2012). The research area is wide because the German higher educational system is fragmented into multiple types of institutions including universities, universities of applied science, and colleges of art and music under state, private, or church control (Behrenbeck, 2011; Hochschulkompass, 2011). Additional differences include types of degrees awarded, student body size, location, types of IT systems in use, and the implementation of these (Alt & Auth, 2010b; Hochschulkompass, 2011; Sprenger, et al., 2010a; Toens, 2009; Welsh, 2010).

The study focused on the experiences of a specific stakeholder group during an ERP implementation at German universities. The aim was to gain an understanding of critical factors during and after a CMS implementation at selected universities, to describe factors in detail, and to identify shareholder-group specific CSRFs. German universities were identified through the website of the Hochschulrektorenkonferenz (German Rector`s Conference) (HRK). The HRK is a

> voluntary association of state and state-recognized universities and other higher education institutions in Germany. It currently has 267 member institutions at which more than 94 per cent of all students in Germany are registered. The HRK is the political and public voice of the universities and other higher education institutions and is the forum for the higher education institutions' joint opinion-forming process (HRK, 2012, para. 1-2).

The HRK`s higher education compass lists higher education institutions in Germany with additional information, including institutional control of the university (state, private, church),

right to award doctorate degrees, type of education (art, music, etc.), number of students, membership in the HRK, and contact information. The HRK`s list included a total of 386 HEIs of which 88 are state owned HEIs allowed to award doctorate degrees. Implications of ERP implementations at larger publicly funded universities may differ from smaller publicly funded universities and private institutions. Universities of applied science, private universities, teaching universities, religious universities, as well as universities of the arts were excluded for the purpose of this study because of their different internal structure and expected demands.

Ranking the remaining institutions by number of students, the top half of the universities was selected for further analysis. Of these 44 remaining institutions, ten matched the criteria of

- in the process of implementing an integrated CMS or completed an integrated CMS implementation past 2010,
- not in the first year of implementation,
- maximum driving distance of 450 kilometers (km) from the researchers' home location, covering the federal states with the most universities (BMBF, 2010).

To analyze experiences with CMS implementations the implementation should be ongoing or not completed before 2010. Older implementations may include previous software versions, fewer experiences with software vendors and implementation timelines, and interview partners may be more difficult to find because of the time elapsed. The findings of Kleimann and Schmid (2007), Breitner, et al., (2008), Sprenger, et al., (2010a), and Alt and Auth (2010b) added an increasing movement of universities toward selecting a CMS or multiple IT-systems to improve strategy, organization, and technology. The movement of German universities toward new IT systems provided by the market gained momentum in 2007 and 2008 (Hübner, et al., 2008; Johannes Gutenberg Universität Mainz, 2012; TU Graz, 2012b). Influencing the

movement were new IT developments, political and organizational changes both on the vendor side as well as on the university side, and additional universities searching for IT support (Honecker, 2012; Technical University Dresden, 2012; University of Stuttgart, 2012). The sample of the study included universities that have completed their ERP implementation since 2010 or were in advanced implementation stages.

CMS vendors in Germany stated the implementation time for a CMS as about 2 to 4 years depending on size of the institution, the modules to be implemented, and the organizational changes needed (Degkwitz & Klapper, 2011; HIS, 2012). To find experiences and CSRF for the newest standardized and integrated ERP software systems, the implementation should not have completed before 2010. This excluded universities implementing or using one of the vendors' non-integrated systems from this study. Excluded were universities using multiple specialized systems because they were creating an integrating CMS and not a single, integrated CMS. The four main vendors were all present within the remaining sample.

The Internet, university news pages, as well as CMS vendor pages, provided the information for the sample analysis for this study. Adding distance as a selection criterion and using Google Maps to calculate the distance to a university from the researchers home reduced the sample size. The distance of 450 km reflected half of the maximum driving distance of 891 km from the researchers home location to the university furthest away. This distance allowed the researcher to conduct the study within multiple-day trip and covered the area of Germany where most universities were located. The sample universities found through the criteria all offered full-time presence degrees except for one, which was therefore excluded from the study.

Figure 3: Framework of the subset of selected universities (not to scale)

shows the framework to arrive at the population for the study: German HEIs, more specifically universities awarding doctorate degrees were selected and ranked according to student body size. The largest 50% were inspected for an integrated CMS implementation ongoing or completed since 2010 and in driving distance from the researcher. This process identified ten universities who subsequently were asked to participate in this study. An information letter (see APPENDIX B and for a translation see APPENDIX C) was send alongside the permission to use premises form (see APPENDIX D). Eight institutions replied, two denying permission, three responding with interest but non-respondent on further contact, two not responding, and three universities agreeing to participate. The three participating universities implemented or were in the process implementing two of the four most popular systems and were located in three states of Germany. Their student population ranged between 18,000 and 29,000 students in centralized and decentralized student service centers supported students.

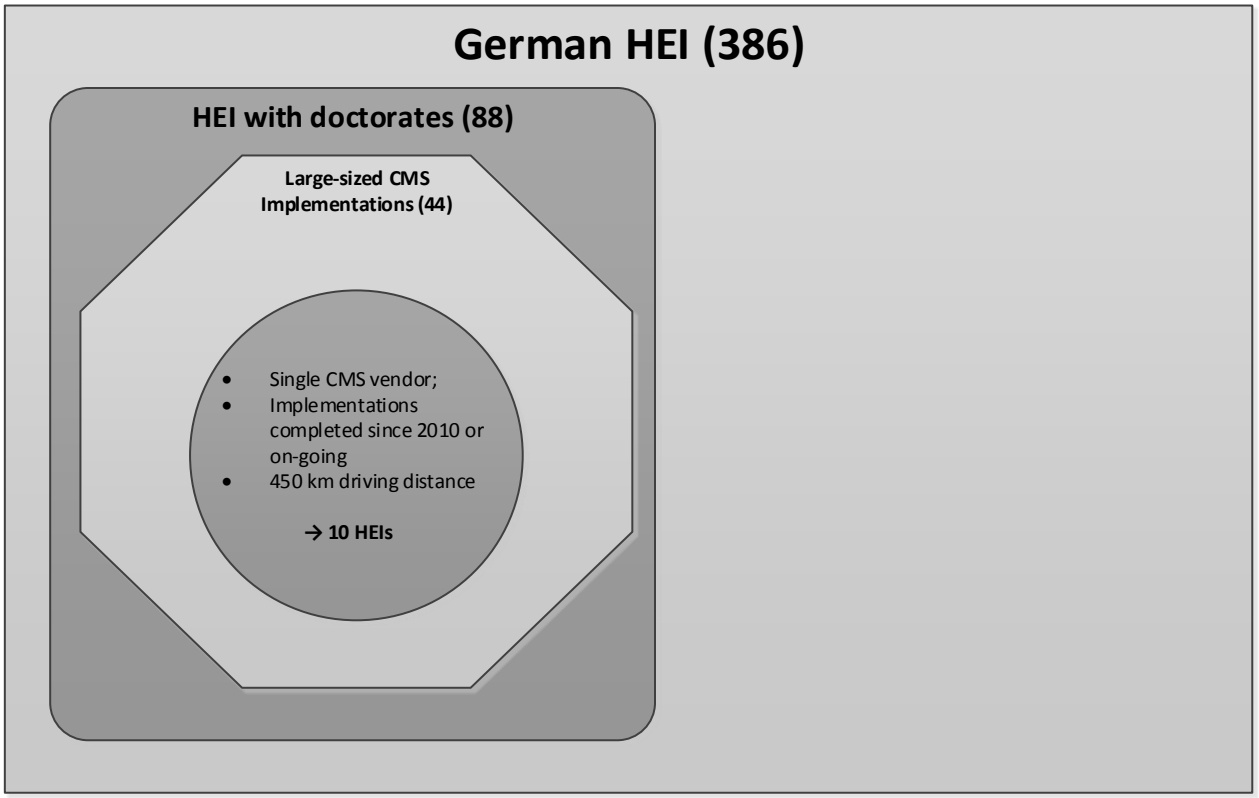

Figure 3: Framework of the subset of selected universities (not to scale)

The interviews for this case study took place at two of the participating universities U1 and U2. No interviews took place at U3. Interview partners were employees at the registrar`s and student services office. Saak (2007) and Pratt (2007) noted the importance of a project sponsor for a successful project. The connection with project leaders in the universities to identify a group of study participants fostered the success of the study. The initial point of contact, the chancellor of the university or the department head of the registrar`s office was asked to name a project sponsor with the required knowledge and status to support the researcher before, during, and after the interview process at the university.

Each university case was to have a sample size of five to ten employees or until saturation was reached. The sample size of each case varied dependent on the employee number

of the registrar`s or student service offices at a university, the experience status of the employees, and the employees willingness to participate in the study. The interview partners were selected to be in a staff position at the registrar`s or student office or similar units offering administrative services for students in the university. Interviewees were to be of non-managerial status and employed at the university for at least two years to have knowledge and experience about the previous system and the implementation. The study did not exclude interviewees who changed positions within the university during the two-year timeframe as long as they acquired knowledge or were engaged in the implementation process. Additional employees with less experience would have been included in the study if the two-year rule would not achieve saturation.

Accessibility and willingness of subjects may be difficult to achieve (Tellis, 1997). The point of contact was asked to provide a list of possible candidates the researcher then contacted. An email was send to the identified candidates, laying out the elements of participation and requirement (APPENDIX E), and the request to participate. Prior to the initial interview, candidates received the informed consent form (APPENDIX F and G) to explain the nature of the study and the interview process, offer an understanding of the data to be gathered, and inform the candidate about withdrawal rights. Interview partner solicitation occurred using information provided on university websites to discover different points of view in regard to social networks the initial point of contact may have employed when creating the list of interview candidates (Noy, 2008). U1 denied identification of initial or additional interviewees but agreed to provide a list of interview partners, all other universities allowed for further inquiries.

Research and Interview Questions

The guiding research question of the study was:

What are the group-specific experiences of non-managerial administrative staff during and after CMS implementations at German universities?

The semi-structured interview guide allowed respondents the opportunity to express their experiences with the CMS implementation. Experiences were personal and included social-emotional feelings that were open to interpretation as positive, neutral, or negative. Interpretation may vary between people, groups, cultures, and dependent on the timeframe, for example before, during, and after an experience. Personal and social experiences can influence future motivation, reasoning, and involvement as well as have (long-term) effects on a process.

The administrative department plays an important role within a university and with it can influence the success of an ERP implementation. Guiding the search for experiences was the question if there are experiences that can be summarized as specific success and risk factors within a university ERP implementation regarding administrative staff. Successive research questions included the description of patterns of experiences described by the subjects as CSRF, how they labeled these CSRF, and if administrative staff perceived a different set of CSRF during and after an ERP implementation than CIOs, management, and IT personnel.

To answer the research question, university administrative staff personnel in the student service departments, for example the registrar's office, was identified. Interview partners were employees at the university for several years and gathered experiences of the implementation and post-implementation time of the CMS. German universities are organized in individual ways and do not offer a standardized department definition. Employment of the interviewees was illustrated by offering student services in direct contact, mainly in the registrar`s office. Employees may have changed their position within the university over time through internal hiring or ERP process and organizational changes leading to different project-involvement

before, during, and after the implementation phase. Experiences with previous systems and projects, educational background, and type of involvement within the ERP implementation project may have influenced their experiences. The contact person named by the university was asked to identify the first interviewees based on the above criteria (see Appendix E). The snowball technique was to be employed to find additional contacts in case saturation was not reached.

The interviews consisted of individual interviews. The purpose of the 30-minute to one-hour individual in person or telephone interviews was to record a description of the interviewees' implementation and post-implementation experiences of the university CMS system. The aim of each interview question was to answer the overarching question: What are the experiences of academic staff members during and after an ERP implementation and how do the staff`s CSRF compare to CSRF by CIOs, managers, and IT personnel. The initial interview questions were developed through literature review (Dowlatshahi, 2005; Dues, 2010; Gattiker, 2002; Ifinedo & Nahar, 2007; Lapham, 2009; Pollock, 2003; Pollock, et al., 2003; Shah, et al., 2011).

Three authors influenced the direction of interview-questions:

(a) Sullivan (2009) questions regarding post-implementation, go-live experiences, and ERP use experiences were adapted to reflect implementation and post-implementation experiences. Sullivan focused on experiences of ERP student administration personnel after the implementation of the ERP system was completed. Her questions were the follow-up step to the study that focused on the CMS implementation period or final stages of implementation. The questions aimed at a different point in the project`s timeline. Sullivan`s follow-up and on-site questions provided leads for this study`s questions. The questions "Can you please generally describe the ERP Student Administration post implementation experience for your institution?",

"Would you describe your Student Administration system as being fully operational or are there functional areas currently being modified or under consideration for modification?", and "Describe your experience with the ERP Student Administration implementation." led to question 1.1 in this interview, asking "How would you describe the current status of the CMS implementation overall and in your specific area?" Sullivan`s question "What type of technical support did your institution use during post-implementation?" steered interview question 2.3 regarding help, support, and other internal and external support through leadership.

(b) Graham (2009) asked questions about personal involvement, perception about project success, and work changes in his multiple exploratory case studies. His question "Describe any operational change or impact upon your position responsibilities that occurred as a result of the ERP implementation project, and how you were prepared for any of the changes as a result of the ERP implementation project" influenced the development of interview questions regarding work impact (3.1 through 3.4). This study focused on the perception of impacts on personal work, department work, workload, and of future expectations of the implementation. Personal perception is expected to have an influence on the status of the project as well as on success of the project overall. Analysis of overall project success is however not a focus of study. Graham`s question to "Describe your thoughts and opinions on the ERP implementation project and the overall success or failure of the ERP implementation project" was used to create the question regarding the interviewees' perspective of the status of the CMS implementation project (question 1.1). The combination of personal impact, personal influence, and personal perspective of CMS project implementation status may lead to success and risk factors to support CMS implementation teams to implement CMS successfully.

(c) Pratt (2007) focused on CIOs and their responsibilities including IT leadership in academia. His study led to CSRF influenced by CIOs and IT leadership. This study does not focus on the CIOs perspective but on the perspective of employees within a specific department. Pratt's (2007) questions helped develop questions to understand the employee perspective of leaders within an implementation project. Questions 2.1 through 2.5 should lead to an understanding of organizational leadership as well as situational leadership, who and how leaders influenced the implementation process, and what additional resources and support registrar`s office employees would emphasize to lead the project to success. Understanding how employees see leaders and organizational leadership may support the project to develop project support, communication, and team engagement.

The interview consisted of 15 questions (see APPENDIX I and J), seven addressed the experiences with the CMS implementation, five addressed the perception of leadership, and the remaining three address the impact on the personal work environment. Because of the limited number of participants no pilot study was conducted but the first two participants were asked to provide feedback to the interview, the questions asked, and any other feedback they had. The feedback led to adjustments to some of the interview questions wording but no other changes.

Language

Polkinghorne (2005) presented an overview of the five qualitative traditions biography, phenomenology, grounded theory, ethnography, and case study but not in terms of their ingredients but on common use of language data. Language is a filter representing gender, skills, education, class, race, ethnicity, actions, and intentions. For this research study, the language of the participants is an important factor – the type of expressions and metaphors used are different, depending on the skills of the person in a language. Polkinghorne (2005) noted the interview

process should be adapted to the individual and with it to the individuals' language. Because the interviews took place in Germany, the interview partners' first language and language of communication was German.

The implications of German interviews are twofold: First, the German language environment has not been part of similar previous research and therefore offers a different cultural background and language expression of participants. The German language and the cultural and educational background may provide or lack expressions and metaphors that have or have not been identified within English language research. Second, the interview language was German. The researcher transcribed and analyzed the interviews in German, translating findings, and comparing the findings with previous findings in the English literature. The need for translation may have induced researcher bias but also highlighted a risk of losing information through translation.

The researcher was aware of the language challenge but is confident about the approach because her first language is German. The interview questions were translated into German and a linguist supported the natural translation process. Comparing results of the study before and after translation minimizes errors. To reduce researcher bias and mitigate translation mistakes, a linguist was included in the translation and evaluation part of the study.

Informed Consent

Orb, Eisenhauer, and Wynaden (2001) highlight the importance of participant autonomy to accept or decline to participate in a study. The recruitment process included questions for minimal personal information to identify the subject for future communication and background-fit to the study`s purpose. The subject received a written explanation of the nature of the study, the interview process, the risks involved, and a way to contact the researcher for additional

questions. A copy of the informed consent form (see APPENDIX F, G) was included in the information package sent to the subject before the interview takes place. Subjects' questions to clarify the research, the subjects' role in the research, and any concerns the subject had were answered at the time presented. The subject received adequate time to consider their decision by providing the study information and consent form before the interview was scheduled. To support the nature of the study and the interview process, there was a set timeframe for a denial or a reply to participate. This process of recruitment and screening allowed the study participants a thorough understanding of the study, risks, benefits, and rights.

Once the participant informally agreed to participate, interview time and location were set. Before the start of the interview, the informed consent form (see APPENDIX F, G) was read aloud in German for the recording and the participant signed the German form. The consent form summarized the information of the study, the interview process, and informed the participant about her rights to participate or not participate in the study. The subject received a copy of the consent form for their own records, including the "right to withdraw at any time [from the study] without penalty" (Orb, et al., 2001, p. 95) and the subjects' right to decline to answer questions. Contact information for additional questions and in case of withdraw from the study were provided with the consent form. Because the subjects' first language was German, the process and communication took place in German. The subjects' received a copy of the English and the German forms and signed a second German form kept by the researcher.

Participating universities provided a point of contact to inquire about interview partners. U1 did not allow the researcher to identify initial or additional interviewees; here U1 provided all contact details. Participants at U2 and U3 were contacted through the universities websites,

which provided email-addresses. The employment of the snowball technique was proposed to acquire additional participants.

Confidentiality

Ethical conduct is an important part of research and includes the acquisition, entry, handling, and storage of data as well as personal information (Orb, et al., 2001; Whittemore & Melkus, 2008). Many countries passed privacy laws to protect the privacy and confidentiality of patients, study participants, and other groups (Gershon & Tu, 2008). Whittemore and Melkus (2008) recommended the development and adherence to procedures to assure participants confidentiality and privacy. Gershon and Tu (2008) recommended the following safeguards of personal data:

- de-identification of data or, if de-identification cannot occur, the substitution of an encrypted unique numeric identifier for personal identifiers,
- stringent physical and electronic security of data,
- limitation of physical and electronic access to the data,
- cultivation of an atmosphere of respect for privacy and confidentiality, inclusion of confidentiality and data protection obligations consent agreements to be signed by the participant and the researcher,
- implementation of strict policies and procedures to handle, access, use, disclose, retain, and destroy data,
- assessment of potential privacy and confidentiality risks for every observational study,

- maintaining code lists and data files in separate secure locations (CITI, Assessing Risk in Social and Behavioral Sciences – SBR, When the Primary Source of Risk is the Data).

The qualitative study uses a tight description of the university selection process that may enable readers to identify the specific university in question. To reduce the possibility of identification, institutions were labeled in a random way using the Microsoft Excel randomize function. The master-list was kept in a password-protected file and a paper list locked at the researchers' home. The identification of the institution may lead to additional questions regarding research but also to analysis of the people involved. Information revealed or extrapolated from the research may lead to embarrassment, mixed feelings, and psychological distress. Interview partners were fully aware of this challenge before signing the informed consent. To reduce negative feelings and the possibility of identification of individual institutions and participants, a clustering or aggregation technique on the information gathered may be used. Participants' names and individual interviews were not shared with the participants' employer or coworkers.

One area without guaranteed confidentiality in is the subjects' behavior of sharing information with others. This includes the passing on of recruitment-information to possible participants. Confidentiality, security of data, and information provided are of up-most importance. The subject herself is responsible for paying attention to what data and information she shares within her private and work environment. The participants were advised of this situation before signing the informed consent. Participating institutions may ask for and receive a summary of findings of the research study.

Data Collection

The data collection took place in Germany at several German universities going through the implementation of a CMS or having completed the project-phase of implementing a CMS. Open-ended semi-structured interviews were used to gather information and an in-depth description of the experiences of administrative staff during and after the implementation process to find CSRFs. The interview questions in APPENDIX I and J provided data to answer the research question. Expected data included positive and negative experiences of administrative staff, administrative staff labels of these experiences, differences of experiences depending on the involvement of the employee, and interviewee categories of group-specific CSRF. Public information from university websites added an additional perspective and supported triangulation of findings because only a small stakeholder group was interviewed. The data analyses lead to group-specific CSRF and comparison with previous findings.

Before administering data collection, participants are selected, permissions gained, and an interview as well as a recording protocol designed (Creswell, 2009). APPENDIX H presents the interview protocol and includes a section of greetings and appreciation, a section with explanations of the study and procedures, and subsequently the interview questions as presented in APPENDIX I and J. Data collection and data analysis may occur concurrently, depending on the interview schedule set. A research diary and detailed notes on the schedules, communications, and personal thoughts reduced researcher bias during the collection and analysis phase.

Face-to-face interviews and possible follow-up questions over the telephone were recorded using two digital recorders, one being the backup in case the first fails. The recording technique applied to participants who cannot or do not want to attend a local interview but wanted to participate through a phone interview. Follow-up or clarifying questions evolved

during the course of this study and were asked either in person or over the telephone. The final study included all follow-up and clarifying questions asked in the summary of interview questions.

Data collection took place using German as the communication language because of the researchers assumption that participants were able to express meaning in more detail in their first language instead of having to struggle to find expressions in a second language that may be loaded with a differing meaning than they expect, an assumption also expressed by Polkinghorne (2005). Brown (2008) found in a study with students with a high level of proficiency in English, feelings of anxiety, shame, and inferiority exist during communication and when one expresses feelings and complex relationships. Many Germans speak English as a second language however personal experiences point the same direction as the findings by Polkinghorne (2005) and Brown (2008): People have a different ability to express themselves in English as a second language. Differences are not only word and expression-oriented but include metaphors, sentence structure, pauses, and non-verbal gestures. The fear of speaking in a different language may also contribute to a reduced interest to participate in the interviews and therefore may reduce the pool of participants.

Process of Transcription

The recorded interviews were transcribed verbatim using *NVivo 10*. The participant received a copy of the German transcript to check for accuracy and for any misunderstandings that occurred during the interview. The participants had the opportunity to remove statements they believed to include confidential or personal identifiable information. The approved version allowed for accurate analysis. The process included the transcription of the German interviews, the analysis, and coding using the original interview language German. Translation of selected

statements from German to English enabled a thick description of findings and themes. The final step was to compare English translations of the findings with previous English research findings.

The bi-lingual researcher translated the German transcriptions to English. A German-English-linguist completed the translation and translation analysis process to reduce researcher translation bias. The German-English linguist role was to support the verification of the transcript-translation to reduce researcher bias and changes of words and meanings occurring over time.

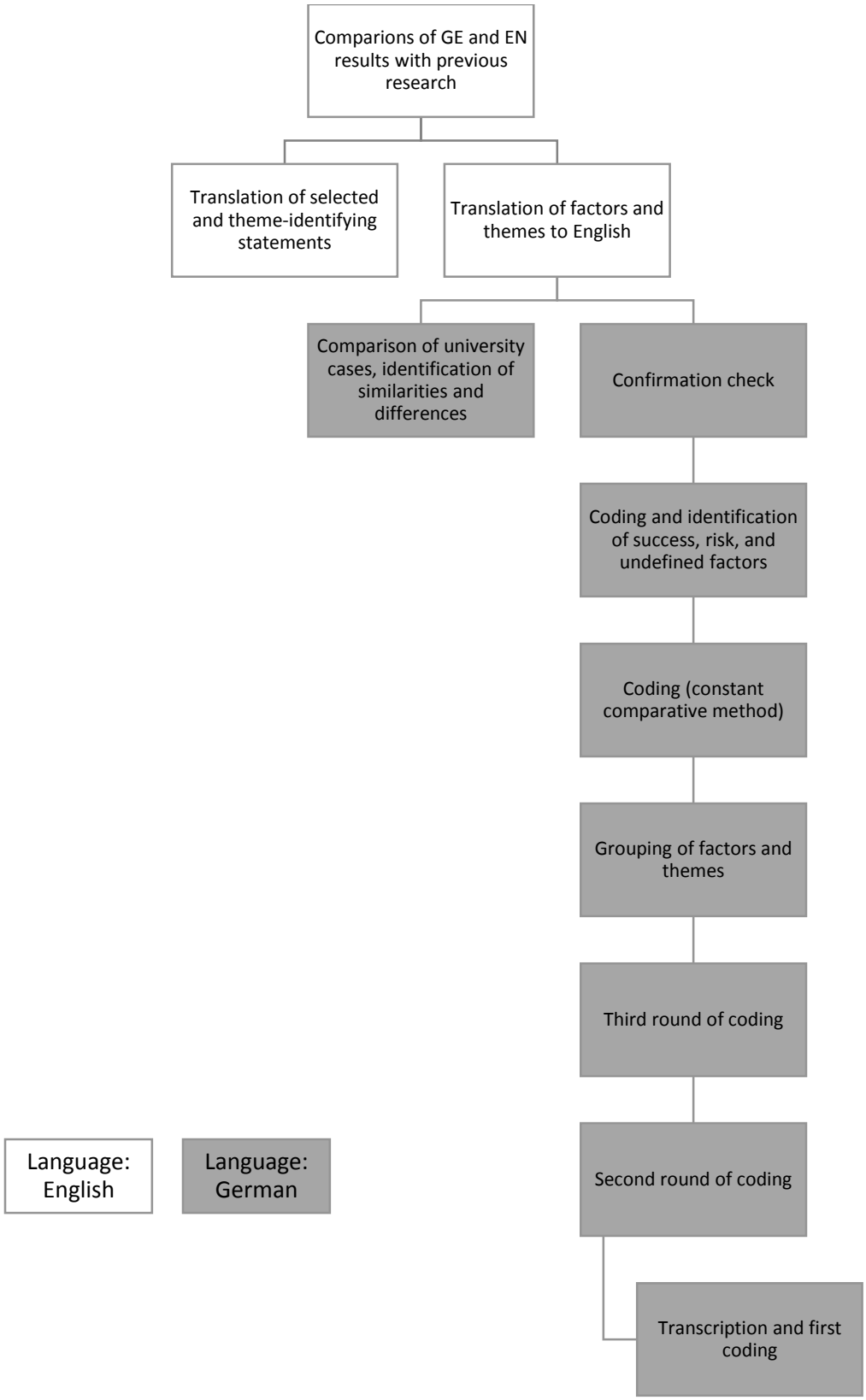

Figure 4: Transcription, translation, and analysis of data and research

Data Analysis

The process of data analysis followed a multi-step model as displayed in Figure 4: Transcription of the recordings and the first data analysis used the original language German. This process supported the naturalistic expression of participants in their first language. Analyzing the German transcripts also reduced translation-related differences in expressions. Multiple steps of data analysis created the basis for the translation of selected sentences and categories from German to English. This created the data foundation for comparison with research results from previous studies done in the English language. Following the translation there was a second round of data analysis. To find differences in expressions and possible cultural and language influences, German and English analysis and previous research were compared. Comparing findings of previous studies identified in the literature review section with the findings was the final step.

Times spent on transcription and translation as well as the time passed between translations may influence expression, transcription, and perception. The computer software *NVivo 10* supported the transcription and the first round of data analysis. *NVivo 10* offered support for transcription, coding, comments, and visualization (*NVivo*, 2013). The researcher completed the following rounds of data analysis, coding, and confirmation by hand in German. The next step was to translate keywords, factors, and selected statements from German to English and their confirmation by a German-English linguist. Using German throughout the multi-step data analysis process reduced translation errors and researcher bias. The final step was the analysis and comparison of factors and themes to previous studies.

Validity, Dependability, and Triangulation

Validity of a case study implies construct validity, internal validity, and external validity (Tellis, 1997). Construct validity is based on the subjectivity of the investigator and may be remedied by "using multiple sources of evidence, establishing a chain of evidence, and having a draft case study report reviewed by key informants" (Yin (1994) as summarized by Tellis, 1997, section Designing Case Studies). Internal validity and credibility of a study was achieved by ensuring that

> (a) the case study research question is clearly written, propositions (if appropriate to the case study type) are provided, and the question is substantiated; (b) case study design is appropriate for the research question; (c) purposeful sampling strategies appropriate for case study have been applied; (d) data are collected and managed systematically; and (e) the data are analyzed correctly (Baxter & Jack, 2008, p. 556).

Yardley (2000) identified similar characteristics as elements of good qualitative research, including (a) sensitivity to context, (b) commitment and rigor, (c) transparency and coherence, and (d) impact and importance. Shinebourne (2011, p. 26) expanded on these characteristics: (a) Sensitivity to context includes sensitivity to relevant theoretical literature, to socio-cultural contexts of the study, to participants involved and their individual experiences and understanding, to the choice of method and rationale for adoption, and attention to detail during analysis of raw data and presenting citations from participants to validate results deducted. (b) Commitment and rigor may be achieved through a prolonged engagement, an immersion into the topic, and by thoroughness, appropriateness, and completeness of the cases. (c) Transparency and coherence may be achieved through clarity and in-depth description of the stages of the research process, including participant selection, interview schedules, interview protocols, and

description of the stages of analysis. Arguments should be presented without ambiguities and contradictions. Resulting presentation should fit the research question and the perspective adopted by the author. (d) Impact and importance are the final factors to highlight the usefulness for the reader. External validity presents and explains how study results are generalizable beyond the studied case (Tellis, 1997).

The study introduces credibility and internal validity in multiple ways: The study was set in a different regional, cultural, and language context, which requires literature explanations as well as detailed analysis of data gathered. The engagement with the participants included prolonged personal interviews and required additional follow-up questions during the interview based on the answers. Participants checked their own interview transcripts for errors, omissions, and changes regarding identification. The small sample size reached saturation and with it credibility when participants presented themes and phenomena repeatedly. Immersion into the different cases was necessary in order to understand the historical and cultural background and to achieve thoroughness and completeness of the case descriptions. Employing process descriptions, schedules, and protocols to create the transcription, translation, and the different steps of data analysis offered a transparent and replicable design. Independent variables cannot be controlled in this study and therefore internal validity and drawing of conclusions may be limited (Cavaye, 1996). The use of an exploratory multiple case study included the replication of the research logic at multiple universities and enabled the researcher to match patterns, therefore creating a limited internal validity. Because of the small participant number and their purposeful sampling the exploratory multiple case study findings may not be generalizable. Selection of multiple universities, variation in participants, and the thick description of cases did improve transferability to other schools, universities, and CMS implementations. Validation of

the results occurred by comparing results of the case studies within the larger case study, and by comparing the findings with findings of similar research studies.

Dependability of the research was achieved on the one hand by using a case study protocol, including the overview of the case study project, the field procedures, the case study questions, and the outline of the case study report as suggested by Tellis (1997). The support of a linguist improved translation dependability of findings. Multiple analysts may have different opinions on coding and analysis. Yardley (2000) highlighted the element of subjectivity in interpretation of data and noted that pre-defining guidelines for the coding process may influence and limit the interpretation of experiences. To enter the data analysis phase with an open perspective and using an inductive approach, there were no pre-defined coding strategies. A double-loop analysis occurred by comparing the original language findings with translated findings and these findings with previous research study findings to increase reliability.

Triangulation is a verification technique which involves "the process of corroborating evidence from different individuals (e.g., a principal and a student), types of data (e.g., observational field notes and interviews), or methods of data collection (e.g., documents and interviews) in descriptions and themes in qualitative research" (Creswell, 2012, p. 259). No pilot study was conducted because of the limited number of participants. Interviewees were asked to provide feedback to the interview, the questions asked, and any other feedback they had. The feedback led to adjustments to some of the interview questions wording. Triangulation included the comparison of the two university cases within the larger case study, publicly available online resources to add a triangulation perspective from university public relations, and previous literature of CMS and university ERP implementation experiences. Using multiple sources of

evidence as recommended by Leedy and Ormrod (2010) and Yin (1994, 2003) enabled the researcher to check the data and findings and to create a stronger, more convincing conclusion.

Summary

The purpose of this qualitative study was to explore administrative staff experiences during and after the implementation of a CMS at German universities to identify group-specific CSRF. Previous studies analyzed experiences of CIOs, managers, and IT personnel within the English-speaking HEI environment. There has not been a detailed investigation of possibly differing perspectives of administrative employees and different cultural and language backgrounds. The qualitative methodology was appropriate to identify nuances and complexities of the implementation experiences a quantitative study may not find. The multiple exploratory case study offered a replication of the study logic in multiple environments, offering more generalizable results than a single case, and enabling a more reliable comparison to previous research findings.

To gather in-depth data of administrative staff CMS implementation experiences, a selected sample was developed including German universities homogeneous in size and within an advanced state of their CMS implementation. Interviewees had direct contact with students, for example at the registrar's office, worked at the university during the implementation process, and worked in a non-management position. Participants were informed about the risks and benefits as well as confidentiality and privacy procedures of the study. The 30 minute to one hour interviews took place in-person and over the phone and included questions addressing the experiences with the CMS implementation, the perception of leadership, and the impact of the CMS implementation and changes on the personal work environment. These data were

confidential by following confidentiality and privacy procedures, including de-identification of data, physical security of research documents, and clustering of data and findings.

The interviews, the transcription, and the first analysis of the gathered data took place using German language. Using German enabled the participants to express their experiences and feelings within their language and cultural background. Transcribing the German recordings and analyzing the data offered an unbiased analysis of the data as no translation errors occurred for the first analysis. A follow-up translation and analysis enabled the comparison of findings within the study and with previous research findings. Validity and dependability of the study was achieved by using multiple cases for evidence, establishing a chain of evidence using *NVivo 10* software, using interviewees for self-review and a linguist for translation review, and comparing the non-translated and translated findings with each other and multiple previous research findings.

Chapter 4

Results

This qualitative case study explored administrative staffs' descriptions regarding the implementation process of CMS systems, actions affecting the process, and process improvement recommendations. The descriptions identified and explored group specific CSRF for CMS implementations. The interview participants of the study were staff members with registrar's offices, performing administrative functions, and with direct student contact of two German universities in advanced stages of their CMS implementations.

Chapter 4 contains the description of the results of the interviews and has the following structure: First, an overview of the study participants followed by a description of the data collection and analysis process. Second, the identified impact factors and sub-factors described using the participants' statements, followed by recommendations' provided by the participants to improve the CMS implementation.

Participants

QRM approval occurred on December 14th, 2013 and full IRB Board approval was received on May 30th, 2014. Initial email requests went out in June 2014 to 57 people generating 24 responses. Ten responded positively, six of whom participated in the interviews while seven provided additional explanation in their email-answers why they were not willing or able to participate. The participants consisted of three females and three males, with three participants from each of the two participating universities. To ease reading and to protect the participants' anonymity, the male form "he" refers to persons of both genders in the following text. Non-participant explanations came from five females and two males with four from U1 and three from U2. All email requests send to U3 were denied or unanswered except for one for

participants from U3 were denied (seven people) or unanswered (11 people), the one contact stopped responding after initial contact and agreement to participate. Two people reported they did not have time to participate in the study. All participants had a higher education background with at least equivalent to a Master's degree up to a PhD. The average years of experience in the registrar's office field was 13 years with experience ranging from 5 years to more than 20 years. The average number of students served through participant's registrar offices was 1,900 with a range of 200 to 2,700. Participants worked in peripheral registrar's offices or in an office, combining study, and registrar's office either for a department or for a specific degree type or program. All interviewees had direct student contact with face-to-face service times, telephone, and email contact.

Table 1

List of All Participants per university

Demographics	Participation per university					
	University 1		University 2		University 3	
	Yes	No (*)	Yes	No (*)	Yes	No (*)
Females	1	5 (3)	2	10 (1)	-	15(-)
Males	2	2 (1)	1	4 (1)	-	4 (-)
Webform/Office-email	-	2 (-)	-	9 (1)	-	- (-)
Participation Percentage	25% (58%)		12% (23%)		0% (0%)	

* = Explanation for non-participation sent via e-mail

Data Collection and Analysis

The six participants agreed to be interviewed using a semi-structured interview process between June and July 2014. With the exception of one phone interview, all interviews took place at the office of the respective participant in German, their native language. The five in-person interviews and the telephone-interview had a length between 53 minutes (telephone-interview) to 1 hour 51 minutes (first interview) with an average length of 1 hour 19 minutes. The interviews included three sections with 4 to 8 open-ended questions each about the participants' experiences regarding the CMS implementation and daily use. Participants received the interview guide and the informed consent a day before the interview. Because of the limited number of interview participants, no pilot-study took place. The first two participants provided feedback on the interview and the interview questions to allow for possibly adaptation in future interviews. Answers led to a change of wording regarding the status of the implementation process in question 1.2 to include past and present, and expanded question 2.5 to include the project in its current status. At the end of the interview, all participants provided feedback about the interview and the interview questions. The researcher digitally recorded the interviews and transcribed them using *NVivo 10*, a qualitative data analysis software.

The transcription process initiated the first step in a seven-step data analysis process. The researcher highlighted keywords and key sentences in *NVivo 10* during the transcription process as a first collection of themes. Once the transcriptions were completed, interviewees received the transcript to mark personal details that would have compromised the participant's anonymity. The researcher eliminated the personal details from the transcript to ensure confidentiality. Because of the small sample size further analysis and coding was done by hand. The researcher, highlighted a second view of the keywords, adding comments, observed gestures, and salient

intonation contours of each participant during the interviews, and reviewed the resulting transcripts. A comparison of the two lists of keywords occurred and similar keywords and characteristics became clearly identifiable. Step three of the process began when the researcher reviewed the data a third time looking for potential patterns in the data and the relation to the research focus. Step 4 included the search for groups of data pieces that cluster together into impact factors and themes. Step 5 was a second round of coding known as the constant comparative method. Step 6 provided needed, continued coding to solidify findings and explore the meaning of the relationship between the codes, including success, risk, and undefined factors. Step 7 was confirmation, which included verifying the correspondence between the findings and the data. To minimize translation and analysis errors, the researcher analyzed the data in German, using the German transcripts as well as German keywords and theme names. Final keywords, themes, and impact factors as well as selected interview-passages presented in this research study underwent translation from German to English and verification by a linguist.

Impact Factors

The analysis of the interview responses presented 13 impact factors:

Participants from U1 provided insight in the implementation of the IT system in use as well as the CMS implementation, whereas participants from U2 focused on their experiences with the IT system in use because the selection phase for the new CMS was put on hold.

University as a Specific Organization, Internal Politics, and Culture

U2P2 noted German universities are public institutions and not commercial enterprises. Participant U2P4 highlighted the uniqueness of German universities by saying "if the university was a market-oriented organization, it would have gone bankrupt already, plus what is mainly missing in the university is that no hierarchies exist to this effect." U2P2 painted the registrar's

office as “an administrative unit which is traditionally limited to reacting (…) [and] not necessarily a unit with much agility or starting many activities.” Participants often presented factors touching upon multiple internal university areas that lead to CSRF for a CMS implementation because of resulting challenges and expectations through the complexity of factors within the university environment.

U2P2 expressed the need for decisive management and leadership because “not making any decision is the absolute worst [decision] of all.” U2P2 also highlighted how important bite and endurance is in the project, saying, “some [people] use unfair means in order to interfere,” recruiting specific agents, and using threats to stop the project or changes.

Tradition, individuality, university rights, professorship culture, and the hierarchical structure of German universities lead to challenges during the CMS implementation. U2P2 expressed the ambivalence of the hierarchical structure not being in the decision making position, but making decisions. U2P2 circumvented decision-making, leading to some extreme and conscious actions by colleagues. U2P4 highlighted the words tradition and individuality of people. Participants connected the word individuality to professorial structures and to the term “ivory tower in teaching.” U2P4 presented individuality as a risk factor because of individuals blocking processes and IT changes and missing possibilities of enforcement within the university and within the CMS project. U2P2 noted the university created an overprotected environment where employees develop a lack of personal responsibility. Restructuring the university processes created challenges because releasing employees is difficult. Stakeholders like schools, deans, and professors can step out of line and block change, leading to “a system where only a generational change brings change [which] is an incredibly phlegmatic bunch” and where one can “act on one’s attitudes” (U2P4).

U2P4 pointed out the requirement for hierarchical and delegation requirements during the CMS implementation and thereafter. The risk is that people do not know "who is responsible for what and who has to initiate what processes" (U2P4). The risk exists not only for people but also upon the roles, people have. Leeway and freedom for institutions and degree programs are additional problems faced by the university because of less-strict rules and enforcement (U2P4). U2P4 highlighted for example the leeway of the president of a school to bring just their degree program into the system instead of creating clear guidelines how degrees should be structured and implemented in the system. U2P6 expressed that it is a political question and "one can and does not want to standardize everything," because it increases work, the law keeps it relative, possibly confusing, or the university and school culture does not think it is required.

U1P7 highlighted cultural understanding by degrees and schools as a factor in CMS implementations. U2P2 noted when he started with the implementation of the old system in his degree area, many people kept saying, "this cannot work for us, we have very special needs." U1P6 also explained their degree is special regarding the registrar's processes. Noting special needs are real, U2P2 verified the IT system in use is adaptable to the degree's needs and they implemented many features. Whereas U1P7 expressed harmonization and standardization as important and understandable goals, he expressed the need for the CMS team to understand that not all requirements originate from within the university and its culture but external agencies, the state government, or laws and regulations impose requirements on the university. The university and with them the IT vendor have to "hurry up" (U1P7) and meet internal as well as external needs and requirements.

The requirement for generational change to let change enter the university structures also leads to the risk of missing and losing information and knowledge (U2P6). U2P4 highlights the

question “weather the one who was trained is the next one who makes a decision.” On the other hand, U2P4 notes that one problem is that “one takes too little time to think about the introduction of certain things” and things change or additional requirements come about on short notice before going to production. U1P6 expressed “tradition should not just be thrown overboard” because changing presentation of degrees, departments’, and schools has a radical impact on the public image and on accessibility and understanding by external stakeholders. Instead of focusing on technical possibilities and requirements, he calls for balance of the whole stakeholder base.

Resistance behaviors were also present regarding administrative engagement. U2P2 noted it is “the reality and tradition of conducting exams versus what the lawmakers really want” and that opposition was present in the academic area and within the registrar’s office itself. U1P4 expressed the feeling academic employees do not want to be told what to do by the administrative department leading to difficulties implementing laws, regulations, and IT processes. U2P2 reported there were “typical cases of people slowing down progress” that enjoyed their stand-alone solutions and traditions.

In addition, because of legal changes and additional requirements, the administrative departments within the universities have grown over the last 20 years, leading to cumbersome reactions to changes (U2P4) and differences of competences and identification (U2P6). U1P4 and U1P7 highlighted the development of manual as well as technical workarounds within the IT system or by using alternative IT platforms, creating data security, and process completion risks.

U1P4 noted responsibility is taken away from the registrar’s office and academic personnel receive tasks with higher responsibilities but do not have the training and experience the registrar’s staff has. The new hierarchical structure is ineffective because it does not foster

direct communication between the groups. The implementation of student coordinators in many subjects merged some higher responsibilities previously held by the registrar's office to the new coordinators. U2P6 noted that student coordinators present an additional academic group in a position to inform students but they were not as educated as the registrar's office employees were and this lack of knowledge lead to miscommunications and repetitive work. U2P2 said many upper academic employees say, "I want to know everything that is going on. I just do not want to be the one to do it." This hints to the fact that there is a culture of hierarchical delegation within the academic environment of the university, leading to the need to inform and train many more people than are actually working the system.

Engagement and Expectations of Stakeholder Groups

U1P6 explained the need to communicate early and down to the lowest employment levels because "those who work with it [the system] in the end are those at the lowest positions, (…) a system gets imposed on them, (…) and they don't understand the new one." Participants reported multiple ways of engaging stakeholder groups in the CMS implementation process, including e-mail newsletters, stakeholder meetings for internal groups, and workgroups. U1P4 reported changes in the engagement of the registrars from regular meetings of all registrars' members to only selected people in addition to a reduction in e-mail information. U1P4 expressed interest in an increased engagement into workgroups and the implementation process but felt left out and disconnected because of the subject area and a peripheral office without close ties to the CMS team. U1P6 understood the difficulty and effort of taking and keeping all employees engaged in the process but the imposing of multiple new systems, the CMS being one of the systems create a threat for employees, making them feel overwhelmed and anxious.

U1P7 stated his position introduced an electronic means of work using the IT infrastructure in-place to transfer administrative work for the degrees. Similar intentions led to the recruitment of U2P2, to reform the degree, to improve processes, and to ensure regulation enforcement. U1P7 reported the requirements and expectations for his position grew over time and expectations were increasing for the new CMS, keeping him engaged in the process from early on. In addition, U1P7 expected to be involved in the degree-development from early on to explain to the CMS team how and why things should be done differently this time compared to the IT system in use.

Participants expressed expectations for their own work as well as for other stakeholder groups. Positive expectations for the system regarding students included improved access to personal data and functionalities, compression of services from multiple systems into a single one, and less organizational requirements (U1P7, U2P6). Participants also expressed concern regarding problems for students during the merging of functionalities, impatience, panic induced by missing functionality or different user-masks, lack of attention of students (U1P6), panic when something does not happen instantly (U2P6), possible reduction in customer orientation, freedom of choice, and provided services (U2P2), and the complexity of degree and organizational requirements overall (U1P6, U2P6). U1P7 expressed worries about internal and external stakeholders demanding more data and statistics and creating pressure to receive such partially sensitive data. For U1P4 the expectation of the system is not only about the IT-implementation of the degree regulations but about the daily work requirements and about how the system can improve daily routine work.

U2P2 reported there are “people slowing down progress, who sit someplace in the university and say ‘I have developed a database system for me back then and it is working and I

want to keep it and [the other system] can never do what I want anyways and that is why I am blocking [the new system]'." U2P2 explained further, calling the project a success means the system should accomplish all the current processes done outside of the system. U1P6 also highlighted the area of customization for the user as an important factor, focusing on customization with the users and the users being present during the customization process to engage them actively. U1P6 furthermore expressed his belief that locally developed solutions through the local team and with the local users improve the speed and fittingness of solutions and reduce costs by not involving the software vendor or consultants.

Complexity

U1P6 noted that complexity increased because of a higher number of students, an increase in degree programs, mergers of departments, and the grandfathering requirement of old degrees. U1P7 questioned the need for different systems and vendors and said "so many different systems and in the end problems and requirements are likely to be always the same." Even with specialized degrees across German universities, it is likely that processes do not differ much, everyday work is similar, and programmers are probably facing similar problems (U1P7). U2P2 on the other hand noted, "one very important characteristic of such systems is that they cannot be implemented in a standardized way and then be tailored to everybody's needs."

U2P6 and U2P2 participated in the project group at U2 to create a functional specification of the system requirement for the new CMS and expressed the results as "an omnibus volume" (U2P2) stretching all schools and most operations of these and the administrative departments. U1P4 noted for the future registrar's employees may need to understand more of the system features than required for the registrar's jobs themselves because of the hierarchies, structures, and dependencies within the system, with multiple stakeholder

groups, and functions. U2P6 mentioned with an increase in system complexity the registrar's office as well as academic employees would need to learn the system in a broader and in a more detailed way. U1P6 expressed the system is "relatively complex until one understands what you have to access in which way." U1P7 stated, "the whole system is also way too complex to really comprehend it completely." U2P2 on the other hand expressed the "setting of the parameters in a system as the final instance is not a problem if I know the parameters [and learned the program]." Broader knowledge requirements lead U1P4 to believe that more training would be required and communication streams need to be improved.

Complexity, requirements, and costs of the CMS implementation project brought university leadership "to its knees," making no decision but recommending to "keep watching the market and expand your functional specifications" (U2P2), and return in a year or so. U2P4 hinted along the same lines the "system is extremely complicated, it stays so complicated because one wants to refrain from the idiosyncrasies of the degree programs, not refrain from the flexibility of the degree programs. On the other hand support [for the degree programs by the software vendor] was extremely problematic [because of these idiosyncrasies and the flexibility]." U1P4 expressed the feeling that U1P4's specific degree area was dropped to make the implementation process easier and because the implementation team did not understand the degree and the requirements.

The size of the system and the size of the university challenged the project team with complexity not only of the system, its features, and its adaptation to local requirements but also with the go-live-process. Participants of U1 and U2 reported a subject-by-subject and degree-by-degree implementation and successive feature implementation. This allows the implementation team to adapt the required components and support group by group. However, it also requires

that multiple systems run in parallel. Parallel structures lead to complexity for routine processes of the different stakeholder groups as well as to IT complexity regarding data exchange and modification. Parallel structures also increase the workload on employees, the ones in the IT implementation team as well as administrative and research employees using the systems. Even within systematic implementations, U1P6 expressed that certain modules have to be implemented "all at once, one cannot implement a piece or something, [the module has to run at time x and] will surely be a time-critical object". Time-critical implementations may lead "to quite some extra work when there is all the sudden no functioning system (U1P6)."

Security, Reliability, and Accessibility (Roles & Rights)

Participants commented on the daily use of the system and the requirement of availability of the system. "One is of course very dependent on the whole [system], thus if something does not run then I basically cannot work, that is clear," expressed U1P7. If the system does not work, no one can work and the employees with customer contact are the first to 'feel the effects' by receiving requests from students and university employees (U1P6, U1P7, and U2P6). The registrar's office requires system availability because of their system-dependent work and the CMS and IT teams need to ensure adequate availability through breakdowns, power failures, software-updates, and changes (U1P7).

U1P7 noted the time-intensive involvement in troubleshooting when finding errors, but highlighted their dependence on the system and the necessity for system reliability because they would have to "return to the stone age" otherwise. U1P7 expanded on the importance of system logic reliability by saying "system logic is most important for me, that it is comprehensible to some degree." U1P7 added, it is possible that other systems than the one in use may be easier to use and highlighting the limited knowledge of other systems as well as being "much like a

prisoner within the system." U1P6 said errors and problems with the system and with the mapping of degrees "affect the employees in the registrar's office. In the end, they are the ones losing out; they are upset every day and have to do the things somehow by hand."

Multiple participants (U1P4, U1P7, and U2P6) highlighted data security. U1P4 noted that data protection rights hinder the implementation of a student picture feature within the system used by the registrar's office and their state counterpart, leading to an increased exchange of paper files to communicate outside of the system. U1P4 elaborated on this by stating that the problem may not result only from data security concerns but from a lack of roles and rights within the system: a student picture is available within the system but it is not available for the registrar's office. At U2, U2P2 noted that a student picture is not a major requirement at the start of the system; implementation may be possible at a later point, and he did not point out any security concerns. A tighter connection and role-adjustable availability of available data were important to U1P4. U1P7 focused on data security regarding statistics and personal information and highlighted to keep data private and confidential, and not to give every bit of data out to someone asking for it. U1P7 saw a risk of increased interest and pressure in data and statistics collected in the system by university employees, students as well as by external stakeholders. U1P7 hinted at the huge problem of system security regarding hacking attacks and reported that the office was keeping paper files for sensitive data along with the data in the IT system.

U1P7 expressed his interest in role descriptions and rights management, including "who gets to view which things and who can do something with this system." U1P6 expressed the importance of rights and roles for the new system because in the IT system in use "the management of access rights is not good or it is designed in a way that you are either allowed to do everything or nothing," leading to process-difficulties and increased centralized work in order

to reduce errors. U1P7 noted the design of roles, rights, and presentations are in the beginning phase whereas the system changeover is supposed to begin within the next three months. Accessibility and resulting rights to enter and adjust data worried U1P7 because of changes made in error or on purpose, which is a reason for him to limit access to certain system features. U1P7 wanted to keep the circle of access to the system small because increasing access is not necessary and to limit challenges. New roles would however transfer work from the registrar's office to peripheral stakeholder groups, freeing capacities in the registrar's office for other things (U1P7). Error handling and tracing were therefore an important factor for U1P7 when more people received access to the system. U2P2 noted that location-independent accessibility by students of personal data and personalized degree information was important to the project, adding that while data migration was very complex and error prone, students offered a layer of data verification.

U1P4 highlighted the peripheral registrar's office "is always handled as a minor matter [by management] even though the most important data are here" and added that some of their registrar's office data were on local hard drives instead of on the network because the IT team and management have not initiated a migration. U1P7 mentioned critical moments for both the registrar's office and the university together when processes and artifacts go awry, for example, when degrees with incorrect information are mailed and have to be called back.

Process and Work Changes

Several participants highlighted previous and ongoing process changes not related to the introduction of a new CMS but as consequences of different IT systems, reformation projects, increased number of students and subjects, differences in university internal processes from registrar's offices, and the university-specific implementation of the Bologna Process (U1P4,

U1P6, U2P4, U2P2, U2P6). U1P4 presented the use of a learning platform easing communication between professors and students as an example, leading to the publication of grades without the knowledge of the registrar's office, which lead to challenges in the students' program progress. U2P2 was recruited to reform the degree including procedural and technical changes and expressed a discrepancy between reality and regulations, which had to be corrected even without new technology. Such process and regulation adaptations were "unsexy" (U2P2), leading to a "lack of acceptance" (U2P2) and internal divisions. U2P6 reported doubling of work because of the Bologna requirement of a successive degree structure for a Bachelor and Master Degree and additional process requirements, for example for transcripts and verifications. U2P4 highlighted that without the Bologna Process there would be no need to introduce a new IT system. U1P4 reported that responsibilities changed and more responsibilities transferred to newly created academic intermediaries, leaving U1P4 with basic work and reduced motivation. U2P6 also hinted at the changes with the introduction of academic intermediaries in contrast to the upgrade and improvements of registrar office employees with higher relevance jobs, responsibilities, and payment. Reducing the perception of study laws and regulations with the importance of the registrar office may lead to dramatic changes when registrar office employees retire or leave (U2P6).

Interviewees talked about proposed process changes for the new CMS and the effect these changes had on their area of work. U2P4 noted a change over time from the goal to create one process for all areas toward the development of multiple harmonized processes. U1P6 highlighted that "some things [namely processes and system functions] may not have the same level of importance for everybody." The project team learned about cultural differences and requirements between degree programs through discussion and workgroups and has to provide

multiple IT solutions for the different processes (U2P6). This approach eased the political pressure and aligned with the individuality and flexibility requirements (U2P6). However, it also led to challenges for subjects that draw on multiple degree programs and therefore have to follow multiple processes (U2P6). U1P4 reported that, even though there were standardized processes, exemptions and exceptions for students seemed to become increasingly the rule, leading to difficulties in recording these changes within the standardized IT system structure. U1P4 and U2P6 found that the predicted paperless office did not come into effect with the IT system but instead increased the need for additional paper and electronic records to sufficient exceptions and preserve information for possible future communications.

U1P6 recalled that their previous local system offered timely customization to new requirements, their degree team made these adjustments, and that the registrar's office and the degree is therefore relatively well-structured and very active regarding the system. The CMS team handled the process of adaptation and customization for the new CMS, leading to increased communication with the team (U1P6). However, resource constraints also led to longer waiting times for requirement-fulfillment (U1P6). U2P6 also criticized a too long customization period.

Participants highlighted a change of the communication process with students from personal contact to more system contact (U1P7). The system does not provide 1:1 counseling on specific student challenges, leading to an increase in high-maintenance visits of students to the registrar's office (U1P4, U1P7). Participants noted that the system offers mass-services and reduces their work through decentralization of certain functions (U1P6, U1P7, U2P2), for example the input of grades through the teachers instead of through the registrar's office or the self-service functions to print transcripts by students. U2P2 explained that after initial freedom of choice course selection and resulting problems: the degree and the project team started to

reduce available choices within the system, fine-tuning the system with their experiences. U1P7 explained that certain processes were shifted to the student side reducing work at the registrar's office and institutions, for example the electronic enrollment for exams from any computer around the world instead of having to hand in paper registrations locally. U2P6 reported that the system increased the workload because meetings with students became more complex and required the students' data from the system as well as paper or e-mail based information stored in separate files. U2P2 highlighted that they enabled online visibility of student data to improve student satisfaction with the system, which also resulted in a fast correction of data repositories and then reduced registrar's office work to verify degree requirements manually.

U1P4 and U2P2 highlighted that processes and procedures are adapted within universities but certain subjects have interconnected processes and procedures with government agencies and other universities. Cooperation with different HEIs from different countries creates similar challenges, including issues of language, corporate design, grading systems, and exchange of personal student data (U1P4). Adaptation and changing of such processes and procedures should occur on both sides of the connection. U2P2 also expressed the need to find ways to reduce work by identifying similar processes for the same student at multiple universities, i.e. through implementation of a common system for all participating degrees. Moreover, governmental and cooperation requirements must not be overlooked while implementing an IT system as otherwise side-systems may have to be developed, discouraging the use and reducing the efficiency of the IT system.

U1P7 mentioned speed as a major change: "the system is of course also advantageous because everything goes very fast, you can get numbers [statistics] very fast." Convenience and the ease of planning while making strategic decisions were two additional changes highlighted

by U1P7 because data within the system was readily available, accessible, and transparent instead of spread over multiple archives and thus involving a work-intensive collection process. U2P2 explained they reduced processes execution time immensely by including the data in the system and creating a logic workflow. While there was some resistance, accepting the system proved advantageous in this instance, reducing the workload from 30 minutes per student to a single mouse-click (U2P2).

Management and Leadership

U2P4 notes "the whole [CMS project] stands and falls with the awareness of the president and the administration of the dimension of such a project and also based upon the management capabilities of such a project." U2P6 explained, "Actually, I have no idea who the project leaders are in my university." U1P7 highlighted the need for university leadership to know and understand the experiences of the system and the project to make strategic-political decisions. U1P7 however also expressed "the less they [upper management and leadership] notice, the better the system runs" because often only problems are communicated to the upper management and leadership levels.

> U2P4 highlights that German HEI ERP implementations lack clear hierarchical orders,
>
> …you cannot recommend [something] to a professor, you can of course tell him you have to do this now this way, but then his secretary is going to do it or one of his staff members. There are always possibilities to break out of the very clearly structured examination processes that we have now and still to do everything in a completely different way (U2P4).

Participants focused on more leadership and explicit decision along the lines of 'we do this now' instead of long-lasting discussions (U2P4). U1P6 noted that university management and

leadership sometimes fight academic departments, and academic departments often oppose the influence in subject-internal businesses by university leadership and management. U2P2 expressed that some decisions, including decisions for the CMS implementation, have to go through five hierarchical decision levels, each posing a 50:50 chance for rejection, and sometimes hindering the innovation process.

Within the hierarchical structure of the universities, handing down certain implementation related information regarding trainings, participation, and timelines did not always occur (U1P4). Additionally, U1P4 felt the registrar's office "is always handled as a minor matter" and does not receive proper attention, financing, and personnel. Additionally management expects administration and their processes to work and somehow it does indeed work (U1P4). U1P7, on the other hand, stated faculty and university management and leadership have only a basic understanding of how the system works and states that they "should steer it in a way, but basically they want to know as little as possible about it because for them it is just part of the administration."

Communication

Participants highlighted the theme of communication throughout their interviews and pointed-out the importance of the availability of information, open and honest communication, and the accessibility of communication partners. The following sub-sections present the three communication sub-topics: internal communication, external communication, and implementation related communication.

Internal communication. Universities have a multi-level communication structure. Internal communication includes the employees of the administrative as well as the research division, the education division, and the students. Substructures of internal communication exist

for example in administration through multiple departments including IT and registrar's office, in research through levels of schools and institutes, and students grouped by their respective study subjects.

U1P4 reported the internal communication between academics and administration has changed, leading to additional hierarchical levels of academics and administration only allowed to request information or action from the lower levels instead of initiating direct communication. Additionally, U1P4 noted that changing regulations and interpretations of degree structures over time were not communicated with the registrar's office, leading to questions including who is responsible for decisions, who informs whom, who is executing which parts of the process, and what led to confusion of where students were sent to answer specific questions. Implementation of new subject programs may even occur without direct knowledge or involvement of the registrar's office (U1P4). U2P2 noted that communication with academic staff has to include communication about the degree regulations and required work processes to improve legal certainty.

Another factor presented was communication between registrar offices. U1P7 explained that communication between registrar's offices is important but is often lacking similarities because "the overlap is *so* [emphasis added by the participant] minor." U2P2 also expressed the advantage of starting later in the implementation process of the CMS, his degree was "lagging behind" but could take advantage of previous experiences and create a reforming project. Communication between upper management and administration presented another area of influence to the CMS project. U1P7 noted communication with upper management and leadership often only included problems with the CMS system.

U1P4 highlighted the need for increased communication with students from both the university side for common information as well as for subject/degree specific information. Students do not know the specifics of their subjects and they seem to have greater problems finding the right people to talk to for correct information. U1P4 articulated the students' positive responses to having a personal contact and go-to-person. The slight differences between degree types and subjects make it difficult for an educator to differentiate students within their courses coming from different degree lines as well as explaining the differences of passing and failing exams and other information (U1P4). Central and peripheral registrar's offices distribute such information but because of the specifics it were often not well understood, regulations and results are misinterpreted between administration and education, or even changed without notification or recognition of the change between the two groups, leading to a "bickering over responsibilities" (U1P4).

External communication. External communication includes interested students, businesses, cooperation partners, as well as vendors of software products, services, and the legislative body. Participants highlighted the need for a single, user-friendly information platform, designed to provide easy access to the IT-system. U1P6 expressed his resentment of the new proposed public image of the universities' degrees, schools, and hierarchical structure in the new CMS, saying that in his view "it is not coordinated with the required committees" and only tailored to the pilot degrees. Before changing the traditional public image of the university, there should be an active discussion throughout the university (U1P6). On the other hand, U1P6 formulated the need for the system to include as much information and communication as possible to not have to search across multiple systems and websites.

Several interviewees highlighted the need for communication with other universities as well as state administrative institutions and for exchanging student data including exams and grades. U1P4 noted that the requirements of these external bodies are often not available within the university IT system and no automatic data exchange can be initiated, leading to manual initiated communication and exchange of files. U1P7 and U2P2 expressed that often a system and its artifacts, i.e. transcripts, look very similar and communication and cooperation may be advantageous to the cluster of university-users.

Implementation related communication. Participants did not only focus on the technical aspect of the CMS implementation but highlighted the organizational and political factors as well. Multiple participants did not understand the reason for embarking on a new implementation process, especially because the IT system in use does run "not so bad" (U1P6). Participants U2P4 and U2P6 identified the Bologna-Process as the reason for a new system and its implementation within German universities leading to a multiplication of work, getting each student through two degrees with two files and processes to go through as opposed to only one degree and file before. U2P4 offered an additional perspective on the implementation of a CMS: the achievement of process standardization and automation, as well as the general standardization of work, procedures, and data collection. U2P4 noted before the system was implemented "everybody fiddled around (…) a bit like [in] Sodom and Gomorrah" and it is the advantage of such a system to make such things more visible and transparent (U1P4, U2P4).

Because of the size of the organization and the multiple stakeholder groups' communication is an important factor, as has already been noted above. All participants highlighted the need for improved communication throughout the CMS implementation. U1P4 and U1P7 noted communication often occurs with the wrong people or finding the right

communication partner is difficult. U1P4 said, "I often do not feel addressed" by invitations and emails and U1P4 hinted to separation of people and groups. U1P4 mentioned previous regular meetings, with a larger number of participants, were converted into "centralized [meetings], thus only selected people from certain areas can go there" and information only comes "bit by bit." U1P6 explained, "I do not know if there was a real platform for exchange [with the team and in between users], but I always think that even if it was existent, I would not have noticed it anyways." U1P4 reported a lack of communication about trainings and workshops taking place locally, at other universities, or at the software vendors. At U2 on the other hand, participants reported being engaged in the process analysis phase and U2P6 stated, "anyone who was somehow in these processes was able to participate [in the workshops]." U2P2 also noted these workshops were "very exciting, took a lot of time, and had no impact on immanent work, though we got to know the different degree cultures, how extremely different they are."

U1P7 stated the need for improved communication by the CMS team and programmers informing more often and more explicitly about program changes and possible impacts on their work areas. Missing communication about implemented changes sometimes led U1P7 to assume the occurrence of technical problems or errors, which were in fact program changes and adaptations. U1P6 experienced a lack of communication regarding solutions, positive changes, and adaptations of the system, leading to a repetition of errors or mal-programming. Communication from the registrar's office to the CMS team also included problem and error reporting and explanations for the wrong system behavior, leading to subject specific knowledge transfer. U1P7 expressed the need for more communication regarding the complete degree-programming process: "I know how our degree program is supposed to run, how I have to

administer everything, how it has to be at the end, and how it should be studied, but I cannot program it. And they can program it, but they do not know the degree program."

U1P4 expressed the need for more communication with the base, i.e., with the people actually using the system, instead of talking to higher levels and managers who do not use the system on a daily basis or at all. U1P6 commented, "(…) this is certainly a difficult thing where you also have the feeling, while, the central level is trying to inform us a lot now," highlighting afterwards that there is not enough communication and understanding of requirements and semester time constraints. U1P7 emphasized communication during the implementation phase because "if communication and information is running smoothly and is understood, then the system runs well. If the system is not running well, then there will always be problems and I do not believe this has much to do with the system." U1P4 would like to see the decision makers for the CMS implementation in the actual user base and not in upper management because often upper management decisions are not feasible leading U1P4 to say "Hello! Not like that." Expansion of communication to all schools instead of just the pilot school and more specific and bundled information were two additional factors named by U1P4 whereas U2P2 highlighted that it may take several semesters for the information and communication to trickle into all areas.

U1P7 explained that reachability of CMS team members is important noting, "if I could always reach one specific person in the CMS team, I would have fewer problems." U2P2 noted that while CMS team reachability is important, the local team members within the same degree program have to work well together and be reachable at any time, too. Participants U1P7, U2P6, and U2P2 mentioned knowing someone with close ties to the implementation team or within the implementation team positively whereas such missing contact led to slow implementations or stagnation of the process (U1P4) because problems and challenges were not resolved. U1P6

implied that an IT employee within the same faculty supported the project, creating close communication-ties by knowing the implementation team members, having "one foot more in the door," and becoming more sensitive for problems and their background, and leading to a constructive exchange. U1P4 reported connections to a former faculty coordinator for the IT team, which helped to remedy some unsolved problems and provide information about the CMS implementation project. Under communication of internal or external changeover of CMS team members also led to support requests by U1P4, who noticed the absence or unavailability of previously available and knowledgeable team members. U1P4 noted the inquired employee kept the support up to reduce the strain on their previous team but communication of the change would have been the better choice.

Trust

Multiple participants did not receive communications for embarking on a new IT system. U1P2 answered, "over time, I learned only to become engaged when I was 100% sure it would happen and the way it would happen." U1P4 noted, "only yesterday at a meeting I started to really realize that [the system] will be now implemented." U1P6 highlighted the new system has been announced for at least five years but "basically one always laughed it off until now, thinking 'it will never come' and now all of a sudden it will be coming very fast." Apart from the registrar's office trust in management, in leadership, and in the system implementation, U2P2 noted that the registrar's office and the CMS team has to build trust in order to realize process changes and use of IT functions. Changes and new functions create opposition and the registrar's office and the CMS team "has to push the envelope (U2P2)," including making some disliked decisions.

Trust and communication of leadership was a primary concern of the participants. One side is the perception by employees that management and leadership do not want to make any mistakes, they are fearful and therefore put projects on hold (U2P2). On the other hand, registrar's employees understand and approve of a hierarchical decision and saw improvements through the implementation of the pre-CMS system (U2P2). However, U1P4 also expresses reduced trust in leadership and management by referring to the project timeframe, highlighting that "within this long timespan it [the IT system] could certainly have been implemented better." U1P6 verbalized his perspective of the implementation as "it does not sound as if everything is running smoothly" hinting at problems in the implementation and communication process. The CMS team told U1P4 the introduction of the new system would take place school by school, to which U1P4 jokingly responded, "yes OK, so until [my] retirement."

Trust is also highlighted by U1P4 regarding responsibilities for correct IT implementations and correct mapping of the degree programs. U1P7 emphasized that "one has to rely too often on the statement [from the CMS team and] (…) accept it (…) because I cannot comprehend it." U1P4 does not want to take the fall for wrong or lacking areas within the CMS, as U1P4 has no education related to IT or CMS implementations. In addition, U1P4 perceived not been taken seriously throughout the old IT implementation and noted this feeling reduced trust in management and in the CMS team. U1P4 also expressed skepticism and dissatisfaction because "to all intents and purposes it [the system] was supposed to bring easement but I cannot detect easement." U1P6 noted that while many people have expectations for the system "there is of course the expectation that it will not be right. That not everything promised will work. I think everybody is thinking this way about the system because it has been postponed too often." U1P7 also expressed skepticism saying, "what I always wonder is whether I have less work

because of the system or more, ultimately I cannot answer that." U1P6 noted the delays "let the feeling arise a bit that it all [the implementation and transition] is not as easy [as expected] not so much better nor very easy to transition to." U2P2 on the other hand trusts his university and believes that his colleagues will consult with him before making decisions, implying that if trust in this decision making process was not present "I would have a very different problem." U2P2 also expressed trust by the school dean into him and his skills, saying he "actually [had] somehow been given free hand."

Implementation Team, Team Composition, and Sustainability

U2P4 highlighted that competence of the project members is an important factor and U1P6 noted that getting in contact with the team is very important and a working team is an important factor for a CMS implementation. With the knowledge about and within the IT department, U2P2 expressed being "in good hands" and U1P6 noted that competence of team members increased over time. U1P4 indicated CMS team members should be aware of their lack of specialized knowledge and ask the specific stakeholders for help, especially to develop an understanding about subject and degree specific background knowledge and processes. U1P6 expressed problems with customization requests because the local CMS team could "also not program many things themselves." U1P7 noted that difficulties during the implementation phase included different approaches in programming by different team members and over time resulted in errors and a difficult and long search for the reasons for the error. In some instances, U1P7 had to explain the error and the results of the error to the programmers, who then had to correct the problem. Finding and explaining errors was work not expected to be the responsibility of the registrar's office (U1P7). However, U1P7 noted that if he knew how to program the system the CMS team would be obsolete and if the CMS team knew the subject's specifics U1P7 would be

obsolete, leading to the understanding that communication and interfaces within their work are very important. U2P2 expressed the division of labor between the CMS team and the registrar's office works well, and regular consultation with U2P2 for faculty specific questions takes place. U2P6 said that because they grew together as a team, everything is working out well.

U1P7 mentioned working together with the implementation team on an almost daily basis because many areas need adaptation, programming for new, and existing degrees in their registrar's office. U2P6 depicted the requirement for a "permanent line" in certain phases and for certain problems. Because of time constraints, some adaptations started early and finish slowly, then are overrun by reality when all of a sudden everything has to be changed immediately (U1P7). Reaching CMS team members is another important factor. U1P7 expressed that "if I could always get in touch with one specific person in the CMS team, I would have fewer problems but (…) he is not only there for me but also for others." U1P7 voiced a preference of a single point of contact for personal CMS support, and stated that "fewer people who know [the system] in detail" instead of many people who do not know the problem and system in depth.

Participants from U1 and U2 noted that the project had a skewed start and it took time to establish the implementation project, especially because only one person was knowledgeable and the project ran the risk of being stuck in case of illness, death, or a job change. U1P4 reported it took more than half a year to replace the first person for the team that had resigned rather quickly, leading to a slow start of the project. U2P4 mentioned one new appointed employee per department supported the implementation of the old IT system. However, problems regarding financing occurred when the initial phase of central financing ran out. U2P2 highlighted, that

their project manager actively engaged in recruiting competent people, leading to the development of an effective team.

U2P4 talked about the extended team as a university-wide workshop and working committee, meeting on a regular basis and adjusting the IT system in agreement on the common requirements. U2P4 stressed the time spent on the adaptation, "which things should be written where and how are things to be labeled and so on" improved the system and usability and reduced consultation requirements. Schools employing IT personnel or IT savvy personnel speaking the IT project language developed an advantage in communicating with the project team. U2P4 hinted at the great work and communication with the implementation team by stating, "we speak one language and also see the necessity of certain things." Whereas U1P4 described the difficulties of no direct contact to the implementation team, no IT personnel within their faculty, and the lack of understanding and knowledge about abbreviations and systems that the project team seemed to require.

At U1, for U1P4 and U1P7 the most important person was a certain person in the CMS team, U1P6 expressed no specific person within the team because U1P6 connected to the most competent person for his question every time, noting the team is the important factor. At U2, participants U2P2 and U2P4 highlighted the same key person within the project team whereas U2P6 noted his local IT-expert as the most important person. U2P4 added that the most important person is taking a key position in the implementation and that it takes a key person to fill that position. Importance was determined through project knowledge, university overview, competence, and communication skills. The person was "the life preserver (…) without whom we would not have pulled it off (U2P2)." U2P2 added the person is a networker, looks behind the backdrop, and is much like a "spider in the middle of a web." U2P2 noted that within his

degree area there was not only a contact person responsible for technical decisions but also a contact for content decisions.

Participants underscored the need for "a working support (…) without having to ask and beg for it (U2P4)." U1P6 expressed the need to use up-to-date technology for communication with the support team, including remote desktop support to improve the understanding and learning for both the support group as well as the registrar's office employees. Furthermore, participants U1P4, U1P6, U2P2, and U2P4 would like to have more IT project team involvement regarding future required functionalities, including introduction to, development of, adjustment to, and education of system parts for the registrar's office. U1P6 highlighted the need for the IT team and the registrar's office to know each other and to learn from each other in order to create understandable and efficient mappings of degree programs in the end.

Software and Vendor

Participant U2P4 called the software and systems in use a cryptic monster and complicated, U2P2 described it as "not very sexy," and U1P4 gave a school grade of D to F. U2P2 expressed that "every system has its own very very specific system logic" and any system will require training. U1P7 pointed out, "all universities really do their own thing." Moreover, U1P7 explained that one of the system's difficulties are the variables used within the software and that over time the registrar's offices requirements change or divert from each other but variables cannot be adapted to the new requirements and processes. Working with the system for a long time, participants reported systems and silo thinking (U1P7, U2P2), i.e., U1P7 stated that "by now I think in terms of the system, of course, but I would say that (…) if I did not know the system, then one would not think that way."

U1P7 reported hearing many complains and predictions of system changes at conferences but expresses the complexity of the system by saying "but in the end something real has to be realized or represented by the system and there will always be difficulties of implementation no matter which program is used." U2P2 said the market for CMS in Germany is "rather small" but a university cannot buy something fitting out-of-the-box. U1P7 noted that no system is the philosopher's stone out of the box and U1P4 expressed that local effort needs to be put into the system to ensures it improves over time, similar to a fruit that ripens at home in the right conditions (U1P6).

Participants recognized the need for an IT system because "without these systems we could not administer the degree programs anymore (U2P4)." U1P7 noted, "sometimes I feel a bit trapped within this system (…), it is a double-sided affair. On the one hand, I like to work with it, but sometimes, if it is not working, then it makes you tear your hair out." Participants U2P4 and U1P7 added that though there are new IT systems available most are not a real alternative to their system in use. Interviewee U2P4 highlighted, any type of system may present challenges "because the individuality of organizational processes and the structure of the degree programs is so complicated and so complex that no system succeeds in mapping them easily." The different perspectives of software vendors, university administration, and university education staff create a divergence and power play between adjusting the degree programs and university structures to the CMS and adjusting the CMS to the requirements of the university (U2P4) as well as software vendors' capabilities and capacities (U1P6).

Unique functionalities of universities often require adjustments to and customization of CMS. Administrative employees in the registrar's office believe altering the code within the system to create features that are not required by system is important. U2P4 noted customization

makes the system fit to the universities culture, language, and terminology, to the requirements of local laws and degree program requirements, as well as to the needs of central and decentralized stakeholders. U1P7 expressed the importance of communication between different stakeholder groups and the programmers during the implementation phase because it is not the program itself out-of-the-box but the customization to the location that leads to project success. U1P6 indicated that some software vendors do not put enough emphasis on customer service by saying that "one does not always have the feeling of being a premium customer." U2P2 noted that support and customization after the initial implementation phase offered a stable employment for the software vendor, offering chances also for smaller software developers and consultants. U2P2 described the political quarreling about and between software vendors as a risk. "Universities are depended on reliability and somehow also on continuity" and organizational and political problems of software vendors create "a strong level of uncertainty also of the users and so on" (U2P2). U2P2 expressed the need for trust between the university and the software vendor and it takes a lot of active cooperation to create trust while it may be lost easily through unsolved challenges.

Usability was a topic for participants U1P6, U1P7, and U2P4. U1P6 and U1P7 highlighting the future system should be more user friendly, self-explanatory, easier to grasp the visual data at the first glance, easier to use, and easier to personalize. U2P2 indicated that the system should be 'dressed up' a bit better to improve the level of acceptance by stakeholders. U1P7 added that the system presents challenges regarding unwanted visibility of data for example real-time visibility of entered grades when the final was not fully graded leading to students calling in to demand information. Situations like this when not remedied by a technical

solution engage the creativeness of employees, including the development of workarounds (U1P7).

Training

U1P4, U1P7, U2P2, and U2P6 expressed they like to learn new things and that they would like to work with the new system. U1P7 underscored the importance to learn to use the system efficiently because counseling and support would not be possible without the system. U2P2 stated the importance of early training and U1P6 expressed the idea of an early sense of achievement, i.e., by well-designed screens and self-explanatory functions. U1P6 also regarded a self-explanatory system as one way to reduce the need for training and improve overall success while it eases the readapting phase. U1P4 voiced the need for more and longer training, in order to internalize the system, and to understand the background of the system, processes, and subject related implementations. U2P2 indicated that they should receive in house training again and position themselves better. U1P6 noted that while training is important, "one notices many things only through interaction [with the system]." Training should also include features U1P4 had previously not used in the system to create an understanding of the complexity and connections for the new CMS.

U2P2 stated there was training for the lower level personnel and upper management was not included in the training, but later upper management came to U2P2 to ask for additional training so they would understand how the system worked. U2P2 noted the training requirements multiplied even though upper hierarchical levels often do not work with the system, they did want to have an overview of the system. U1P6 reported good information and training but a lack of communication of positive developments and modifications with the registrar's offices. A lack of personnel probably led to a lack of courses to refresh or update ones skills

(U1P6). Communication about trainings and workshops available locally, at other universities, or at the software vendors did not reach participant U1P4, because his supervisor did not forward the email. Sustainability and availability of training was also a point highlighted by U2P6 who said that because they were late in the implementation of the old system, they did not receive much training and had to learn on their own instead of in an organized context.

Resources - Finances, Time, Personnel

Management and leadership have to understand, communicate, and initiate resources. U2P4 connected good management, clarity of purpose, and the setup of the project, and added that "certain amount of money has to be put in, such and such people, such and such positions, and from the beginning one should think about the leeway you give to people and how to handle things, then the project will not run so hesitant." U1P4 reported problems with the IT implementation within their degree program for almost two decades, a period more could have been done in.

Investment- and implementation costs connected to complexity and system requirements of the CMS implementation project brought university leadership "more or less reasonably to its knees" according to U2P2. System specifications grew and spanned multiple business areas of application, leading to high costs and effort expectations (U2P2). While U2 halted the implementation process to focus on additional market monitoring, U2P2 expressed the need to make a decision at some point in the future to invest into upgrading the IT system in use or implementing a new CMS. Once there was a final decision and the system implementation completed, the university viewed the software vendor as a partner. U2P2 expressed his perspective on the relationship between the university and the software vendor in financial terms with the words, "[after the decision is made,] they [the university] do not look at the money (…),

how high the support-costs are not important any [more]." U2P2 highlighted the chance for smaller software developing houses to gain access to the HEI CMS market, a chance also for universities to migrate to smaller, CMS-developments with iterative programming cycles in close connection to the university's needs.

The shortage most often named was personnel connected with financing and time. U2P4 stated the decision makers did not understand the reason to spend money on certain positions or additional employees, leading to system implementation with too low a staffing ratio. Additionally, according to U2P4 schools reasoned, "we never wanted to implement this [system], therefore we do not feel up to putting money into the [schools] budget to pay for that, university president you have to take this [in your budget]." U1P6 expressed the registrar's offices at the university "are different with regard to their personnel, also how they are doing things, and how positions are paid." U1P6 also noted, "the better the staffing the easier it is to realize something successfully." U1P4 and U2P6 explained the decentralized registrar's offices have many advantages; however, a disadvantage includes no substitute during vacation, trainings, and illnesses. U2P6 highlighted the problem that "work is now even more unevenly spread across the year," leading to an increase in peak periods and stress with fewer chances to take vacation or trainings.

When there was a need for additional personnel, they received short-term contracts and contracts were not renewed or not renewed in time resulting in high turnover (U1P4). Non-renewed contracts also lead to university internal relocation of personnel: U1P4 reported a team member changed position internally but kept supporting her previous team members to reduce the team's pressure. When no additional personnel were employed, work was distributed using the "resources present" or "there anyways (U2P6)" principle: those who are employed are

believed available and received the work on top of their previous workload, leading to resource and time constraints, especially in smaller institutions. Some institutions created positions through "creative financing" and U2P4 recommended you should better not check the financing of these positions because financing comes from projects and other sources, not necessarily following the regulations for proper employment. Participant U2P2 who reported working with minimal personnel also felt shortages of personnel and there were times during the implementation of the IT-system where they "were on their last legs," his mailbox exploded, and it was "really a very very hard time to get through somehow." U1P7 expressed reaching CMS team members was another important factor, saying that "if I could always reach one specific person in the CMS team, I would have fewer problems but (…) he is not only there for me but also for others." U1P7 added additional personnel is "naturally always a question of financing" but U1P7 believed, that CMS team members had "very very very very much to do" with the IT system in use and the implementation of the new one.

Available positions within the university area are challenging to fill and lack correct funding (U2P4). U2P2 positively pointed out more positions offer part time work with home office possibilities. U1P4, U2P4, and U2P6 noted the positions in institutions are often equipped with research staff. Research positions are easier to create on short notice and for shorter terms but research staff frequently fluctuate, and create long-term challenges regarding administrative knowledge and tasks. Administrative staff on the other hand, possesses specific administrative knowledge that may be beneficial following processes and procedures, and understanding laws and regulations (U2P6). However, these positions are long-term and more difficult to create especially in the face of governmental savings measures.

Time is a factor highlighted by multiple interviewees (U1P6, U2P4), including the lack of time to explain requirements and the length of time it takes to adapt or develop subject-specific requirements. U1P7 noted that questions regarding roles, rights, and presentation are just starting and the system changeover is supposed to begin within the next three month. U1P7 expressed time-pressure regarding programming of degrees: "one can never test all cases that daily life offers" but there is the requirement for the system to work or to be adjusted quickly to match reality and law, leading to critical moments as soon as a degree goes live. U1P6 experiences a lot of burdensome work with the initial entrance of data into the system. U2P2 observed that, even with a high presence of communication and training, it took two passes for the degree and the related staff to adapt to new regulations and IT changes. U1P6 expressed that it took time for the support and for the registrar's office team to build up a system and process competence, leading to many problems in the beginning, but improving performance and communication over time.

U1P7 articulated time and resource constraints for system testing. Within the test-environment, only the CMS team had access and administrative rights, leaving them to test for errors whereas U1P7 would like to support the team and to test developments more. U1P7 estimated that more personal engagement and understanding would have helped in several cases in which only an interim solution was used. Resource constraints regarding finances for future developments was highlighted by U1P6 saying they can neither use personnel to do their own programming nor do they have money to spend for consultant or vendor customizations.

Improvements and Recommendations by Participants

U2P4 emphasized key positions and support positions within a CMS project, requiring competence, communication, time, and organizational talent as a key success factor. In addition

to these key positions, stakeholders working with the system have and need distinct competence levels, leading to differing job descriptions and profiles (U2P4, U2P6). Management and leadership need to gain an understanding of job descriptions and profiles, including possible skill and payment changes from the previous system to the new system (U2P4). U2P4 envied universities that were able to create multiple new positions and a support team along with them to serve the whole university. Such a support unit may have not worked at U2 as schools may have said, "we do not want to be taken care of" in a centralized manner (U2P4). U2P2 expressed that it is great when "more of one's knowledge can be distributed over [more] heads." However U2P2 added, "I see [added personnel] not as so important because I would not know how to supervise them" but it is more important to increase and repeated training and improve internal structure of the registrar's office.

U2P2 explained they did not migrate any data for their second implementation phase for two reasons: first, it is a very short degree section and second, their experience with migrating almost 100,000 data sets and recognizing afterwards that more than 50% was "junk." U2P2 therefore does not want to migrate any old data but "update everything bit by bit" and recommends this procedure for other scenarios. Furthermore, U2P2 recommends making the decision for a new CMS system depended on the requirements and goals of data migration, answering the question "what do we do with our stock of old data" early.

Some registrar office staff reported supporting subjects with a high interconnection between multiple degree programs, with other universities, or with governmental institutions. These employees are interested in additional standardization between the different internal and external participants to reduce work and errors (U1P4, U2P4). U1P4 and U2P4 recommended stricter guidelines for the degree implementation in the IT system early in the implementation

process. Both recommendations lead to a higher involvement and increase future-oriented thinking by management and leadership including clear outcomes and orders. The interaction between different degrees and institutions also mandates a regular communication and update of used procedures and IT functions (U1P4).

U2P4 and U1P7 suggested taking a closer look at other universities, their systems, and processes. U2P4 highlighted, unlike his own university, East-German universities have gone through massive changes since the reunification of Germany, including organizational and personnel changes, leading to internal reorganization and a fresh start similar to younger German universities. Analysis of successful change and IT projects may support the decision and implementation process. U1P7 asked, "who for example has the system that we have," expressing the need for more information about the CMS as well as from the vendor to increase cooperation between the system's users. Increasing cooperation between registrar's offices within the university and with registrar's offices from other universities as well as between university programmers and team members of the CMS project could benefit process and solution development (U1P7, U2P2). U1P4 offered the idea to enable exchange of data between universities and other state institutions by either knowing the other institutions system, allowing data exchange, or even using the same system and therefore reducing requirements of change when internal structures change and reducing repetition of work. Cooperation and exchange would offer not only an overview of the different and similar IT systems but also a new perspective of 'things' (U1P7).

While participants highlighted the need for an all-encompassing CMS (U1P4, U1P7), some recommended a more integrating CMS (U1P6, U2P2, U2P4) and others noted examples of less-known software vendors and developers (U2P2, U2P4). U2P2 and U2P4 noted the

possibility to use a small software development company instead of one of the large CMS vendors combined with a rapid application development process, creating tangible results within weeks, an approach used by some statewide IT projects. The process is "very refreshing (U2P2)," offered quick wins, and active influence from participating universities and institutions early within the development and implementation process. Each type of development participants drew attention to would, however require adequate personnel, finances, and leadership support.

Creating efficient and available support and IT development structures was another recommendation provided by participants. U1P6 expressed the idea of a communication and exchange platform, a Wiki, and help functions for users and IT personnel, sharing information, knowledge, new functions, tips and tricks, and best practices but exposed the problem of employee time to search for and write such posts within the platform. U1P6 noted being sometimes blind to new information leading to the need to "rub it under people's noses" and make the information stand out. U1P4 highlighted that in their faculty "IT support is done by everyone who knows a bit and it is rather neglected while it would be important in many areas (U1P4)." U2P6 noted, "teams work best if there is only one person in charge of one specific field." U1P4 emphasized the idea of creating a faculty CMS position or expanding the centralized CMS team with more personnel and more faculty-individual contacts. U1P7 also presented the idea of adding faculty related CMS positions but retracts it as "wishful thinking" and that too many people may lead to "not so much creative input." U2P4 gave prominence to the importance of the IT team saying, "basically, there need to be stronger people within the IT department who are really responsible for and competent within those systems [not just dealing with them] on the side." U2P2 remarked dedicated employees, who want to be recognized as an

active partner, are important, and are not recognized for their contribution by the faculty. Activity leads to the creation of support structures, connections, and invitations for participation (U2P2).

Interviewees remarked, implementation of processes often occurred under time pressure and the implementation team should allocate more time. Adding additional time ahead of an implementation or go-live process offers more time for a thought process about changes and adaptations as well as better testing not resulting in changes once something is already live (U2P4). How this time is used depends on needs of system's users as well as on the decision and implementation process of the new system. U2P2 believed it took time for the system and functions to be accepted everywhere, similarly "not everybody using their ATM card." By now, many processes have become routine in U1P6's and U2P2's office even though U2P2 noted some people fought long against it and some are still accepting the use of manual processes and computer process to accomplish a task to keep their procedures up. U2P2 and U2P4 highlight the need to stop and review accomplishments, where the program, the team, and the university are with previous changes, and then analyze the destination and vision. U1P6 voiced the idea of a change-halt, too, saying that changes have been going on over years at multiple system-construction sites, the same employees are affected, and some people are losing their enthusiasm, their interest to go to another seminar or training and "you just want to have your peace and work on your things."

Whereas most recommendations were aimed at the new CMS implementation, U1P4 called attention to recommendations for the current system in use. There needs to be an understanding of the system in use to create requirements, understanding areas of improvement, and creating quality control procedures for the new system. U1P4's thought was to learn step-

by-step from the current system, easing the future migration process or have learning advantages re-mapping the programs in the new CMS, and to reduce manual work until the new CMS is finally introduced in their degree program. U1P6 emphasized the uniformed development of degree programs as a prerequisite, highlighting that "the clearer they are developed in legal terms, the easier they are to map [in the system]." U2P2 talked about the learning experiences from their system in use, noting they "had to pay dearly [for the first study period implementation]," however with much communication and education "the learning curve was fairly steep." U1P7 encouraged others "to now learn from the past," from the error rate and the insufficient implementation so the future system will be convenient and easy to use. U1P6 remarked that experience with a previous IT system, and with ones roles improve the transition and work with a new system.

Some participants noted that with the change of processes, hierarchies, and IT infrastructure their responsibilities reduced. U1P4 wished to move into a different more responsible job category to not fall into disuse, asking for new job descriptions and tasks. U1P6 expressed the need for an understandable and easy way to organize the roles and rights environment to be able to find better solutions and to adapt to new processes, including allowing more decentralized work processes. U2P6 presented the opposite feelings saying, "I am more appreciated by the whole department" but U2P6 also had a lot to learn. U2P6 also expressed growing requirements in knowledge and skills for registrar office employees: an increased understanding of regulations with academic connections, high skills in written and oral communication, skilled in arguments, IT skills, and a continuous hunger for learning and growth. U2P4 stated there needed to be dedicated employees responsible for bringing the new and

seasoned employees to the system and helping them learn the functionalities as well as create training to help the transition to the new system.

U2P2 expressed that the registrar's office and especially the university did not have a vision where to be in 2020 or 2025, they do have many ideas, but they need to stop and consolidate achievements. For U2P2 many ideas are utopic. Other participants expressed a future vision for the registrar's office, for services, and the system (U1P7, U2P4, and U2P6). U1P4 and U2P2 see the registrar's office as a service provider and different stakeholder groups as customers, leading to a clarification of the service environment and the creation of improved services. U2P2 noted that employees at the registrar's office have to get involved, accept the conditions, think, think within the system, and "maybe also need to look left and right." U2P2 expressed that not all registrar's office employees have to do the same job, "ultimately it is [a question] of the internal distribution of work" and everything is learnable.

U2P2 advocated that schools and especially emphasized decision makers within the university should be more serious about implementation related issues. U2P2 said, "tolerance grows along with one's distance to the problem" and explained, "the further up [the decision] goes, the more obligatory the decision is, but the more information about details of the work involved is also lost." In some instances, hierarchical decisions go through five levels, each giving a 50:50 chance to pass with lots of communication necessary, with possibility to fail at the highest hierarchical level, and make the innovation process a "very exhausting and an uphill struggle." Structural hierarchical control requirements for the non-administrative side of the university were highlighted by U2P6 who said, there is a clear hierarchy, and with it direction in the administrative departments, but not in the academic departments because, "researchers are per se believed to be able to do everything but that is *not* [emphasis added by participant] right."

U2P4 and U2P6 requested a central complaint division, enabling employees to bring forward complaints and ideas and create a single point of contact for the system. U2P4 and U2P6 brought forward the idea to create a position of CMS commissioner similar to the commissioner of the disabled.

Summary of Impact Factors

The semi-structured, face-to-face and telephone interviews with the participants consisted of three topic areas with four to eight questions each, designed to explore the experiences of registrar's office employees during a CMS implementation. The factors listed in APPENDIX K emerged and were reduced to the following 13 impact factors:

- environment including university as a unique organization, internal politics, and culture;
- stakeholder expectations;
- complexity;
- security, reliability, and accessibility;
- workflows;
- management and leadership;
- communication;
- trust;
- team dynamics and sustainability;
- vendor and software identification;
- training;
- funding and resource allocation;
- and customer input.

Impact Factor Triangulation

The 13 factors and sub-factors presented a variety of factors named by participants of the two universities. In triangulating the factors, the intent was to group connected factors. Each assessed factor went under review in multiple iterations to try to identify a broader topic that it might fit. Two perspectives emerged with the one consisting out of four main factors and the other having seven factors.

The seven factors consist of

- Environment – with a focus on the university as a special organization, internal and external politics, and culture.
- Management and Leadership – including the sub-theme of trust.
- Complexity – including processes and work changes as well as security, reliability, and accessibility as sub-themes.
- Communication – with sub-themes of internal and external communication as well as implementation and IT-related communication
- IT-System – with a focus on software selection, the software vendor, and consultants employed.
- Resources – with sub-themes of finances and time as well as the sub-theme personnel, which has the underlying themes of engagement and expectations, team composition, and sustainability.
- Training

The factors management, leadership, and complexity are sub-factors of environment; however, distinguishing them as main factors as highlighted by the participants increases their impact on the presented study. Categorizing the factor training under the factor resources

connects it closer with the elements in the category however using training as a separate factor stresses the importance participants gave to training throughout their interviews and in their recommendations.

Findings

The qualitative interviews addressed the research question regarding the employees of the registrar's office experiences in the three categories of CMS implementation, leadership, and work impact. The questions asked aimed at exploring CSRF from the perspective of the registrar's office employees. The participating universities selection occurred because of their online information on the progress of the CMS implementation. However, it turned out neither of the participating universities CMS implementations was as far as presented in their public relations communications. U1 appeared still in the pilot phase and only few modules of the CMS were about to be implemented. U2 had stopped the implementation process altogether, though they focused on expanding and integrating the system in use. Nevertheless, interviewees highlighted CSRFs from the registrar's office perspective in each of the stages of the implementation process.

The first category of interview questions focused on the experiences of participants with the CMS implementation. Only two of the six interviewees were active in the implementation phase of the new CMS whereas three interviewees were active in the system in use and one was a user of the current system without active participation. Emerging themes were, however, present from both user groups, the ones actively involved in the new CMS implementation as well as from the ones using the current system. Table 2 identifies the factors participants from both universities expressed with regard to the CMS implementation. In the second category, the interview questions addressed participants' experiences with leadership during different phases

of the CMS implementation. Table 3 identifies the factors emerged regarding leadership during the CMS implementation. The third category of the interview questions addressed CMS implementations work impact on participants. Participants at U1 and U2 focused on the factors presented in Table 4.

Table 2

Condensed Factors Influencing the CMS Implementation

	U1 **Pilot phase in one school**	**U2** **Halted implementation phase**
Phase independent themes	(a) stakeholder engagement (b) complexity (c) implementation related communication (d) CMS customer service (e) CMS team availability, connection, and competence (f) Training (g) financial, time, and personnel resources	
Phase-dependent factors	(h1) dependency, security, reliability, accessibility, roles, and rights (i1) trust in system and people (j1) system usability and local and vendor customizability, (k) integration in decision-making process	(h2) security, reliability, and accessibility (i2) trust in system, vendor, and people (j2) customizability
University-specific factors	(l) reasons for implementation (m) learning by developing the old system and cooperating and exchanging with other universities	(n) time pressure (o) process harmonization instead of standardization (p) position-development of a central commissioner of CMS

Table 3

Leadership Experience During the CMS Implementation

	U1 **Pilot phase in one school**	**U2** **Halted implementation phase**
Common factors	(a) internal and external communication	
Focus on	(b1-1) tradition, internal politics, and culture (c1) trust in management and decisions	(b2-1) tradition, hierarchical presentation (b2-2) internal politics and culture (c2) trust in management and people
University-specific factors	(d) reasons for implementation (e) generational change (f) mission and vision development including review of achievements	g) position-development of a central commissioner of CMS

Table 4

Factors Affecting Participant's Work

	U1 **Pilot phase in one school**	**U2** **Halted implementation phase**
Common factors	(a) organizational processes and IT-system complexity (b) non-IT related changes (c) communication processes (d) financial, time, and personnel resources (e) stakeholder engagement in CMS process and customization development (f) suitable training and customer service (g) changes between administration and academic work distribution	
Highlighted	Dependency, security, reliability, accessibility, and roles and rights requirements regarding the CMS and their work processes	Security, reliability, and accessibility
University-specific factors	(h) system usability and customizability (i) an exchange platform	(j) process harmonization instead of standardization

Participants expressed the importance of the CMS for their area of work, including their dependence of the availability and accessibility of the service. They outlined the importance of communication; CMS team availability and composition, customization ability, training, and resources. They highlighted the challenging factors of university culture, tradition, and hierarchy, leadership and management, and the risks involved with financial, time, and personnel resources. Several participants pointed out not all of these CSRF exclusively relate to CMS implementation but result from internal and external influences on the university and its processes. All participants expressed interest in an active engagement in the CMS

implementation process and offered ideas and improvement recommendations to make the CMS implementation successful.

Summary

Chapter 4 presented the results of this study to explore CSRF from the perspective of the specific stakeholder group of registrar's office employees at German universities. The analysis of the interviews focused on CSRF regarding the three categories of CMS implementation, leadership, and work impact. Whereas the participating universities were selected based upon their online information on the progress of the CMS implementation, the interviewees exposed that neither university was as far into the implementation process as presented in public relations communications. The data analysis from the interviews with participants of U1 in the pilot phase and participants of U2 with a stalled implementation and return to the drawing board however offered the possibility to explore the CSRF within the present phase of the projects and with the system in use. The emerging factors from interviewees responses focused on the university environment including uniqueness, politics, and culture; management and leadership and the trust therein; complexity of processes and the customization-requirements of the CMS; internal, external, and implementation related communication; CMS specific factors including the software selection, the software vendor and consultants employed; training; and the factor of resources including finances, time, and personnel with a focus on stakeholder engagement, expectation management, team composition, and sustainability. Participants highlighted the importance of the IT system in use for the work of registrar's office employees. In addition, interviewees expressed the importance of updating or migrating to a new CMS for their area of work to compensate for new requirements and the increase in student numbers. Participants expressed their general interest in supporting the implementation and their expectation of being

included into the customization and adaptation process. Chapter 4 contained a detailed description and data analysis exploring the CSRF of the 13 participants. Chapter 5 addresses the limitations and discusses the implications as well as recommendations based on the results of the study.

Chapter 5

Discussion

The purpose of the study was to explore group-specific CMS implementation related CSRF from a non-managerial administrative point of view within multiple university cases in Germany. Employees in registrars' offices of the two universities in Germany that agreed to participate in interviews about their experiences during and after a CMS implementation. The focus of the study was to explore staffs' experiences regarding the implementation process, leadership, and work-process changes. The study was undertaken because previous research stated a possible presence of stakeholder-specific CSRF and lack of research regarding HEI ERP implementations in non-English-speaking countries. This case study research promoted discovering the administrative staff's experiences with CMS implementations in Germany and their perception of CSRF during and after the implementation. Chapter 5 includes limitations, implications, the outcome of the research question, and recommendations based on the findings and themes. Chapter 5 concludes with recommendations for future research and a summary of the research.

Limitations

The qualitative exploratory multiple case study limitations include: The number of possible participating universities had to be reduced before conducting the study, therefore press releases and university websites were used to gather initial data to make the selection. This may have excluded universities not announcing their status publicly and in turn included universities overemphasizing their current project status, leading to participants not yet using the CMS. Reduction of the multiplicity of experiences was not possible because of the small sample and number of interested participants and therefore let to the change of the study from implementing

and using the CMS to using the current IT system and few experiences with the implementation of the CMS. Though the limitation of small and changed sample existed, the broadening of experiences provided previously identified and new themes regarding CSRFs and filled gaps in research. The qualitative design in connection with the small sample size did not allow for weighting, identifying possible relationships, and relative importance factors and themes. Future research including more cases or quantitative analysis may lift this limitation.

Excluding smaller German HEIs and private HEIs limits the generalizability of the study. The researcher found largest data collection miscalculation occurred with participants misunderstanding of the solicitation email as searching for employees within the CMS projects of the respective universities. The researcher explained and corrected the solicitation text, which lead to a higher reply rate, but still many addressees did not see themselves as good participant-fits. A second reminder email with an expansion to users of the CMS system did lead to few additional replies but overall the researcher expected a higher rate of participation. The complete non-participation of U3 was disadvantageous for the study because U3 was the furthest in the implementation process of the new CMS according to their website and participation would have provided additional participants, another project stage, and possibly additional impact factors or factor focus. The goal of this study was to interview administrative employees in the registrar's office about their experiences with the CMS implementation to explore group-specific CSRFs. Most participating staff members reported they were not deeply involved in the implementation of the new CMS system, not yet affected, or the new CMS implementation process halted. They did, however, express their experiences with the IT system in use and their perception of the implementation of the new CMS or their perspective on the IT system in use and their recommendation on how a future CMS should be implemented. The researcher therefore had to

adapt the research focus regarding CSRF not only on the implementation of the new CMS but derive CSRF from the experiences of the IT system used and the new CMS system.

The researcher's own experiences may have had an influence on the process of the interview. The interview questions (APPENDIX I and J) were a guideline. The researcher followed the structure but did not interrupt the interview-flow if a participant expanded and introduced another question or focus. Follow-up clarification questions allowed the interviewer to gain answers in case participants provided bidirectional answers to questions. The interviewer answered interviewee's questions during the interview. Personal experiences may have influenced the questions asked by the researcher by wording a question in a certain way. Moses and Knutsen highlighted this behavior writing, "if something appears meaningful or real to a social agent, then it may affect his behavior and have real consequences for the society around him" (2012, p. 11 f.). The researcher does admit that personal experiences may have biased the (design of the) study but does not feel any real limitation overall since the results show patterns of experiences by the participants.

Implications and Findings

The sample included registrar's office employees from two universities in Germany that agreed to participate. Seven employees replied with an explanation for their non-participation in the interview process. Six employees from the two participating universities agreed the interview and expressed their experiences and perceptions about the IT system in use, the decision-making process for a new CMS, and about the implementation of the new CMS. The interview questions were broken down into three areas: (a) experiences with the CMS implementation, (b) leadership, and (c) work impact to find a variety of factors regarded by the participants as influencing their daily work routines during and after the CMS implementation.

Experiences with the CMS implementation varied between non-users of the system, user of the IT system without close knowledge of the new system, to users of the IT system in use engaged in the development process. None of the sample worked full-time with the new system. Addressing upper management and university leadership, participants used less favorable descriptions, highlighting the need for increased communication. Because participants were not yet working with the new CMS, their experiences focused on the system in use and procedural changes within the university and governmental regulations. The participants in the sample emphasized many changes going on within their work environment, including organizational and degree-structure changes, laws and regulation, and IT changes, leading to increased workload and educational requirements and creating stress.

The summary of the research suggested differing factor importance depending on the implementation phase of the CMS and the engagement of the sample. The factors extrapolated from the data can have a positive but also a negative influences on the CMS implementation project, depending on the handling or inactivity of each. Three themes emerged from the interviews and subsequent factor analysis: (a) communication, (b) system customization, and (c) team composition and resources.

Theme: Communication

Communication was the most important factor named by the sample. All participants reported a lack of internal and external communication regarding the CMS implementation project. Participants expressing a negative perspective about the implementation as not feeling included in decision-making and implementation processes, reported lacking information regarding the project and its vision, and expressed a general lack of trust in leadership and management. Participants connected missing communication with lack of interaction and

engagement, perceiving themselves as lacking required skills and knowledge as points of hindrance though expressing interesting in education and increased inclusion in the implementation process and communication about the implementation. Negative experiences of leadership and management communication included political power plays with a multifaceted perspective of university tradition, culture, politics, and hierarchy. Participants reporting a positive perspective about the CMS implementation highlighted they felt included in the implementation and development process through active and repetitive communication. Those participants also expressed high engagement into the implementation process, including a tight connection with the CMS team, their own interests, and IT related skills. The sample expressed favorable communication strategies, including open and frequent communication, public exchange platforms, CMS customer service availability, a diverse range of training opportunities and communication about these, as well as adequate equipment with finances, time, and personnel to cope with the communication and learning requirements of the new system. Respondents noted leadership and managerial communication as critical in influencing CMS implementation, development, trust, and success.

Theme: System Customization

The sample reported dependency on the IT system, current and new alike, because of increasing work based upon internal and external requirements. Participants expressed high time and effort to make processes work. They enjoyed inclusion in process design and system adaptation to their respective subject areas. Respondents highlighted the need for system customization because of many specifics for individual subjects, degrees, as well as school, state, and external organizations requirements. Participants noted the uniqueness of their respective degree area and therefore their unique and complex requirements. Whereas they highlighted

their unique requirements, they also articulated possibilities to standardize or harmonize processes, requirements, and IT systems. The sample expressed iterative changes in their work processes with new university and law requirements and changes fostering and requiring IT system changes, that in turn foster additional university requirements and changes. IT and registrar office requirements and processes are changing and increasing in this iterative loop. Rapid and continuous changes and customizations created difficulties for participants to learn and use the IT system. Respondents called for an increase in CMS customer service through improved availability and competence of team members, an increase in regular communication, and process and CMS specific training to cope with CMS complexity.

Theme: Team Composition and Resources

The six participants expressed dedication to their work and to the successful implementation of the CMS. They highlighted cooperation with the CMS team as important but noted the difficulty of engaging in the project's processes because of resource and communication constraints. The sample presented a general level of lack of trust in the system, customizations, and the vendor based upon previous experiences and ongoing problems. Participants not engaged in the implementation process expressed reduced trust in university leadership and project management as an underlying factor. Those participants not actively engaged in the CMS implementation requested to be more involved in the decision-making and implementation process. Respondents highlighted active engagement and connection with the CMS team as beneficial for the implementation process and regarding trust. The sample voiced the need for the right composition of the CMS team with competent and experienced people, with technical and communication skills who create a trusting service environment for the project and thereafter. The respondents emphasized the need for increased customer orientation

by the CMS team regarding administrative needs as well as regarding needs of other stakeholder groups. Participants closely connected team composition with long-term resource requirements. Long-term resource requirements include financial, time, personal, and training resources for the IT system, the local service team, and needed customization services. The sample noted the importance available resources for the CMS team and within the registrar's office.

Outcome of the Research

The data analysis from the research study assisted in answering the research questions and validating the documentation discussed in the literature review. The following is the outcome to the research question: What are the group-specific experiences of non-managerial administrative staff during and after CMS implementations at German universities?

The research question aimed at finding group specific experiences during and after a CMS implementation. The group specific experiences were then summarized and triangulated to identify the group specific CSRF for registrar's office employees during and after a CMS implementation. Seven group specific factors were identified, namely (a) environment, (b) management and leadership, (c) complexity, (d) communication, (e) IT-System and Services, (f) training, and (g) financial, personnel, and time resources. The factors in this study are similar to CSRFs from previous studies (Gattiker, 2002; Ghosh & Skibniewski, 2010; Ifinedo & Nahar, 2007; Pearlson & Saunders, 2010; Scott & Vessey, 2002) and identified by the stakeholder groups of management and IT. Whereas the findings of this study did not present any additional general categories of CSRF, they introduced (a) specific sub-categories for CMS implementations in Germany, (b) a differing depth of factors within the stakeholder groups of administrative employees, and (c) differences in focus on certain factors depending on the project status. The findings align with Sullivan (2009) who thought that other cultures and

regions might add additional success and risk factors though they were triangulated and defined as sub-factors in this study. Sullivan's (2009) expressed an analysis of the specific organizational or business area as well as stakeholder-specific factors may support the implementation project. More information on details of factors and categories was available in this study because participants had more hands on experience because of their day-to-day experience with the system and its implementation. The perspectives of participants included different project statuses, U1 in the pilot-implementation phase of a new CMS and U2 in the maintenance-phase of the old CMS with ongoing research for a new CMS. The differing statuses led participants to focus on certain sub-factors, omitting others not perceived by participants in another project-phase, while at the same time highlighting all the main factors. The results of this study with an emphasis on the in-depth work perspective of the stakeholder group of administrative employee's provides project management with the ability to influence project outcome by focusing on phase-specific and stakeholder-specific sub-factors. Phase-specific and stakeholder specific factors in this research study fill part of the gap in literature regarding differences and similarities of CSRFs of CMS implementations but leave room for further studies with larger sample sizes and quantitative analysis.

German HEI environment and IT. The environment in German HEIs aligned with Pollock and Cornford (2004) and Lockwood (1985), and reasons participants perceived the university environment as unique were the universities' inability to adapt quickly to environmental changes, the waste of resources, and uneconomic and unresponsive business processes. Participants reported partial movement and partial halt within the university depending on the participants' school and the projects' status. Study results were not conclusive or generalizable but hint to Pollocks' (2003) findings about the ambivalence of change in certain

HEI areas though this study did not find ambivalence for the university as a unit but for the participating schools within. Participants expressed an interest in certain changes, especially increased individual support, standardization to reduce uncontrolled IT and information growth outside the administrative department, integration and connection to systems used to leverage data and to reduce repetitive tasks, and to improve student services. Interviewees expressed the need for technology to keep up with the internal and external requirements of collecting, controlling, and presenting data, aligned with Quapp's (2010) findings. Degkwitz and Klapper's (2011) findings for increased cooperation and data sharing through the internal HEI structure was found by this study to lead to a split perception by participants. Participants expressed the increased collection of student data with data security and data reliability risks; questions of responsibility about data entry, protection, regulations, and use; and study participants asking for clear role definitions, position descriptions, adequate staffing, security, and support. Participants welcomed an increased involvement of decentralized participants not included in the registrar's office, integration of multiple legacy systems to reduce repetition of tasks and improve data quality, and educating other stakeholder groups throughout the university. Participants expressed a general interest in creating a service-oriented department and highlighted the importance of the project leadership, stakeholder groups, and their knowledge to transform the department and the university.

Regarding the main reason for transformation, participants pointed out the Bologna Process changes as reason for ongoing changes in the participants' university IT. Administrative employees expressed a circular influence of Bologna requirements influencing degree requirements, increasing reporting and degree-implementation needs, and leading to additional IT requirements and changes within their respective schools. Participants accepted the ideas of

the Bologna Process, but most were not in agreement with the style of implementation: Interviewees expressed a discrepancy between the Bologna Process objectives, implementation ideas expressed by the Benelux Bologna Secretariat (2010), and how German universities and states implemented objectives locally. In addition to the Bologna Process, participants touched on the increasing internationalization of degrees and the university as a whole, the number of degrees offered by schools, and technological advancements. The findings aligned with Alt and Auth (2010a) and Sprenger, et al., (2010b) findings and expressed the globalization process universities are going through and touch on the need for a successful CMS implementation.

Participants with a long working history at their university reported benefits of the old IT system, noting it was doing well with the old degrees and requirements because of customization. Younger administrative employees, expressing negative experiences with the old system and hopes for the new system, highlighted technological advances and improvements. Participants requested a type of standardization of CMS across universities or at least across university-groups using the same CMS vendor, leading to the creation of reusable modules (Klaus, et al., 2000). Participants sided with the creation of reusable modules across universities, schools, and more inter-university cooperation regarding specific CMS implementations. Simultaneously participants stressed the differences between universities and schools, expressing only certain areas could be standardized, others were unique and needed to be highly customized, not only to the university but also specific to the school or even subject. This perspective of not only HEI uniqueness but school or subject specialty aligns with Pollock's (2003) findings about the difficulty of molding ERP modules to the HEI environment because of the unique culture of HEIs, the power of default, and the of lack of decision making. The creation of a unique HEI IT market is therefore both a wanted and an unwanted event, yet most participants applauded the

market-development because it created movement in HEI IT support by creating competition to the state-supported HEI IT monopoly. With the perspective of HEI uniqueness and need for highly customized IT systems, HEIs in Germany may have reason to use the term CMS instead of HEI ERP system as German universities do create a distinct HEI IT market with their requirements. Regional HEI ERP vendors on the other hand do not seem to benefit from the localized community and support as much as Rabaa'i et al., (2009), HIS (2010a, 2012), and Pollock (2003) expected vendors to benefit. Contrasting to Ghosh and Skibniewski's (2010) perspective that HEIs need to implement their unique communication and social culture into the IT system, software vendors in Germany seem overrun by HEIs specific requirements, ideas, and requests to implement the HEIs social culture and communication strategies into the IT system, as participants reported delays of software modules and customization requests. The perspective of participants regarding reuse of system-modules contrasting the creation of highly customized CMS implementations between and sometimes within universities underscored the uniqueness of the HEI ERP market and the difficulty of CMS vendors to utilize the user community in German universities.

Considering the studies' findings about IT expectations and experiences, participants expect CMS to be more than pure IT systems, a finding also expressed by Klaus, et al., (2000). Interviewees highlighted the perception of a SLC system, including intelligence for decision-making for students, teachers, as well as administrators, and a system to produce data outputs easily. Participants expressed expanding the CMS to other organizational areas, creating an integrated or integrating system, a finding in line with Haag and Cummings (2008). The finding flows into the hopes for a Swiss-army knife of IT systems, a single tool for every problem and for every stakeholder-group, but participants expressed knowledge of the caveat of financing,

staffing, and software customization to the differing needs. Regarding staffing, interviewees offered the perspective to include more internal personal resources in the implementation project to create and grow internal knowledge and skills, a strategy accentuated by Conghua (2002). It was important for study participants to have local experts readily available, engage in constructive communication, and to find solutions quickly, including local university or subject specific programming or customizing.

Risk and success factor models. Comparing the studies' findings with the multiple CSRF-models from the literature analysis offers a perspective of similarities and differences of group-specific factors between the managerial and IT focus of previous research and the non-managerial administrative perspective of this study. The interviews and the following development of the impact factor themes highlighted two main influence factors, the internal, and the external environment of the university (Scott & Vessey, 2002). Understanding, evaluating, and including the differing influence factors including internal and external politics, governmental requirements, business connections, university culture, and tradition may support the development of CMS system and successful implementations because of an increase of awareness and understanding for connections. Awareness of project management was also the focus of Pearlson and Saunders (2010) who developed a model of four dimensions: resource constraints, impacts on customers, business success, and preparation for the future. The results of this study express the following four dimensions: Most participants want the project to succeed, offer support, and apply themselves to the project not only focusing on their own work environment but also on other stakeholder groups and their needs and requirements. However, participants expressed the dimension of resource constraints in multiple ways, saying that time, finances, training, and personnel are limited, work is increasing and changing, and it is difficult

to convince management and leadership to listen to administrative project requirements and needs. This leads participants to paint a grey picture for the projects future, long-term costs, lacking positions, and non-sustainability of CMS support and service are fears presented by interviewees while they hope for process and IT improvements.

The seven group specific factors identified in this study can be broken down into the two main and multiple sub-category-areas Gattiker (2002) presented. Gattiker (2002) divided success and risk factors first into implementation related and ERP specific factors. This research highlights a similar perspective. Many factors are present without the implementation of a new CMS but relate to a successful project outcome. Gattiker (2002) named top management involvement, link to business strategy, software selection, user involvement, and pre-existing data and systems as sub-factors of implementation related factors and this study findings agree with previous research. ERP specific sub-factors according to Gattiker (2002) are package standards and process standards which may be expanded by the stakeholder groups' specific themes found in this research namely support, customization, reliability, continuity, trust, and cooperation with a focus on the ERP system and the ERP vendor.

Gattikers' (2002) divisions found in Ifinedo and Nahar (2007) where implementation related factors include information quality, individual impact, organizational impact, and workgroup impact and ERP specific factors are system, vendor, and consultant quality. Ifinedo and Nahar (2007) focused on quality and impact factors and their categories cover the findings of this study except for the external environment impact on the university organization. The external impact in HEI implementations includes more than Infinedo and Nahar's (2007) findings of vendor and consultant quality, the organizational impact, as interviewees called attention to external influences from organizations, state-treaties, and governmental regulations.

The study by Ghosh and Skibniewski (2010) focuses on ERP complexity in the categories of structural, directional, temporal, and technical complexity and offers another perspective of this study's findings. Ghosh and Skibniewski (2010) noted ERP projects are not only computer projects but also they are projects influencing the whole organization and this study concurs with Ghosh and Skibniewski's findings: The organization and the environment was actively influencing the ERP project, especially because of differing needs of different stakeholder groups. Ghosh and Skibniewski (2010) categories were present in the complexity factor identified in this study:

- Structural complexities in this study included hierarchical differences between administration and academic departments, multiple projects in different phases including university-wide as well as department-specific ones which in turn may be interconnected with other projects;
- Directional complexities in CMS implementations included unclear direction of the university mission and vision in relationship to the new CMS, tradition and culture, ambivalence between internal changes and external requirements as highlighted also by Alt and Auth (2010b), Pollock (2003), and Welsh (2010), and internal and external political influences;
- Temporal complexities include running multiple system simultaneously, tight project schedule connected to the university study-cycle, high workload during certain project periods, and influences from outside the project or university requiring fast adjustments of processes, services, and the IT system;
- With regard to technical complexities of the CMS implementation project factors such as running systems parallel with possible bi-directional exchange of data,

stakeholder-groups requirements, and multiple process requirements because of harmonization instead of standardization.

The results of this study aligned with previous research and offer some stakeholder-specific and organization-specific outlook. The results of the study concur with the difficulty of authority and autonomy in connection with multiple university stakeholder groups (Lockwood, 1985, Pollock & Cornford, 2004).

Risk and success factor outcomes. This research confirms existing CSRF categories and added stakeholder group specific factors as well as hinted to implementation-phase dependent factors. Participants based many problems on communication challenges, including the integration of participants and stakeholder groups, regular updates on the project status and timeline, as well as timely participation in the decision-making processes. Not adhering to the project timeline, an important factor Dowlatshahi (2005) noted, led participants to express progress of the implementation with negative connotations, and reduced participants' interest to participate. Interviewees expressed difficulties to adjust their work schedule to new requirements of degrees and CMS. The increase in reporting, degrees, and student numbers, new systems and features, and an increase in CMS-educational needs for administrative employees lead many interviewees to feelings of being overwhelmed and having no downtime because previous work-cycles dissolved to more continuous work requirements. Work pressure may lead to future staffing problems because of work related sicknesses like burnout or even early retirement as some participants expressed their worries about their personal future. Early retirement of administrative staff leads to internal changes either within the departments or by merging departments in HEIs as Shah et al., (2011) expressed, and participants reported succession planning is not in place. Leadership and management will need to evaluate the factor

of staffing and succession to increase short-term implementation success and long-term stakeholder support.

Participants did note the future capabilities of the CMS, its optimization for the specific university, including increased data sharing, time reductions, need for access to fewer systems, and the change in communication requirements, aligned with Dowlatshahi's (2005) findings. Subjects agreed on merging functions and systems into a single system, but also expressed the benefits of connecting instead of integrating specific IT systems, creating a best-of-breed infrastructure as highlighted by Rabaa'i et al., (2009). Aligned with Fryling's (2010) findings regarding customization, interviewees emphasized the importance of adjusting the CMS to the university and more specifically to their specific school. The highly customized IT system empowers employees within the administrative departments to provide increased and differentiated information not available before with little internal and external support but requires a continuous IT improvement cycle as noted by Badrakhan (2010). Contrasting the feeling of empowerment is the participants' perception of change of roles and responsibilities. Participants noted a tendency to decentralize and de-administrative certain areas of their previous administrative work and information, leading to frustration by interviewees and misinformation of students. As Stephenson and Sage (2007) noted, aligning processes, roles, people, and IT to improve the dependency on each other is a challenge for leadership, a challenge applying also to the HEI environment as findings of this study show.

Many sub-factors identified fall into the category of environment. Findings frequently do not focus on the IT side of the CMS implementation but include organizational as well as political aspects. Interviewees highlighted the importance research on political power play and politicking (Okunoye et al., 2008) because of the different internal and external influences on

CMS implementation projects. Subjects expressed negative perceptions about the project because of political power plays and hierarchical influences. Multiple participants expressed a specific type of power, academic power, as described by Whitworth (2012). Some participants developed a stand against academic power or cultured an alliance of giving and taking with the power-holders while other participants expressed difficulty of working with, guiding of, and receiving support from academic employees.

Interviewees regarded project complexity as an important factor in the paralysis of management and leadership to make decisions. The perspective from the non-administrative side also offered more specific problems whereas management and leadership in previous studies may only have been aware of the summarized problem areas or complaints but not of day-to-day problems and perspectives. Political engagements along with Sullivan's (2009) perspective that different stakeholder groups have different success-objectives for IT projects highlighted by participants who present the differing focus on project requirements. Interviewees expressed differing goals, some with higher objectives, and some with very close to home contexts. Summarizing the two participating universities into cases, one group of participants was unsure of the vision for the CMS implementation whereas the other group of participants seemed more in general agreement of future outcomes. In addition to participants' goals and outcomes, their perception of success changed over the course of the project. Participants reportedly started out with high hopes and all-inclusive systems and ended up with some new functionality but being happy if the system performed "old" tasks without additional work. Their hopes faded and their expectations reduced leading to disillusionment and holding back personal engagement until being included into the process. Several participants developed frustration about changes in work procedures, information politics, and reduced administrative rights because of the

implementation of academic study managers, leading to tensions between the administrative and the teaching departments. Some participants perceived the CMS project took away the feeling of importance and work-satisfaction from them, a finding similar to the research of Okunoye et al., (2008), Shah, et al., 2011, and Omerzel (2011). This research confirms the importance of research regarding stakeholder group specific CSRF, group expectations, and the search for solutions to improve project outcome.

The category of leadership and management included the difficulty for participating universities to develop structures supporting and leading the CMS implementation process. Both university cases highlighted the motivation for the CMS implementation initiative came from upper management though they could not express who specifically initiated the process. Initiation of the CMS project top-down introduced communication and organization challenges because some study-participants felt excluded from decision-making and from providing input to the selection phase of the project. Reed (2006) and Okunoye et al., (2008) noted speed in decision-making and decisiveness are important factors in the strategic implementation of IT. Study participants in one case expressed their contrasting expectations to their leadership's perspective, lack of inclusion into decision and customizations processes, and a general slow speed of the project after the initial leadership decision for implementation whereas participants in the second case accented how a reduced speed in the decision and implementation process improved their perception about the project. The latter positive influence of a slower but more detailed and connecting decision and implementation phase is mirroring Okunoye et al.'s, (2008) results, pertaining that allowing more time for a project decision is a viable strategy when more stakeholder groups are included into the process. Participants in the second case highlighted the importance of internal dialogues, discussions, and learning about best practices from other

departments and schools, because of the added time including forming of interpersonal connections, knowledge about other units, and building of trust-relationships that may support future projects. These perspectives underscore the evaluation that a CMS project is first a communication project and then and IT project.

Universities follow the general division of administration and academics including education and research, creating a split leadership hierarchy. Within the administrative environment, clear hierarchical elements of organizational structure exist and clear delegation is a formal element. Within the academic division, an organizational hierarchical tree often exists, too, however delegation and direction is often not as clear as in the administrative hierarchy. Researchers often think they are managers while they are not and professors cannot tell other professors what to do and move jobs around, leading to confusion as to who is responsible for what. Participants highlight the importance of awareness of the president, or the highest level of management and leadership at the universities, about the dimension and the requirement of the CMS project and the importance of creating an adequate support and management structure equipped with resources to guide the CMS project to success. An additional factor regarding leadership and identified alongside previous research of Katz et al., (2004) is institutional memory. Participants expressed concern about lost pockets of knowledge and power, leading to difficulties for administrative staff to connect with the right CMS team members in the future or vice versa, and reduced decision-making expertise based on previous knowledge.

Dues expressed a relationship between ERP success and leadership style not found in this research. The results of this study do however present a differing perspective of interviewees on the most important persons for the CMS project. Participants from one university named a specific person as the project sponsor whereas the other university highlighted the team as a unit.

The perception of transformational leadership, project support, and a different connection between study participants and the CMS project may lead to differing outcomes of project success as Nahavandi (2006) pointed out. The perspective of registrar's employees supporting transformational IT leadership within the CMS implementation differs from previous research that drew attention to the importance of a project sponsor in upper management. Participants watched management to see if management followed through with their actions. Participants however seemed much closer connected and interested in the direct communication and work with the most important person in the CMS implementation team. Participants expressed the importance of the implementation team and cooperation with the team by highlighting either their personal involvement or their lack of involvement in the implementation process. Several interviewees reported their biggest concern was to integrate most subject-specifics into the software but expressed difficulties in explaining the internal requirements to the software vendor and the CMS team. This research indicated a well-connected, transformational leader within the CMS project can integrated the university departments and schools in an active way, increasing interest to participate, and to make active decisions.

Recommendations

In this research study, an important factor identified was communication on multiple levels. Leadership and project management should implement a communication strategy at the very beginning of the project, including elements of internal and external communication but most importantly, any implementation related communication. Frequency and depth of communication depend on the project status but most communication should be available for all stakeholder groups and not depend on the activity-level of the group or person. Regular face-to-face meetings, i.e., full university gatherings or stakeholder groups' specific presentations,

regular e-mail updates, a website, an open-access forum for debate and exchange, best-practice and skill-update emails, trainings, and integrating CMS team members into CMS user-environments are examples to improve communication in different phases of the implementation cycle. The CMS project, its team members, and leadership did not address problems: reduced communication, not addressing specific stakeholder groups, reducing trust in the CMS project its team members, and university leadership.

Recommendations for Future Research

Future research needs to focus on the diversity of stakeholder-groups perception of impact factors within a HEI ERP implementation. Non-administrative employees in the registrar's office differed in perception of HEI ERP implementation impact factors in contrast to perceptions of managers and CIOs of local United States government and mid-size organizations (Dues, 2010; Khatib, 2010) and HEIs (Graham, 2009; Pollock, 2003; Pollock, et al., 2003; Pratt, 2007; Sullivan, 2009). The results of this research aligned with the findings of Alt and Auth (2010b), Pollock and Cornford (2004), Toens (2009), and Welsh (2010) that universities are unique subgroups of organizations with specialized IT requirements, politics, and internal culture. Generalization of results is not possible because of the limited number of participants and participating universities. Future researchers therefore should use the factors from this and other studies and create a qualitative research tool inviting more universities and additional stakeholder groups to participate, including additional language areas. Results may then be generalizable and offer the possibility to identify factors of importance for different types of stakeholder groups, different types of universities, and different types of CMS implementation statuses time wise.

The connection between success factors and university behavior previously highlighted by Kansal (2008) and her research found a direct connection between business process development, decision-making processes, and enterprise-wide information system implementation and performance. Pollock (2003) found that a clear decision-making process is not the single point to make a university ERP implementation a success because of the universities' reluctance to embrace the needed change process. The question resulting from Kansal's (2008) and Pollock's (2003) observation together with the presented research study is how much the universities implementing a CMS embraced change and where they limited change. These internal and environmental factors featured group specific stakeholder factors but a detailed analysis in future studies is necessary. Whereas this study focused on the non-managerial administrative employees of registrar's offices and other studies focused on management and CIOs, future studies should analyze additional HEI stakeholder groups and the influence of stakeholder theory in HEIs (Alves, et al., 2010) in CMS implementation projects. The research and application regarding real project management techniques (Haase, 2014) for IT projects should be expanded to include HEI CMS implementations. This study presented factors influencing participating cases and additional research in HEI project management techniques may provide HEIs and other organizations with applicable techniques and practices.

Study participants added additional layers of future research, including university internal interactions between the different employee groups (humans and social connections), the implications of general models on degree development, development of job-profiles for the 21st century university, as well as IT-system design and system usability. Study participants also hinted to differences in age and location of the university and challenges faced in the IT implementation. A future study could focus on different locations, sizes, and ages of German

universities and compare the IT implementation process as well as other developments leading to success and risk factors for IT implementations. Perceptions of interviewees differed between the extremes of fully integrated ERP system, integrating ERP system, and best-of-breed systems aligned with Rabaa'i, et al., (2009) findings. Future research can focus on the political decision making process between the spectrum of implementation and specific factors were influencing the different styles of implementation process. More research on the factors implementing HEI ERP systems and their local customization is also of interest; including the question, what factors influence the implementation of HEI ERP systems and development of customizations or additional systems and in what way do factors influence developments. Factors may include local initiatives like the "Exzellenzinitiative," regional initiatives like the Bologna Process, strategies for internationalization, and others.

Research concurred with previous research regarding general categories of CSRF but participants highlighted group specific sub-categories. Future research needs to validate the findings of this study and should analyze the specific sub-categories for CMS implementations in this study, including if the depth of factors exposed in this study is sustainable or if changes need to be made to the structure and factors for specific stakeholder groups like administrative employees. The project status at U1 and U2 underlined several different factors. Project status may therefore be an additional element to analyze in connection with stakeholder groups specific CSRFs by future research.

This study provided known factors but highlighted stakeholder groups' specific sub-factors and foci to support success in specialized ERP implementation projects, and knowledge and understanding of these sub-factors may result in higher success rates of university ERP implementations in the future. Future studies may use the results of this study to create a

framework for the analysis, design, and implementation of a CMS at any type and size of educational institution in a standardized way. Such a tool would ease the selection and implementation process, reduce the time needed for implementation, and therefore lower costs of consulting and adjustment services (Rowland, 2007; Sullivan, 2009). Application and comparison of research in ERP systems of the Anglo-American market to the German CMS market requires further research. In addition, a case study of a single university with all stakeholder groups and their experiences of success and risk factors could be a future study.

Summary

The purpose of the study was to describe and identify group-specific CMS implementation related CSRF from a non-managerial administrative point of view within multiple university cases in Germany. This exploratory multiple case study offered a description and analysis of professional perceptions of employees in registrars' offices of two universities in Germany during and after a CMS implementation. The focus of the study was to explore staffs' experiences regarding the implementation process, leadership, and work-process changes and explored stakeholder-specific CSRFs. Previous research stated the lack of research of stakeholder-specific CSRF in HEIs, the lack of research regarding HEI ERP implementations in other countries than the United States, Australia, and the United Kingdom, and led to this study.

The interviews were analyzed to identify and explore group specific CSRF during and after a CMS implementation. According to their public relations websites, the two German universities were in different advanced stages of their CMS implementation. The interviews however identified one university in pilot state status and the other at a halted implementation point. Whereas the original intent of the study was to explore CSRF of the new CMS implementation, the interviews provided most information about the IT system in use and some

details about their till-date experiences with the new system or the decision-making process. The results of this study lead to a stakeholder specific list of factors influencing higher education ERP implementations presented by the factors (a) environment, (b) management and leadership, (c) complexity, (d) communication, (e) IT-System and Services, (f) training, and (g) financial, personnel, and time resources. The three main themes identified through the exploratory multiple case study were (a) communication, (b) system customization, and (c) team composition and resources. Whereas general factors and previous research aligned, their sub-categories highlight difference in focus by the stakeholder groups of non-administrative employees and depending on the phase, the CMS implementation project is in.

References

Aldayel, A. I., Aldayel, M. S., & Al-Mudimigh, A. S. (2011). The critical success factors of ERP implementation in higher education in Saudi Arabia: A case study. *Journal of Information Technology & Economic Development, 2*(2), 1-16. Retrieved from http://gsmi-jited.com/

Allen, D., Kern, T., & Havenhand, M. (2002, January 07-January 10). *ERP critical success factors: An exploration of the contextual factors in public sector institutions.* Paper presented at the 35th Annual Hawaii International Conference on System Sciences (HICSS'02)-Volume 8, Big Island, Hawaii.

Allen, D., Kern, T., & Mattison, D. (2002). Culture, power, and politics in ICT outsourcing in higher education. *European Journal of Information Systems, 11*(2), 159-173. doi: 10.1057/palgrave.ejis.3000425

Allen, T. (2011). Improve your business processes for ERP efficiency. *Strategic Finance, 92*(11), 54-59. Retrieved from http://www.imanet.org/resources_and_publications/strategic_finance_magazine.aspx

Alsène, É. (2007). ERP systems and the coordination of the enterprise. *Business Process Management Journal, 13*(3), 417-432. doi: 10.1108/14637150710752326

Alt, R., & Auth, G. (2010a). Campus-Management-System. *Wirtschaftsinformatik, 52*(3), 185-188. doi: 10.1007/s11576-010-0224-4

Alt, R., & Auth, G. (2010b). Campus Management System. *Business & Information Systems Engineering, 2*(3), 187-190. doi: 10.1007/s12599-010-0105-9

Alves, H., Mainardes, E. W., & Raposo, M. (2010). A relationship approach to higher education institution stakeholder management. *Tertiary Education & Management, 16*(3), 159-181. doi: 10.1080/13583883.2010.497314

Arbeitgebervereinigung der Bundesländer. (2013). TV-L Tarifvertrag. *TV-L* Retrieved from http://www.tdl-online.de/tv-l/tarifvertrag.html

Badrakhan, B. (2010). Data-driven quality. *Electrical Wholesaling, 91*(2), 32. Retrieved from http://ewweb.com/

Balderston, F. (1995). *Managing today`s university: Strategies for viability, change and excellence.* San Francisco, CA: Jossey-Bass Publishers.

Baltzan, P., & Phillips, A. (2009). *Essentials of business driven information systems* (1st ed.). Boston, MA: McGraw-Hill/Irwin.

Bauer, N.-J. (2011). Sieben Jahre integriertes Campus Management an deutschen Hochschulen - Ein Erfahrungsbericht [Seven years of integrated campus management at German universities - a field report]. In A. Degkwitz & F. Klapper (Eds.), *Prozessorientierte Hochschule - Allgemeine Aspekte und Praxisbeispiele [Process oriented university - Common aspects and practice examples]* (pp. 39-50). Bad Honnef, Germany: Bock + Herchen Verlag.

Baxter, P., & Jack, S. (2008). Qualitative case study methodology: Study design and implementation for novice researchers. *The Qualitative Report, 13*(4), 544-559. Retrieved from http://www.pathfind.org/site/DocServer/m_e_tool_series_case_study.pdf

Behrenbeck, S. (2011). Effekte der Bologna-Reform auf die Hochschultypen. [Effects of the Bologna-reform on the types of higher education institutions]. *Wissenschaftsrecht, 44*, 156-179. Retrieved from

http://www.mohr.de/zeitschriften/rechtswissenschaft/wissenschaftsrecht-wissr/zeitschrift.html

Benelux Bologna Secretariat. (2010). Welcome to the website of the European Higher Education area: The official Bologna Process website 2007-2010 Retrieved from http://www.ond.vlaanderen.be/hogeronderwijs/bologna/

Bensberg, F. (2009). TCO-Analyse von Campus-Management-Systemen – Methodischer Bezugsrahmen und Softwareunterstützung. [TCO-analysis of campus management systems - Systematic frame of reference and software support]. *Wirtschaftinformatik Proceedings 2009, Paper 129*. Retrieved from http://aisel.aisnet.org/wi2009/129

Berg, B. L. (2009). *Qualitative research methods for the social sciences* (7 ed.). Boston, MA: Pearson Education.

Bess, J. L. (1977). The motivation to teach. *The Journal of Higher Education, 48*(3), 243-258. Retrieved from http://www.jstor.org/stable/1978679

Bingi, P., Sharma, M. K., & Godla, J. K. (1999). Critical issues affecting an ERP implementation. *Information Systems Management, 16*(3), 7. doi: 10.1201/1078/43197.16.3.19990601/31310.2

Bischof, C., Hengstebeck, I., & Grzemski, S. (2011). Einführung eines Service Desk am Rechen- und Kommunikationszentrum der RWTH Aachen University [Introduction of a service desk at the computing and communication center at RWTH Aachen university]. In A. Degkwitz & F. Klapper (Eds.), *Prozessorientierte Hochschule - Allgemeine Aspekte und Praxisbeispiele [Process oriented university - Common aspects and practice examples]* (pp. 181-198). Bad Honnef, Germany: Bock + Herchen Verlag.

Black, T. R. (1999). *Doing quantitative research in the social sciences: An integrated approach to research design, measurement and statistics*. Thousand Oaks, CA: Sage Publications.

Blackstone Jr, J. H., & Cox, J. F. (2005). *APICS Dictionary* (11th ed.). Chicago, IL: APICS: The Association for Operations Management.

Blümel, A., Kloke, K., & Krücken, G. (2011). Professionalisierungsprozesse im Hochschulmanagement in Deutschland [Processes of professionalization in higher education management in Germany]. In A. Langer & A. Schröer (Eds.), *Professionalisierung im Nonprofit Management (Professionalization in nonprofit management)* (pp. 105-127). Heidelberg, Germany: VS Verlag für Sozialwissenschaften.

BMBF. (2010). Hochschulen nach Hochschulart und Ländern in Deutschland (2010), from http://www.datenportal.bmbf.de/portal/grafik-2.5.1.pdf

BMBF. (2011). *Hochschulen nach Hochschularten und Ländern*. Bundesministerium für Bildung und Forschung (BMBF) Retrieved from http://www.datenportal.bmbf.de/portal/Tabelle-2.5.1.html.

BMBF. (2012, July 16, 2012). Excellence initiative for cutting-edge research at institutions of higher education Retrieved from http://www.bmbf.de/en/1321.php

Böhm, B., Held, W., & Tröger, B. (2007). Integriertes Informationsmanagement einer großen Universität [Integrated information management of a big university]. In A. Degkwitz & P. Schirmbacher (Eds.), *Informationsstrukturen im Wandel. Informationsmanagement an deutschen Universitäten [Changing infrastructures for academic services. Information management in German universities]* (pp. 141-152). Bad Honnef, Germany: Bock & Herchen.

Bologa, R., Bologa, A.-R., & Sabau, G. (2009, November 13-November 15). *Success factors for higher education ERPs.* Paper presented at the 2009 International Conference on Computer Technology and Development, Kota Kinabalu, Malaysia.

Bowen, G. A. (2009). Document analysis as a qualitative research method. *Qualitative Research Journal, 9*(2), 27-40. doi: 10.3316/qrj0902027

Brantlinger, E., Jimenez, R., Klingner, J., Pugach, M., & Richardson, V. (2005). Qualitative Studies in Special Education. *Exceptional Children, 71*(2), 195-207. Retrieved from http://www.cec.sped.org/

Breitner, M., Klages, M., & Sprenger, J. (2008). *Wirtschaftlichkeitsanalyse ausgewählter Campus Management Systeme im Auftrag der TU9 - Management Summary* (WaCaMaS Vers 1.1 ed.). Hannover, Germany: Leibniz Universität Hannover.

Broom, A., Hand, K., & Tovey, P. (2009). The role of gender, environment and Individual biography in shaping qualitative interview data. *International Journal of Social Research Methodology, 12(1),* 51-65. doi: 10.1080/13645570701606028

Brown, L. (2008). Language and anxiety: An ethnographic study of international postgraduate students. *Evaluation and Research in Education, 21*(2), 75-95. doi: 10.2167/eri410.0

Carton, F., Adam, F., & Sammon, D. (2008). Project management: a case study of a successful ERP implementation. *International Journal of Managing Projects in Business, 1*(1), 106-124. doi: 10.1108/17538370810846441

Cavaye, A. L. M. (1996). Case study research: A multi-faceted research approach for IS. *Information Systems Journal, 6*(3), 227-242. doi: 10.1111/j.1365-2575.1996.tb00015.x

Chen, J.-R. (2009). An exploratory study of alignment ERP implementation and organizational development activities in a newly established firm. *Journal of Enterprise Information Management, 22*(3), 298-316. doi: 10.1108/17410390910949733

Cobarsí, J., Bernardo, M., & Coenders, G. (2008). Campus information systems for students: classification in Spain. *Campus - Wide Information Systems, 25*(1), 50-50-64. doi: 10.1108/10650740810849089

Conghua, L. (2002). ERP packages. In J. M. Myerson (Ed.), *Enterprise Systems Integration* (2nd ed.). Boca Raton, FL: Auerbach Publications.

Creswell, J. W. (2009). *Research design: qualitative, quantitative, and mixed methods approaches*. Thousand Oaks, CA: Sage Publications.

Creswell, J. W. (2012). *Educational research. Planning, conducting, and evaluating quantitative and qualitative research* (4th ed.). Boston, MA: Pearson Education.

Cunningham, J. B. (1997). Case study principles for different types of cases. *Quality and Quantity, 31*(4), 401-423. doi: http://dx.doi.org/10.1023/A:1004254420302

Datenlotsen. (2012). Geschichte (History) Retrieved from http://www.datenlotsen.de/de/unternehmen/geschichte/Seiten/default.aspx

Davenport, T. H. (2000). *Mission critical*. Boston, MA: Harvard Business School.

Davenport, T. H. (2005). *Thinking for a living: How to get better performance and results from knowledge workers*. Boston, MA: Harvard Business School Press.

Davenport, T. H. (2011). Rethinking knowledge work: A strategic approach. *McKinsey Quarterly*(1), 89-99. Retrieved from http://www.mckinseyquarterly.com/

de Millo, A. (2005). Risk management strategy: A practical guide for risk awareness and its cause and effect on project deployment. *Journal of Digital Asset Management, 1,* 88-95. doi: 10.1057/palgrave.dam.3640015

DeCarlo, D., Lewis, J. P., & Wysocki, R. K. (2004). *eXtreme project management. Using leadership, principles, and tools to deliver value in the face of volatility*. San Francisco, CA: Jossey-Bass.

Degkwitz, A., & Klapper, F. (2011). *Prozessorientierte Hochschule - Allgemeine Aspekte und Praxisbeispiele*. Bad Honnef, Germany: Bock + Herchen Verlag.

Dittrich, Y., Vaucouleur, S., & Giff, S. (2009). ERP customization as software engineering: Knowledge sharing and cooperation. *IEEE Software, 26*(6), 6. doi: 10.1109/MS.2009.173

Dixit, A. K., & Prakash, O. (2011). A study of issues affecting ERP implementation in SMEs. *Researchers World, 2*(2), 77-85. Retrieved from http://www.researchersworld.com/

Dowlatshahi, S. (2005). Strategic success factors in enterprise resource-planning design and implementation: A case-study approach. *International Journal of Production Research, 43*(18), 3745-3771. doi: 10.1080/00207540500140864

Dredden, G., & Bergdolt, J. C. (2007). Enterprise resource planning. *Air Force Journal of Logistics, 31*(2), 48-52. Retrieved from http://www.aflma.hq.af.mil/lgj/journals.asp

Dues, P. M. (2010). *Quantitative correlation of enterprise resource planning type, success, and technology leadership style in local government* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3455559)

DUZ. (2010). Unabhängige Deutsche Universitätszeitung Retrieved from http://www.duz.de/docs/magazin.html

ERP IT Toolbox. (2007). Success/fail rates for ERP implementations Retrieved from http://erp.ittoolbox.com/documents/successfail-rates-for-erp-implementations-12546

Esteves, J., & Bohorquez, V. (2007). An updated ERP systems annotated bibliography: 2001-2005. *Communications of AIS, 2007*(19), 386-446. Retrieved from http://aisel.aisnet.org/cais/

European Commission. (2010). Education & Training. Retrieved from http://ec.europa.eu/education/higher-education/doc1290_en.htm

Ferratt, T. W., Ahire, S., & De, P. (2006). Achieving success in large projects: Implications from a study of ERP implementations. *Interfaces, 36*(5), 458-469. doi: 10.1287/inte.1060.0203

Franck, E., & Opitz, C. (2000). Selektion und Veredelung von Humankapital: Implikationen für eine leistungsorientierte Vergütung von Hochschullehrern. [Selection and refinement of human capital: Implications of performance-based compensation for academics]. *Zeitschrift für Personalforschung (German Journal of Research in Human Resource Management), 14*(3), 270-290. doi: 10.5167/uzh-2788

Frantz, P. S., Southerland, A. R., & Johnson, J. T. (2002). ERP software implementation best practices. *EDUCAUSE Quaterly, 25*(4), 38-45. Retrieved from http://net.educause.edu/ir/library/pdf/eqm0246.pdf

Franz-Balsen, A., & Heinrichs, H. (2007). Managing sustainability communication on campus: Experiences from Lüneburg. *International Journal of Sustainability in Higher Education, 8*(4), 431-445. doi: 10.1108/14676370710823591

Freeman, R. E. (1984). *Strategic management: A stakeholder approach*. Boston, MA: Pitman.

Fryling, M. (2010). *Total cost of ownership, system acceptance and perceived success of Enterprise Resource Planning software: Simulating a dynamic feedback perspective of*

ERP in the higher education environment (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3402347)

Fullan, M., & Scott, G. (2009). *Turnaround leadership for higher education*. San Francisco, CA: Jossey-Bass.

Gable, G. G., Sedera, D., & Chan, T. (2003). *Enterprise systems success: A measurement model.* Paper presented at the 24th International Conference on Information Systems, Seattle, Washington.

Gartner. (2012). IT glossary: ERP Retrieved from http://www.gartner.com/technology/it-glossary/erp.jsp

Gaston, P. L. (2008). Bologna: A challenge for liberal education and an exceptional opportunity. *Liberal Education, 94*(4), 14-19. Retrieved from http://www.aacu.org/liberaleducation/

Gattiker, T. F. (2002). Anatomy of an ERP implementation gone awry. *Production and Inventory Management Journal, 43*(3/4), 96-105. Retrieved from http://www.apics.org/industry-content-research/publications/p-im-journal

Gattiker, T. F., & Carter, C. R. (2010). Understanding project champions` ability to gain intra-organizational commitment for environmental projects. *Journal of Operations Management, 28*(1), 72-85. doi: 10.1016/j.jom.2009.09.001.

Gerring, J. (2007). *Case study research: Principles and practices*. Cambridge, MA: Cambridge University Press.

Gershon, A. S., & Tu, J. V. (2008). The effect of privacy legislation on observational research. *Canadian Medical Association. Journal, 178*(7), 871-873. doi: 10.1503/cmaj.061353

Ghosh, S., & Skibniewski, M. (2010). Enterprise resource planning systems implementation as a complex project: A conceptual framework. *Journal of Business Economics and Management, 11*(4), 533-549. doi: 10.3846/jbem.2010.26

Goldman, A. I. (1999). *Knowledge in a social world*. New York: Oxford University Press.

Goodman, L. A. (1961). Snowball sampling. *The Annals of Mathematical Statistics, 32*(1), 148-170. Retrieved from http://www.jstor.org/stable/2237615

Grabski, S. V., Leech, S. A., & Schmidt, P. J. (2011). A Review of ERP Research: A Future Agenda for Accounting Information Systems. *Journal of Information Systems, 25*(1), 37-78. doi: 10.2308/jis.2011.25.1.37

Graham, J. F. (2009). *Enterprise resource planning implementation in higher education* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3455493)

Green, J., Willis, K., Hughes, E., Small, R., Welch, N., Gibbs, L., & Daly, J. (2007). Generating best evidence from qualitative research: the role of data analysis. *Australian & New Zealand Journal of Public Health, 31*(6), 545-550. doi: 10.1111/j.1753-6405.2007.00141.x

Greenfield, D. (2008). CRM 2.0. *eWeek, 25*(19), 32. Retrieved from http://www.eweek.com

Guntamukkala, V., Wen, H. J., & Tarn, J. M. (2006). An empirical study of selecting software development life cycle models. *Human Systems Management, 25*(4), 265-278. Retrieved from http://www.iospress.nl/journal/human-systems-management/

Haag, S., & Cummings, M. (2008). *Management information systems for the information age* (Vol. 7th Edition). New York, NY: Mcgraw Hill Higher Education.

Haase, L. (2014). *Identifying and applying themes in large-scale IT: Implementations of the development team and end users* (Dissertation). (UMI No.

Hall, R. J., & Swee, H.-Y. (2006). Quantitative research approach *Encyclopedia of industrial/organizational psychology* (pp. 652-655). Thousand Oaks, CA: Sage.

Hawari, A. a., & Heeks, R. (2010). Explaining ERP failure in a developing country: A Jordanian case study. *Journal of Enterprise Information Management, 23*(2), 135-160. doi: 10.1108/17410391011019741

Heiskanen, A., Newman, M., & Similä, J. (2000). The social dynamics of software development. *Accounting, Management and Information Technologies, 10*(1), 1-32. doi: 10.1016/S0959-8022(99)00013-2

HIS. (2010a). Jahresbericht 2010 Retrieved from http://www.his.de/pdf/jahresberichte/Jahresbericht2010.pdf

HIS. (2010b). Unternehmen und Hochschulforschung (Company profile and university research). Retrieved from http://www.his.de/english/organisation

HIS. (2011). HIS und EUNIS richten internationale Konferenz zu Business Intelligence aus. Retrieved from http://www.his.de/presse/news/ganze_pm?pm_nr=828

HIS. (2012). Nutzertagungen Übersicht Retrieved from http://www.his.de/veranstaltung/nutzer/nuta

Hochschulkompass. (2011). HRK - Hochschulrektorenkonferenz: Die Stimme der Hochschulen Retrieved from http://www.hochschulkompass.de

Hofmann, P. (2008). ERP is dead, long live ERP. *IEEE Internet Computing, 12*(4), 84-88. doi: 10.1109/mic.2008.78

Holland, C. P., & Light, B. (2003). A framework for understanding success and failure in enterprise resource planning system implementation. In G. Shanks, P. B. Seddon & L. P.

Willcocks (Eds.), *Second-Wave Enterprise Resource Planning Systems* (pp. 180-195). United Kingdom: Cambridge University Press

Honecker, P. (2012). Startschuss für ein Großprojekt im Campusmanagement, Online Pressrelease. Retrieved from http://www.portal.uni-koeln.de/nachricht+M596dd844713.html

Hoopes, J. (2003). *False Prophets: The gurus who created modern management and why their ideas are bad for business today*. Cambridge, MA: Basic Books.

Hossler, D. (2006). The impact of implementing new information systems on the priorities, management, and allocation of resources at colleges and universities. *New Directions for Higher Education*(136), 69-76. doi: 10.1002/he.240

HRK. (2012). About HRK Retrieved from http://www.hrk.de/eng/hrk_auf_einen_blick/hrk_at_a_glance.php

Hsieh, H.-F., & Shannon, S. E. (2005). Three approaches to qualitative content analysis. *Qualitative Health Research, 15*(9). doi: 10.1177/1049732305276687

Huang, M.-H., Wang, J.-C., Yu, S., & Chiu, C.-C. (2004). Value-added ERP information into information goods: an economic analysis. *Industrial Management & Data Systems, 104*(8), 8. doi: 10.1108/02635570410561681

Huang, X., Gattiker, T. F., & Schwarz, J. L. (2008). Interpersonal trust formation during the supplier selection process: The role of the communication channel. *Journal of Supply Chain Management, 44*(3), 53-75. doi: 10.1111/j.1745-493X.2008.00066.x

Hübner, U., Duda, I., Merz, M., Natusch, D., & Weckmann, H.-D. (2008). *HISinOne - Development and early adoption partnerships*. Paper presented at the EUNIS 2008 -

"VISION IT - Visions for use of IT in higher education", Aarhus University, Denmark. http://eunis.dk/papers/p8.pdf

Humboldt, W. v. (1851). *Ideen zu einem Versuch, die Grenzen der Wirksamkeit des Staats zu bestimmen*. Breslau, Germany: Eduard Trewendt.

Ibrahim, A., Sharp, J. M., & Syntetos, A. A. (2008). *A framework for the implementation of ERP to improve business performance: A case study*. Paper presented at the European and Mediterranean Conference on Information Systems 2008 (EMCIS2008), Dubai. www.iseing.org

Ifinedo, P. (2006). Extending the Gable et al. enterprise systems success measurement model: A preliminary study. *Journal of Information Technology Management, 17*(1), 14-33. Retrieved from http://www.aom-iaom.org/

Ifinedo, P. (2007). Interactions between organizational size, culture, and structure and some IT factors in the context of ERP success assessment: An exploratory investigation. *Journal of Computer Information Systems, 47*(4), 28-44. Retrieved from www.iacis.org/jcis/jcis.php

Ifinedo, P., & Nahar, N. (2007). ERP systems success: An empirical analysis of how two organizational stakeholder groups prioritize and evaluate relevant measures. *Enterprise Information Systems, 1*(1), 25-48. doi: 10.1080/17517570601088539

Jacobs, R. F., & Weston Jr., F. C. T. (2007). Enterprise resource planning (ERP)—A brief history. *Journal of Operations Management, 25*(2), 357-363. doi: 10.1016/j.jom.2006.11.005

Johannes Gutenberg Universität Mainz. (2012). Auswahlverfahren Retrieved from http://www.projekt2008.uni-mainz.de/209.php

Kansal, V. (2008). Proposing enterprise wide information systems business performance model. *International Journal of Computer and Information Science and Engineering, 2*(2), 136. Retrieved from http://www.enggjournals.com/ijcse/

Katz, R. N., Kyavik, R. B., Renrod, J. I., Pirani, J. A., Nelson, M. R., & Salaway, G. (2004). Information technology leadership in higher education: The condition of the community Retrieved from http://www.educause.edu

Khatib, E. (2010). *A phenomenological study on the potential impact of implementing information systems in midsize corporations* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3446506)

Kieser, A. (2010). Unternehmen Wissenschaft? [Science corporation]. *Leviathan, 3*, 347-367. doi: 10.1007/s11578-010-0093-7

Kim, Y., Lee, Z., & Gosain, S. (2005). Impediments to successful ERP implementation process. *Business Process Management Journal, 11*(2), 158-170. doi: 10.1108/14637150510591156

Klapper, F. (2011). Geschäftsprozessmanagement unter dem Fokus des IT-Managements [Business process management in the focus of IT-management]. In A. Degkwitz & F. Klapper (Eds.), *Prozessorientierte Hochschule - Allgemeine Aspekte und Praxisbeispiele [Process oriented university - Common aspects and practice examples]* (pp. 181-198). Bad Honnef, Germany: Bock + Herchen Verlag.

Klaus, H., Rosemann, M., & Gable, G. G. (2000). What is ERP? *Information Systems Frontiers, 2*(2), 21. doi: 10.1023/A:1026543906354

Kleimann, B., & Schmid, U. (2007). E-Readiness der deutschen Hochschulen - Ergebnisse einer Umfrage zum Standt von IT-Management und E-Learning [E-readiness of German higher

education institutions - Results of a survey regarding the status of IT-management and E-learning]. In R. Keil, M. Kerres & R. Schulmeister (Eds.), *eUniversity - Update Bologna*. Hamburg, Germany: Waxmann Verlag.

Klopper, H. (2008). The qualitative research proposal. *Curationis, 31*(4), 62-72. Retrieved from http://www.denosa.org.za/

Konopka, R. J. (2007). *Building an information sharing management system (ISMS) for administrative services in a charter school* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3244738)

Krakowsky, R. P. (2008). *Sustaining change in higher education administrative student services* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3315151)

Kroenke, D. M. (2011). *Using MIS* (3rd ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Kuhn, T. S. (1996). *The structure of scientific revolutions* (3rd ed.). Chicago, IL: The University of Chicago Press.

Kumar, K., & Van Hillegersberg, J. (2000). ERP experiences and evolution. *Communications of the ACM, 43*(4), 22-26. Retrieved from http://cacm.acm.org/

Küpper, H.-U., & Sinz, E. (1998). *Gestaltungskonzepte für Hochschulen: Effizienz, Effektivität, Evolution*. Stuttgart, Germany: Schäfer-Poeschel.

Kuratko, D. F., Hornsby, J. S., & Goldsby, M. G. (2007). The relationship of stakeholder salience, organizational posture, and entrepreneurial intensity to corporate enterpreneurship. *Journal of Leadership & Organizational Studies, 13*(4), 56. doi: 10.1177/10717919070130040801

Lacurezeanu, R., Buchmann, R., Bresfelean, P., & Mares, V. (2011). The pace of e-learning in Romanian universities' strategies. *Informatica Economică, 15*(1), 220-227. Retrieved from http://revistaie.ase.ro/

Lapham, J. E. (2009). *Public leadership competencies in adoption of enterprise systems at Federal Government institutions* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3388318)

Laudon, K. C., & Laudon, J. P. (2008). *Management information systems: Managing the digital firm* (11th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Lee, J. C., & Myers, M. D. (2004). Dominant actors, political agendas, and strategic shifts over time: a critical ethnography of an enterprise systems implementation. *The Journal of Strategic Information Systems, 13*(4), 355-374. doi: 10.1016/j.jsis.2004.11.005

Leedy, P. D., & Ormrod, J. E. (2010). *Practical research: Planning and design* (9th ed.). Upper Saddle River, NJ: Prentice Hall.

Li, Y., Liao, X. W., & Lei, H. Z. (2006). A knowledge management system for ERP implementation. *Systems Research and Behavioral Science, 23*(2), 157-169. doi: http://dx.doi.org/10.1002/sres.751

Lockwood, G. (1985). *Universities as organizations*. Windsor, Great Britain: NFER-Nelson Publishing.

Luftman, J. N. (2004). *Managing the information technology resource: Leadership in the information age*. Upper Saddle River, NJ: Pearson Prentice Hall.

Malloy, D. C., & Lang, D. L. (1993). An Aristotelian approach to case study analysis. *Journal of Business Ethics, 12*(7), 511-516. Retrieved from http://www.jstor.org/stable/25072431

Marterer, A. C. (2008). *Enterprise resource planning in higher education: A comparative case study* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3338728)

Masrek, M. N. b. (2007). Measuring campus portal effectiveness and the contributing factors. *Campus-Wide Information Systems, 24*(5), 342-254. doi: 10.1108/10650740710835760

Maurer, A. (2011). Organisationsmodell für Campusmanagement - Umbruch durch Software oder Software durch Umbruch [Organisational model for campus management - Change through software or software through change]. In A. Degkwitz & F. Klapper (Eds.), *Prozessorientierte Hochschule - Allgemeine Aspekte und Praxisbeispiele (Processoriented university - Common aspects and practice examples)* (pp. 113-127). Bad Honnef, Germany: Bock + Herchen Verlag.

Maxwell, J. A. (2005). *Qualitative research design*. Thousand Oaks, CA: Sage Publications.

McKeen, J. D., & Smith, H. A. (2009). *IT strategy in action*. Upper Saddle River, NJ: Pearson Prentice Hall.

Mehlinger, L. B. (2006). *Indicators of successful enterprise technology implementations in higher education* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3216235)

Merriam, S. B. (2009). *Qualitative research: A guide to design and implementation. Revised and expanded from qualitative research and case study applications in education*: John Wiley & Sons Inc.

Metrejean, E., & Stocks, M. H. (2011). The role of consultants in the implementation of enterprise resource planning systems. *Academy of Information and Management Sciences Journal, 14*(1), 1-24. Retrieved from http://www.alliedacademies.org/

Mitchell, R. K., Agle, B. R., & Wood, D. J. (1997). Toward a theory of stakeholder identification and salience: Defining the principle of who and what really counts. *Academy of Management Review, 2*(2-4), 853-886. doi: 10.2307/259247

Moses, J. W., & Knutsen, T. (2007). *Ways of knowing - Competing methodologies in social and political research*. New York, NY: Palgrave Macmillan.

Moses, J. W., & Knutsen, T. (2012). *Ways of knowing - Competing methodologies in social and political research* (2nd ed.). New York, NY: Palgrave Macmillan.

Moustakas, C. (1994). *Phenomenological research methods*. Thousand Oaks, CA: Sage Publications, Inc.

Mudaliar, A., Garde, V. D., & Sharma, D. P. (2009, December 16-December 18). *Educational resource planning - A framework for educational institutions.* Paper presented at the 2009 Second International Conference on Emerging Trends in Engineering & Technology, Nagpur, Maharashtra India.

Multimedia Kontor Hamburg. (2013). Campus innovation Retrieved from http://www.campus-innovation.de/home.html

Nahavandi, A. (2006). *The art and science of leadership* (4th ed.). Upper Saddle River, NJ: Pearson Prentice Hall.

Noy, C. (2008). Sampling knowledge: The hermeneutics of snowball sampling in qualitative research. *International Journal of Social Research Methodology, 11*(4), 327-344. doi: 10.1080/13645570701401305

NVivo. (2013). NVivo features and benefits Retrieved from http://www.qsrinternational.com/products_nvivo_features-and-benefits.aspx

Okunoye, A., Frolick, M., & Crable, E. (2006). ERP implementation in higher education: An account of pre-implementation and implementation phases. *Journal of Cases on Information Technology, 8*(2), 110-132. doi: 10.4018/jcit.2006040106

Okunoye, A., Frolick, M., & Crable, E. (2008). Stakeholder influence and ERP implementation in higher education. *Journal of Information Technology Case & Application Research, 10*(3), 9-38. Retrieved from http://jitcar.ivylp.org/

Omerzel, D. G., Biloslavo, R., & Trnavčevič, A. (2011). Knowledge management and organisational culture in higher education institutions. *Journal for East European Management Studies, 16*(2), 111-139. Retrieved from http://www.hampp-verlag.de/hampp_e-journals_JEMS.htm

Orb, A., Eisenhauer, L., & Wynaden, D. (2001). Ethics in qualitative research. *Journal of Nursing Scholarship, 33*(1), 93-96. doi: 10.1111/j.1547-5069.2001.00093.x

Palonen, K. (2003). Four times of politics: Policy, polity, politicking, and politicization. *Alternatives: Global, Local, Political, 28*(2), 171-186. Retrieved from http://www.jstor.org/stable/40645073

Parmar, D., & Trotter, E. (2004). Keeping our students: identifying factors that influence student withdrawal and strategies to enhance the experience and retention of first-year students. *Learning & Teaching in the Social Sciences, 1*(3), 149-168. doi: 10.1386/ltss.1.3.149/0

Parr, A., & Shanks, G. (2000). A model of ERP project implementation. *Journal of Information Technology (Routledge, Ltd.), 15*(4), 289-303. doi: 10.1080/02683960010009051

Patton, M. Q. (1990). *Qualitative evaluation and research methods* (Vol. 2nd). Newbury Park, CA: Sage Publications.

Paulsen, & Schlüter. (2012). *Erfahrungsberichte HISinOne-Einführung [Experiences with HISinOne Implementations]*. Paper presented at the conference Planst du noch oder prüfst du schon? [Are you still planning or already examining?] Potsdam, Germany. http://www.his.de/veranstaltung

Paulsen, R. (2008). *Aktuelles zur HIS-Softwarepolitik*. Paper presented at the Tagung der Studiensekretariate, Erfurt. Presentation retrieved from http://sulwww.uni-erfurt.de/studsekleitertagung2008/2008-12-11_Paulsen.pdf

Pearlson, K. E., & Saunders, C. S. (2010). *Managing and using information systems: A strategic approach* (4th ed.). Hoboken, NJ: John Wiley & Sons.

Pfeffer, J., & Salancik, G. R. (1974). Organizational decision making as a political process: The case of a university budget. *Administrative Science Quarterly, 19*(2), 135-151. doi: 10.2307/2393885

Pirani, J. A., & Salaway, G. (2004). Information technology alignment in higher education. Retrieved from http://www.educause.edu/

Polkinghorne, D. E. (2005). Language and meaning: Data collection in qualitative research. *Journal of Counseling Psychology, 52*(2), 137-145. doi: 10.1037/0022-0167.52.2.137

Pollock, N. (2003). The 'self-service' student: Building enterprise-wide systems into universities. *Prometheus, 21*(1), 101. doi: 10.1080/0810902032000051045

Pollock, N., & Cornford, J. (2004). ERP systems and the university as a "unique" organization. *Information Technology & People, 17*(1), 31-52. doi: 10.1108/09593840410522161

Pollock, N., Williams, R., & Procter, R. (2003). Fitting standard software packages to non-standard organizations: The `biography` of an enterprise-wide system. *Technology*

Analysis & Strategic Management, 15(3), 317-332. doi: 10.1080/09537320310001601504

Pratt, G. (2007). *Cultural and operational process issues of information technology support in academia: A grounded theory study* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 304732945)

Quapp, U. (2010). Akkreditierung - ein Angriff auf die Freiheit der Lehre. [Accreditation - an attac on the freedom of teaching]. *Wissenschaftsrecht, 43*(2010), 346-363. Retrieved from http://www.ingentaconnect.com/content/mohr/wissr

Rabaa'i, A. A., Bandara, W., & Gable, G. (2009, 2-4 Dec 2009). *ERP systems in the higher education sector : A descriptive study.* Paper presented at the 20th Australasian Conference on Information Systems, Caulfield Campus, Melbourne.

Radenbach, W. (2009). *Integriertes Campus Management durch Verknüpfung spezialisierter Standardsoftware.* Paper presented at the Wirtschaftinformatik, Vienna, Austria.

Reed, G. E. (2006). Leadership and systems thinking. *Defense AT&L, May-June*.

Rietfort, S. (2010). Mehr Studenten - weniger Geld (More students - less money). *Focus online* Retrieved from http://www.focus.de/wissen/campus/tid-20528/hochschulen-mehr-studenten-weniger-geld_aid_574792.html

Ringleb, U., & Thelen, A. (2006). *Universitäres Wissensmanagement – Analyse und prototypische Umsetzung am Beispiel einer Microsoft Infrastruktur (University Knowledge Management – Analysis and Exemplary Realization with a Microsoft Infrastructure)* (German Diploma Thesis). (UMI No. n/a)

Ross, J. W., Vitale, M. R., & Willcocks, L. P. (2003). The continuing ERP revolution - Sustainable lessons, new modes of delivery. In G. Shanks, P. B. Seddon & L. P.

Willcocks (Eds.), *Second-wave enterprise resource management systems: Implementing for effectiveness*. Cambridge, MA: Cambridge University Press.

Rowland, N. J. (2007). *First we built, now we buy: A sociological case study of enterprise resource planning systems in higher education* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3297088)

RS3G. (2009). Rome student systems and standards group (RS3G) Retrieved from http://wiki.teria.no/display/RS3G/Home+of+RS3G

Rubin, A. (2008). *Practitioner's guide to using research for evidence-based practice*. Hoboken, NJ: John Wiley & Sons Inc.

Saak, M. (2007). *The role and impact of the project sponsor* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3278606)

SAP Press. (2003). SAP releases campus management student administration system Retrieved from http://www.sap.com/press.epx?pressid=2178

Sathe, P. (2011). *RES/722 - Research design*. University of Phoenix.

Sayer, A. (2000). *Realism and social science*. London, UK: Sage.

Scheer, A.-W., & Habermann, F. (2000). Enterprise resource planning: Making ERP a success. *Communications of the ACM, 43*(4), 57-61. doi: 10.1145/332051.332073

Schiesser, R. (2010). *IT systems management* (2nd ed.). Upper Saddle River, NJ: Prentice Hall.

Schreiber, J. B., & Asner-Self, K. (2011). *Educational research. The interrelationship of questions, sampling, design, and analysis*. Hoboken, NJ: John Will & Sons Inc.

Scott, J. E., & Vessey, I. (2002). Managing risks in enterprise systems implementations. *Communications of the ACM - Supporting community and building social capital, 45*(4), 74-81. doi: 10.1145/505248.505249

Sedera, D., Gable, G. G., & Chan, T. (2004, 14-16 June). *Measuring enterprise system success: The importance of a multiple stakeholder perspective.* Paper presented at the 12th European Conference on Information Systems, Turku, Finland.

Sedera, D., Gable, G. G., & Palmer, A. (2002). *Enterprise resource planning systems impacts: a Delphi study of Australian public sector organizations.* Paper presented at the Pacific Asia Conference on Information Systems (PACIS), Tokyo, Japan.

Shah, S. I. H., Khan, A. Z., Bokhari, R. H., & Abbas Raza, M. (2011). Exploring the impediments of successful ERP implementation: A case study in a public organization. *International Journal of Business & Social Science, 2*, 289-296. Retrieved from http://www.ijbssnet.com/

Shank, G. D. (2006). *Qualitative research: A personal skills approach* (2nd ed.). Upper Saddle River, NJ: Pearson.

Shinebourne, P. (2011). The theoretical underpinnings of interpretative phenomenological analysis (IPA). *Existential Analysis: Journal of the Society for Existential Analysis, 22*(1), 16-31. Retrieved from http://www.existentialanalysis.org.uk/

Sia, S. K., Tang, M., Soh, C., & Boh, W. F. (2002). Enterprise resource planning (ERP) systems as a technology of power: empowerment or panoptic control? *SIGMIS Database, 33*(1), 23-37. doi: 10.1145/504350.504356

Sprenger, J., Klages, M., & Breitner, M. (2010a). Cost-benefit analysis for the selection, migration, and operation of a campus management system. *Business & Information Systems Engineering, 2*(4), 219-231. doi: 10.1007/s12599-010-0110-z

Sprenger, J., Klages, M., & Breitner, M. (2010b). Wirtschaftlichkeitsanalyse für die Auswahl, die Migration und den Betrieb eines Campus-Management-Systems. [Cost-benefit

analysis for the selection, migration, and operation of a campus management system]. *Wirtschaftsinformatik, 52*(4), 211-224. doi: 10.1007/s11576-010-0229-z

Stake, R. E. (2000). Case studies. In N. K. Denzin & Y. S. Lincoln (Eds.), *Handbook of qualitative research* (2nd ed., pp. 435-454). Thousand Oaks, CA: Sage.

Stephenson, S. V., & Sage, A. P. (2007). Architecting for enterprise resource planning. *Information Knowledge Systems Management, 6,* 81-121. Retrieved from http://www.iospress.nl/journal/information-knowledge-systems-management/

Sullivan, L., & Porter, R. (2006). Implementing student information systems. *New Directions for Higher Education*(136), 35-51. doi: 10.1002/he.238

Sullivan, L. S. (2009). *Post-implementation success factors for enterprise resource planning (ERP) student administration systems in higher education institutions* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3383697)

Tarafdar, M., & Sufian, Q. (2010). Examining tactical information technology - Business alignment. *Journal of Computer Information Systems, 50*(4), 107-116. Retrieved from http://www.iacis.org/jcis/jcis.php

Taylor, S. J., & Bogdan, R. (1984). *Introduction to qualitative research methods: The search for meanings*. New York, NY: Wiley.

Technical University Dresden. (2012). Program TUDO - TU Dresden optimized Retrieved from http://tu-dresden.de/die_tu_dresden/rektoratskollegium/tudo

Tellis, W. (1997). Introduction to case study. *The Qualitative Report, 3*(2). Retrieved from http://www.nova.edu/ssss/QR/QR3-2/tellis1.html

Thomas, C. (2009, June 16). *Einführungsprozess eines integrierten Campus Management Systems auf der Basis von SAP SLCM*. Paper presented at the Digitalisierung der Hochschule - Erfahrungen mit Campus-Management-Software, Bonn, Germany.

Thomas, C. (2010). *Campus management systems as ERP systems*. [Presentation]. ZKI - Zentren für Kommunikation und Informationsverarbeitung e.V. Nürnberg, Germany.

Toens, K. (2009). The Bologna Process in German educational federalism: State strategies, policy fragmentation and interest mediation. *German Politics, 18*(2), 246-264. doi: 10.1080/09644000902870875

Tsai, W.-H., Chen, S.-P., Hwang, E. T. Y., & Hsu, J.-L. (2010). A study of the impact of business process on the ERP system effectiveness. *International Journal of Business and Management, 5*(9), 26-37. Retrieved from www.ccsenet.org/ijbm

Tsang-Kosma, W. W. (2010). *University staff perspectives on change management strategies in student information system adoption* (Doctoral Dissertation). ProQuest Dissertations and Theses database. (UMI No. 3411035)

TU Graz. (2012a). CAMPUSonline Retrieved from http://campusonline.tugraz.at/

TU Graz. (2012b). Technische Universität München Retrieved from http://campusonline.tugraz.at/technische-universit%C3%A4t-m%C3%BCnchen

University of Stuttgart. (2012). IT-Lösung für besseren Studierendenservice, Online Pressrelease. Retrieved from http://www.uni-stuttgart.de/hkom/presseservice/pressemitteilungen/2012/023_campus.html?__locale=de

Vathanophas, V., & Stuart, L. (2009). Enterprise resource planning: Technology acceptance in Thai universities. *Enterprise Information Systems, 3*(2), 133-158. doi: 10.1080/17517570802653800

von Urff Kaufeld, N., Chari, V., & Freeme, D. (2009). Critical success factors for effective IT leadership. *Electronic Journal of Information Systems Evaluation, 12*(1), 119-128. Retrieved from www.ejise.com/

Wagner, E. L., & Newell, S. (2004). 'Best' for whom? the tension between 'best practice' ERP packages and diverse epistemic cultures in a university context. *Journal of Strategic Information Systems, 13*(4), 305-328. doi: 10.1016/j.jsis.2004.11.002

Wang, Y., Li, H., Warfield, J., & Xu, L. (2006). Knowledge management in the ERP era. *Systems Research & Behavioral Science, 23*(2), 125-128. doi: 10.1002/sres.765

Weiss, M. L. (2010). *Information technology management in higher education: An evidence-based approach to improving chief information officer performance* (Doctoral dissertation). ProQuest Dissertations and Theses database database. (UMI No. 3402405)

Welsh, H. A. (2010). Higher education in Germany: Fragmented change amid paradigm shifts. *German Politics & Society, 28*(2), 53-70. doi: 10.3167/gps.2010.280204

Whittemore, R., & Melkus, G. D. E. (2008). Designing a research study. *The Diabetes Educator, 34*(2), 201-216. doi: 10.1177/0145721708315678

Whitworth, A. (2012). Invisible success: Problems with the grand technological innovation in higher education. *Computers & Education, 59*(1), 145-155. doi: 10.1016/j.compedu.2011.09.023

Wiepcke, C. (2009). Employability in the Bologna Process: An area of tension between society, businesses and students. *International Journal of Learning, 16*(4), 435-445. Retrieved from http://ijl.cgpublisher.com/

Willis, J. W. (2007). *Foundations of qualitative research: Interpretive and critical approaches*. Thousand Oaks, CA: Sage Publications.

Yang, C., & Su, Y.-f. (2009). The relationship between benefits of ERP systems implementation and its impacts on firm performance of SCM. *Journal of Enterprise Information Management, 22*(6), 722-752. doi: 10.1108/17410390910999602

Yardley, L. (2000). Dilemmas in qualitative health research. *Psychology & Health, 15*(2), 215-228. doi: 10.1080/08870440008400302

Yin, R. K. (1994). *Case study research: Design and methods* (Vol. 5). Thousand Oaks, CA: Sage Publications.

Yin, R. K. (2003). *Case study research: Design and methods* (3rd ed.). Thousand Oaks, CA: Sage Publications.

Yin, R. K. (2010). *Qualitative Research from Start to Finish*. Beverly Hills, CA: Sage Publications.

ZKI. (2012). *Top concerns - Spring 2012*. ZKI - Zentren für Kommunikation und Informationsverarbeitung in Lehre und Forschung e.V. Retrieved from http://www.zki.de/

ZKI. (2013). Arbeitskreis Campus Management Retrieved from https://www.zki.de/arbeitskreise/campus-management/

Zornada, L., & Velkavrh, T. B. (2005). *Implementing ERP systems in higher education institutions*. Paper presented at the 27th Int. Conf. Information Technology Interfaces ITI, Cavtat, Croatia.

Appendix

Related Qualitative and Quantitative Studies

Qualitative and Quantitative Studies Related to Success/Risk Factors and ERP Implementations in Higher Education Institutions

Author(s)	**Type of Study**	**Location/ Type of Institution**	**Subjects**	**Focus**	**Time**
Aldayel, et al., (2011)	Explor-atory case study using quantitative descriptive data	Saudi Arabia – Higher education institution	IT personnel and end-users	CSF from a technical perspective and user satisfaction	Post-impleme ntation
Dues (2010)	Quanti-tative correla-tional	USA - Local government	Senior technology leaders in local governments responsible for ERP system support (=CIO)	Relationship of leadership style, type of ERP implemented, and perceived success	Post-impleme ntation
Graham (2009)	Multiple (explor-atory) case study	USA - Higher education institutions, public and private	Project management team members, project managers, functional team leaders, technical team leaders, module functional team members, or technical team	Project success factors	Post-impleme ntation

			members – communication organized through the IT service department		
Khatib (2010)	Phenomenological study	USA - Midsize corporations	Employees in midsize corporations with two years of employment – no management	Themes hinting toward organizational success during IS changes	Current and post-implementation
Lapham (2009)	Phenome-nological study	USA – Federal institutions in defense, health, and others	Senior executives and organizational leaders, program or project managers, change agents, functional sponsors, and technical experts	Individual competencies to engage and influence ERP implementation success	Post-implementation (2000 or later)
Okunoye, et al., (2008)	Explor-atory case study	USA – Private higher education institution	Project manager, project members, committees, senior administrative staff, documents	Stakeholder influence and stakeholder groups	End of implementation phase
Pollock (2003)	Ethno-graphic study	UK - Higher education institution	Senior university managers, external consultants, project managers, practitioners, academics, administrators, and support staff	Commercial ERP self-service applications onto a higher education institution and its challenges	Implementation ("in the making" (p. 104))
Pratt (2007)	Grounded theory	USA - Higher education	CIOs and CEOs	Alignment of IT with the	No project

		institutions, public and private		institution in terms of cultural and organizational processes to discover areas of consequences for efficiency and effectiveness	focus - overall alignment of IT with the campus
Rabaa'i, et al., (2009)	Single descriptive case study	Australia – Higher education institution	"elite interviewing" of IT and business managers	Description of single case success factors	Post-implementation
Sullivan (2009)	Mixed-method: online survey and exploratory case study	USA - Higher education institutions, public and private	Quantitative: EDUCAUSE participants – CIOs or primary technology administrator; Qualitative: contact identified in survey; for site visits registrar, director of admissions and student financial aid, IT developers, end-users of student administration module, academic	Post-implementation characteristics and experiences	Post-implementation

			advisors, and faculty members		
Tsang-Kosma (2010)	Phenome-nological study	USA – Higher education institution	Legacy and non-legacy system users, heavy and light system users	Experiences of the IT adoption process, upgrades, and change management strategies	Post-impleme ntation

Appendix B

Invitation to Participate in a Research Study (E)

Dear Miss _____ / Dear Mr. _____,

My name is Anja Thelen and I am a doctoral student in the Doctor of Management in Organizational Leadership with a specialization in Information Systems and Technology (DM/IST) Program of the University of Phoenix. I am writing my dissertation on the topic of "Experiences of German University Administrative Staff during and after ERP System Implementation: A Case Study."

In this case study the researcher explores critical success and risk factors in the registrar`s and students services department during an campus management system implementation. This approach has not been taken or not been analyzed in depth. Previous studies focused on experiences of IT managers and CIO`s or were not conducted in the German language area. Additionally, the implementation of campus management systems is very present in the media to support the student life cycle and to reduce administrative work. Multiple challenges are faced especially by big state-funded universities and the knowledge about success and risk factors can influence the implementation process positively.

The University _____ matches the criteria for my study: being a state-funded university, having more than 15,000 students, having completed a CMS-implementation past 2010 or being in an advanced state of implementation, and is reachable in a 450 km driving distance from Stuttgart, the researcher's current place of residence. This selection offers the

opportunity to do a comprehensive analysis of different university organizational structures, CMS-vendors, and transnational differences.

I would appreciate if you would show interest in participating in this study. The University of Phoenix requires a filled-out permission form to allow me to conduct my research at the University _____. Attached you find the form that I request you to fill out, to sign, and to send back to me in the self-addressed and stamped envelope. Without the completed permission form I am not allowed to conduct my research at the University _____. If you do not want to participate I would appreciate if you could send me a short notice via email.

After receiving the permissions from universities, my proposal will be go through the internal review board (IRB) process of the University of Phoenix. With a positive IRB response I can then contact the participants of the study, who of course are not required to take part in the study or may opt out at any time. To find eligible participants, I would appreciate if you could either name a contact person to inquire about participants or name participants directly.

I am available for questions via the telephone at (+49) 0711-601-9124 or via Email at athelen@email.phoenix.edu.

Sincerely,

Anja Thelen

Appendix C

Invitation to Participate in a Research Study (GE)

Sehr geehrte Frau _____ / Sehr geehrter Herr _____,

mein Name ist Anja Thelen und ich bin Doktorandin im „Doctor of Management in Organizational Leadership with a specialization in Information Systems and Technology (DM/IST) Program“ der Universität Phoenix. Ich schreibe meine Dissertation über das Thema Erfahrungen universitärer Verwaltungsmitarbeiter während und nach der Einführung eines Campus Management Systems (CMS) (Experiences of German University Administrative Staff during and after ERP System Implementation: A Case Study).

Es handelt sich um eine Fallstudie, die zentralen Erfolgs- und Risikofaktoren bei der Implementierung von Campus Management Systemen im Bereich Prüfungsamt und Studiensekretariat herausarbeiten wird. Dieser Ansatz wurde bisher noch nicht oder nur unzureichend analysiert. Frühere Studien haben sich meist auf Erfahrungen von IT Managern und CIO`s gestützt oder sind nicht im deutschsprachigen Raum durchgeführt worden. Hinzu kommt die Aktualität der Einführung von Campus Management Systemen in den Medien um den Student Life Cycle zu unterstützen und die Universitäten zu entlasten. Gerade große staatliche Universitäten stehen vor vielfältigen Herausforderungen und das Wissen um Erfolgs- und Risikofaktoren kann den Einführungsprozess positiv beeinflussen.

Die Universität _____ entspricht den Kriterien für meine Studie, eine staatliche Universität mit über 15.000 Studierenden zu sein, seit 2010 eine CMS-Implementierung abgeschlossen zu haben oder in einer fortgeschrittenen Phase der

Implementierung zu sein, sowie in einer maximalen Entfernung von 450 km von Stuttgart, meinem Wohnsitz, zu liegen. Diese Auswahl ermöglicht eine breite Analyse über verschiedene universitäre Organisationsstrukturen, CMS-Anbieter, und Länderunterscheide.

Ich würde mich sehr freuen, wenn Sie Interesse an der Mitarbeit in dieser Studie bekunden würden. Die University of Phoenix benötigt vor Beginn meiner Studie Ihr Einverständnis (bzw. das des zuständigen Entscheidungsträgers) um an der Universität _____ die Studie durchführen zu dürfen. Anbei erhalten Sie daher ein Formular, das ich Sie bitte auszufüllen, zu unterschreiben und mir mit dem beiliegenden frankierten Rückumschlag zuzusenden. Ohne Ihre Einwilligung darf ich die Studie an der Universität _____ nicht durchführen. Sollten Sie nicht teilnehmen wollen, bitte ich Sie, mir eine kurze Absage per Email zu senden.

Nach dem Eingang der Einwilligungen wird mein Dissertationsthema durch das Internal Review Board (IRB) der University of Phoenix geprüft. Im Anschluss an die Zustimmung des IRB werden dann die Teilnehmer/innen der Studie kontaktiert, die selbstverständlich nicht verpflichtet sind an der Studie teilzunehmen und jederzeit aus der Studie aussteigen können. Hierzu wäre ich Ihnen sehr dankbar, wenn Sie mir einen Ansprechpartner zur Akquirierung der Teilnehmer nennen oder Teilnehmer direkt nennen würden.

Gerne stehe ich Ihnen für Rückfragen telefonisch unter (+49) 0711-601-9124 oder via Email unter athelen@email.phoenix.edu zur Verfügung.

Mit freundlichen Grüßen,

Anja Thelen

Appendix D

Permission to use Premises, Name, and/or Subjects

PREMISES, RECRUITMENT AND NAME (PRN) USE PERMISSION

Name of Facility, Organization, University, Institution, or Association

Please complete the following by check marking any permissions listed here that you approve, and please provide your signature, title, date, and organizational information below. If you have any questions or concerns about this research study, please contact the University of Phoenix Institutional Review Board via email at IRB@phoenix.edu.

☐ I hereby authorize Anja Thelen, a student of University of Phoenix, to use the premises (facility identified below) to conduct a study entitled "Experiences of German University Administrative Staff during and after ERP System Implementation: A Case Study."

☐ I hereby authorize Anja Thelen, a student of University of Phoenix, to recruit subjects for participation in a study entitled "Experiences of German University Administrative Staff during and after ERP System Implementation: A Case Study."

☐ I hereby authorize Anja Thelen, a student of University of Phoenix, to use the name of the facility, organization, university, institution, or association identified above when publishing results from the study entitled "Experiences of German University Administrative Staff during and after ERP System Implementation: A Case Study."

_____ ____/____/_____

Signature Date

_____

Name

_____

Title

Address of Facility_____

Appendix E

Initial Questionnaire to Solicit Interview Partners

Last name, first name	
Describe your educational level and training background	
University employed at	
Current department of employment	
Current job title	
How long have you worked in this position?	
Describe in five sentences or less what your main work in your current position involves:	
Previous department(s) of employment	
Previous job title(s)	
How long have you worked at this university?	
CMS experiences	○ Previous CMS system or IT system(s) used ○ CMS implementation time ○ Post-implementation time
Would you be available for a 30 minute to one hour interview regarding your experiences with the CMS implementation process?	○ In person ○ Over the telephone
Would you prefer an face-to-face interview or a telephone interview?	○ Face-to-face interview ○ Telephone interview When would be a good time for the interview (day of week and time of day): _____
How may I contact you (email, telephone,…)? Please provide your contact details:	
Do you have any questions or concerns about the proposed meeting, interview, etc.?	

Appendix F

Informed Consent (E)

INFORMED CONSENT: PARTICIPANTS 18 YEARS OF AGE AND OLDER

Dear ,

My name is Anja Thelen and I am a student at the University of Phoenix working on a doctoral degree. I am doing a research study entitled "Experiences of German University Administrative Staff during and after ERP System Implementation: A Case Study." The purpose of the research study is to explore administrative staff experiences during and after the implementation of a campus management system at German universities. For this purpose, I seek to interview five to ten participants of the registrar`s and students service office at multiple universities currently implementing or having completed an implementation of a campus management system. I have received permission from your university to contact you and ask you to participate in this study.

Your participation will involve an interview about 30 min to one hour in length over the phone or in person at a location of your choice. The interview includes 17 questions regarding the IT implementation project, project leadership, and work impact in the interviewees work environment. You are asked to answer the questions with a description and reasoning of your personal experiences, thoughts, ideas, and recommendations. Clarifying or follow-up questions may be asked during the interview or after. The interview will be recorded as an audio file, transcribed by the researcher, and sent to you for review. During the one week review time (or till an upon-agreed date) you may delete anything that might reveal confidential or personal information. Other changes or additions may be submitted as "amendments" but cannot be included into the original transcription because they would alter the findings of the case. The time spend on the review will depend on your personal preferences and requirements. The approved text will be used for analysis and parts may be translated to English.

You can decide to be a part of this study or not. Once you start, you can withdraw from the study at any time without any penalty or loss of benefits. The results of the research study may be published but your identity will remain confidential and your name will not be made known to any outside party.

In this research, there are no foreseeable risks to you.

Although there may be no direct benefit to you, your participation in the study may assist in gaining an in-depth understanding from the administrative point of view of critical experiences (called success and risk factors) during and after the implementation of a campus management system. Successful campus management implementations could have a positive impact on the respective employee, affiliated organization, and other stakeholder groups. Your participation will provide data to improve available literature that may lead to successful implementations of CM systems.

If you have any questions about the research study, please call me at +1 732 917 0411, Skype name: serendpt13, or write me at athelen@email.phoenix.edu. For questions about your rights as a study participant, or any concerns or complaints, please contact the University of Phoenix Institutional Review Board via email at IRB@phoenix.edu.

As a participant in this study, you should understand the following:

1. You may decide not to be part of this study or you may want to withdraw from the study at any time. If you want to withdraw, you can do so without any problems.
2. Your identity will be kept confidential.
3. Anja Thelen, the researcher, has fully explained the nature of the research study and has answered all of your questions and concerns.
4. If interviews are done, they may be recorded. If they are recorded, you must give permission for the researcher, Anja Thelen, to record the interviews. You understand that the information from the recorded interviews may be transcribed. The researcher will develop a way to code the data to assure that your name is protected.
5. Data will be kept in a secure and locked area. The data will be kept for three years, and then destroyed.
6. The results of this study may be published.

"By signing this form, you agree that you understand the nature of the study, the possible risks to you as a participant, and how your identity will be kept confidential. When you sign this form, this means that you are 18 years old or older and that you give your permission to volunteer as a participant in the study that is described here."

CHECK ONE

(☐) I accept the above terms.

(☐) I do not accept the above terms.

Signature of the interviewee _____ Date _____

Signature of the researcher _____ Date _____

Appendix G

Informed Consent (GE)

EINVERSTÄNDNISERKLÄRUNG: TEILNEHMER MIT 18 JAHREN ODER ÄLTER

Sehr geehrte/r ,

Mein Name ist Anja Thelen und ich bin Doktorandin an der University of Phoenix. Ich mache eine Fallstudie unter dem Namen „Erfahrungen von Verwaltungsmitarbeitern an deutschen Universitäten während und nach der Einführung eines Campus Management Systems (CMS)." Für diese Studie suche ich fünf bis 10 Interviewpartner aus dem Prüfungsamt oder dem Student Service Bereich, die Erfahrungen mit der gerade stattfindenden oder abgeschlossenen Implementierung des CMS haben. Ich habe die Erlaubnis Ihrer Universität erhalten nach Teilnehmern für meine Studie zu suchen und würde Sie gerne als Teilnehmer in meiner Studie begrüßen.

Ihre Teilnahme an meiner Studie enthält ein ca. 30 minütiges bis eine Stunde langes Interview, entweder per Telefon oder an einem Ort Ihrer Wahl in der Universität. Das Interview enthält 17 Fragen über das IT Einführungsprojekt, Projektleitung, und den Einfluss auf Ihre Arbeitsumgebung. Sie sind gebeten diese Fragen mit einer Beschreibung Ihrer Erfahrungen, Gedanken, Ideen, und Empfehlungen zu beantworten und ggf. zu Begründen. Klärende Nachfragen können während des Interviews und im Anschluss durch den Interviewer gestellt werden. Das Interview wird als Ton aufgenommen, transkribiert und Ihnen zugesandt werden. Dann haben Sie für eine Woche (bzw. bis zu einem abgestimmten Termin) die Chance Änderungen bzw. Löschungen von Daten vorzunehmen, die Sie persönlich identifizieren oder die vertraulich sind. Andere Änderungen können als „Ergänzung" hinzugefügt werden jedoch nicht gelöscht werden, da sie eine Veränderung der Studienergebnisse nach sich ziehen würden. Der abgestimmte Text wird dann für die weitere Analyse verwendet und z.T. ins Englische übersetzt.

Sie können entscheiden ob Sie bei dieser Studie teilnehmen wollen oder nicht. Auch können Sie jederzeit von der Studie zurücktreten ohne dass Ihnen eine Strafe droht oder Sie Leistungen verlieren. Die Ergebnisse der Studie werden publiziert - Ihre Identität wird vertraulich behandelt und Ihr Name wird niemand Anderem bekannt gemacht. Diese Studie birgt keine vorhersehbaren Risiken für Sie.

Auch wenn diese Studie Ihnen nicht unbedingt direkt einen Nutzen bringt, so kann Ihre Teilnahme an der Studie das Verständnis über die Verwaltungsperspektive während und nach einer solchen CMS Implementierung stärken und evtl. spezifische kritische Erfolgs- und Risikofaktoren kategorisieren. Erfolgreiche CMS-Einführungen könnten einen positiven Effekt auf Mitarbeiter, zugehörige Organisationen, und andere Akteure haben. Ihre Teilnahme würde Daten bereitstellen, die zur Verbesserung von CMS-Einführungen führen könnten.

Sollten Sie irgendwelche Fragen zur Studie haben, so rufen Sie mich bitte an unter +1 732 917 0411, Skype Name: serendpt13, oder schreiben Sie an athelen@email.phoenix.edu. Für Fragen zu Ihren Rechten als Teilnehmer oder jegliche Art von Bedenken oder Beschwerden wenden Sie sich bitte an die Ethikkommission (Institutional Review Board) der University of Phoenix erreichbar via Email über IRB@phoenix.edu.

Als ein Teilnehmer dieser Studie sollten Sie die folgenden Informationen verstehen:

1. Sie können jederzeit entscheiden ob Sie an dieser Studie teilnehmen möchten oder sich davon zurückziehen wollen. Wenn Sie sich zurückziehen wollen, so können Sie dies ohne Probleme jederzeit tun.
2. Ihre Identität wird vertraulich behandelt.
3. Anja Thelen, die Forscherin, hat den Charakter der Studie vollständig erklärt und jede Frage beantwortet bzw. Bedenken ausgeräumt.
4. Wenn Interviews durchgeführt werden, dann dürfen sie aufgenommen werden. Wenn sie aufgenommen werden sollen, müssen Sie der Forscherin Anja Thelen Erlaubnis geben diese aufnehmen zu dürfen. Sie verstehen, dass die Informationen der Aufnahme transkribiert werden. Die Forscherin wird eine Methode zum Codieren der Informationen entwickeln, sodass Ihr Name vertraulich bleibt.
5. Daten werden in einem abgeschlossenen Bereich gesichert. Die Daten werden für drei Jahre aufbewahrt und dann zerstört.
6. Die Ergebnisse dieser Studie können veröffentlicht werden.

“Mit Ihrer Unterschrift auf diesem Formular stimmen Sie zu, dass Sie den Charakter der Studie und die Risiken als Teilnehmer verstanden haben und darüber aufgeklärt wurden, was mögliche Risiken für Sie sind. Wenn Sie dieses Formular unterschreiben, bedeutet dies, dass Sie 18 Jahre oder älter sind und Sie sich als freiwilliger Teilnehmer dieser Studie anschließen wollen.”

BITTE EIN FELD AUSWÄHLEN

(☐) Ich akzeptiere die oben genannten Konditionen.

(☐) Ich akzeptiere die oben genannten Konditionen nicht.

Unterschrift Interviewter _____ Datum _____

Unterschrift Forscher _____ Datum _____

Appendix H

Interview Protocol

Basic Information to fill out by the researcher

- Participant ID _____
- University ID _____
- Date & Time: _____
- Interview-Number: _____

Introduction

- Greeting and appreciation for the time and participation in the interview.
- Purpose of the interview
    - I am conducting a research study for my dissertation about experiences with CMS implementations at German universities.
- Ground rules
    - Role of the interviewer
    - Interview will be audio-taped
    - Explanation and signing of the informed consent form
        - Confidentiality of comments/responses
        - Right to withdraw from the study at any time
    - Individual opinions and no right or wrong answers
    - Possible follow-up questions
    - Transcription of the interview and check through the interviewee

Interview

- See interview questions in Appendix I and J

Appendix I

Interview Questions (E)

1. Experiences with the CMS implementation:
    1.1. How would you describe the current status of the CMS implementation overall and in your specific work area?
    1.2. How are/were you involved with the CMS implementation process?
    1.3. Describe your overall positive and negative experiences with the CMS implementation (to date).
    1.4. What was in your opinion the most critical moment (to date) in the project and why?
    1.5. Describe your specific experiences in your work/department. Are there factors and areas that did not receive enough attention by project management (to date)? Explain.
    1.6. How would you summarize and label some of your experiences (to date) as success or risk factors?
    1.7. Describe from your experience (to date) the timeframes when project management should be aware of specific factors affecting the CMS implementation process.
    1.8. Which factor is currently the most important for implementation/post-implementation success in your opinion and why?
2. Leadership:
    2.1. Describe a situation you feel was critical in the implementation process (to date). Who improved the situation and how?
    2.2. Describe who the most important person was during the implementation phase (to date). Why?

2.3. What help/support… would you have liked to receive/ to have had, when, by whom, and why?

2.4. Describe a situation you feel you would have handled differently in the implementation process. How would you have improved the situation?

2.5. If post-implementation phase: Describe who the most important person is after the CMS system is implemented. Why?

3. Work impact

3.1. Describe if processes-reengineering or IT-changes during (and after) the implementation had an impact on your work and department.

3.2. How did you experience the impact to date?

3.3. How did the impact change your work/work load to date?

3.4. If during implementation phase: Describe your future expectations of the implementation and post-implementation phase.

Appendix J

Interview Questions (GE)

1. Erfahrungen mit CMS Einführungen:
   1.1. Wie würden Sie den derzeitigen Status der CMS Einführung beschreiben, insgesamt und in Ihrem spezifischen Aufgabengebiet?
   1.2. Wie sind/waren Sie involviert in den CMS Einführungsprozess?
   1.3. Beschreiben Sie Ihre allgemeinen positiven und negativen Erfahrungen bis heute mit der CMS Einführung.
   1.4. Was war nach Ihrer Meinung der kritischste Moment bis heute innerhalb des Projektes und warum?
   1.5. Beschreiben Sie Ihre spezifischen Erfahrungen innerhalb Ihrer Arbeit bzw. innerhalb Ihrer Beschäftigungsstelle. Gibt es bis heute Faktoren und Bereiche die nicht genug Aufmerksamkeit durch die Projektleitung erhalten haben? Bitte erörtern Sie.
   1.6. Wie würden Sie Ihre Erfahrungen bis heute zusammenfassen bzw. mit einem Label belegen welches als Erfolgs- oder Risikofaktor bewertet werden kann?
   1.7. Beschreiben Sie aus Ihrer Erfahrung bis heute den Zeitrahmen in dem die Projektleitung auf bestimmte Faktoren, die das Projekt beeinflussen, mehr Rücksicht nehmen sollte.
   1.8. Welcher Faktor ist für Sie aktuell der wichtigste um Erfolg für die Einführung und Nacheinführungsphase zu sichern und warum?
2. Führung:
   2.1. Beschreiben Sie eine Situation, die nach Ihrer Meinung kritisch für den Einführungsprozess war. Wer hat die Situation gemeistert und wie wurde sie gemeistert?
   2.2. Beschreiben Sie die wichtigste Person der Einführungsphase. Warum war/ist Sie das?

2.3. Welche Hilfe/Unterstützung… hätten Sie gerne erhalten, durch wen und warum?

2.4. Beschreiben Sie eine Situation die Sie selbst anders angegangen wären. Wie hätten Sie die Situation gemeistert?

2.5. Falls die Universität die Einführung beendet hat: Beschreiben Sie die wichtigste Person nach der Einführung des CMS. Warum ist sie für Sie die wichtigste Person?

3. Arbeitsauswirkungen

3.1. Beschreiben Sie Prozessänderungen und IT-Änderungen die während (und nach) der Einführung einen Einfluss auf Ihre Arbeit und Ihre Arbeitsstelle hatten.

3.2. Wie empfinden Sie die Änderungen heute?

3.3. Wie haben die Änderungen Ihre Arbeit/Arbeitslast bis heute verändert?

3.4. Falls die Universität noch in der Einführungsphase ist: Beschreiben Sie Ihre Erwartungen für die Zukunft der Einführungsphase bzw. die Zeit nach der Einführung.

Appendix K

Factors

Factors

U1	U2
(a) tradition, internal politics, and culture	(a) differences in university organization versus commercial enterprises
(b) changes between administration and academic work distribution	(b) tradition and hierarchical representations
(c) stakeholder engagement	(c) internal politics and culture
(d) local and vendor customization	(d) generational change
(e) complexity	(e) time pressure
(f) dependency, security, reliability, accessibility, roles, and rights	(f) stakeholder engagement
(g) non-IT related changes	(g) organization and system complexity inherent as well as self-made
(h) internal and external communication as well as implementation related communication	(h) security, reliability, and accessibility
(i) integration and involvement in decision-making process	(i) non-IT related changes
(j) customer service	(j) process harmonization instead of standardization
(k) reasons for implementation	(k) time to accept and improve system
(l) trust in management, system, people, and decisions	(l) sustainable training and customer service
(m) team availability, connection, and competence	(m) internal and external communication as well as implementation related communication
(n) system usability and customizability	(n) reasons for implementation
(o) training and exchange platform	(o) trust in management and people
(p) financial, time, and administrative personnel resources connected to registrar's office, CMS implementation and customization, CMS post-implementation phase	(p) team availability, competence, sustainability
(q) learning by developing the old system, exchange and cooperation with other universities	(q) system customizability
	(r) vendor trust, reliability, and service
	(s) financial, time, and administrative personnel resources connected to registrar's office, CMS implementation and customization, CMS post-implementation phase
	(t) mission and vision development including review of achievements
	(u) central commissioner of CMS
	(v) changes between administration and academic work distribution

AUTHOR BIOGRAPHY

Anja Thelen was born in Bonn, Germany in 1980 and graduated from the Realschule St. Josef in 1996 and Gymnasium Nonnenwerth, Germany in 1999. She completed her German Diplom in Wirtschaftsinformatik (Master of Science in Computer Science and Management) at the University of Paderborn, Germany in 2006 with majors in Business Computing, International Management, and Software Ergonomics. She graduated from the University of Phoenix with a Doctorate in Management in Organizational Leadership with a specialization in Information Systems and Technology in 2015. She is a member of IEEE, PMI, and Delta Mu Delta and her research focusses on implementing IT systems in Higher Education Institutions and involving stakeholder groups to increase project success.