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ORIGINAL ARTICLE

Stakeholder-driven ERP implementation in German higher education: key challenges and adoption factors

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Abstract

Enterprise Resource Planning (ERP) systems are increasingly implemented by higher education institutions (HEIs) to support administrative and financial processes. However, ERP implementation in HEIs remains challenging due to decentralized governance structures, diverse stakeholder interests, and limited alignment between system functionalities and institutional practices. This study examines stakeholder-related factors influencing ERP implementation and adoption in German HEIs. It is based on an in-depth case study at a large public university and is complemented by survey data from nine additional HEIs. The findings identify five factors that consistently shape stakeholder perceptions and adoption processes: (1) project team composition and resource allocation, (2) structured change management, (3) alignment of ERP functionalities with institutional processes, (4) continuous training and support, and (5) long-term leadership commitment. The analysis highlights that early and sustained stakeholder involvement is associated with higher perceived alignment and acceptance of ERP systems, while predominantly top-down implementation approaches tend to intensify resistance and usability concerns. By focusing on stakeholder perspectives, this study contributes empirical insights into ERP implementation challenges in German HEIs and offers practice-oriented implications for managing stakeholder involvement during ERP adoption in highly decentralized public institutions.

Keywords Enterprise Resource Planning (ERP) · Higher Education Institutions (HEIs) · Critical Success Factors (CSFs) · Stakeholder involvement · Change management · System adoption

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1 Introduction

Enterprise Resource Planning (ERP) systems are increasingly implemented by Higher Education Institutions (HEIs) to modernize administrative and financial processes, integrate siloed systems, and improve organizational transparency. However, ERP implementation in HEIs presents unique challenges compared to corporate settings, particularly due to decentralized governance, diverse stakeholder interests, and fragmented IT landscapes. The coexistence of administrative, academic, and research workflows adds complexity to ERP rollouts and limits the applicability of standardized implementation strategies. While ERP adoption in enterprises has been widely studied, including critical success factors (CSFs) such as project governance and change management (Fattah-Weil 2024; Soliman and Noorliza 2022), far less is known about how these factors are perceived by the varied stakeholder groups within HEIs. The higher education context is shaped by strong institutional autonomy, participatory governance structures, and legal constraints, particularly in Germany, resulting in distinct implementation conditions. Faculty resistance, ambiguous system ownership, and alignment gaps between system functionality and academic needs are recurring themes in this setting (Abu Madi et al. 2024; Shatat and Dana 2016). This study focuses specifically on stakeholder-related challenges during ERP implementation in German HEIs. It does not evaluate ERP success in a narrow, outcome-based sense. Rather, it investigates how stakeholder involvement, engagement practices, and perceived system alignment influence the dynamics of ERP adoption. The study builds on an in-depth case study of an SAP implementation at the Technical University of Berlin and is complemented by qualitative survey responses from nine additional HEIs. This mixed-methods approach provides context-rich insights into institutional adoption practices and stakeholder perceptions. The study is guided by the following research questions:

RQ1: How do different stakeholder groups in HEIs evaluate the critical factors for ERP implementation?

RQ2: What role does stakeholder involvement play in shaping the perceived alignment and acceptance of ERP systems?

The study aims to contribute to a more differentiated understanding of ERP adoption in higher education and offers practice-oriented implications for managing stakeholder collaboration in decentralized academic institutions.

The paper is structured as follows: Sect. 2 presents the theoretical background, followed by the methodology in Sect. 3. Sections 4 and 5 discuss the findings and implications for both theory and practice before concluding with recommendations for future research.

2 Theoretical background

ERP implementation success has been widely studied in different sectors, yet its application in Higher Education Institutions (HEIs) remains a topic of ongoing research (Al-Amin et al. 2023). The DeLone and McLean IS Success Model (DeLone and McLean 2003) has been extensively used to measure ERP success, but its appli-

cability to HEIs is debated due to the distinct stakeholder structures in academic settings (Seo 2013; Pollock and Cornford 2004). Research indicates that Enterprise Resource Planning (ERP) adoption in Higher Education Institutions (HEIs) across North Africa, Europe, and Asia is significantly influenced by factors such as institutional governance structures, user training programs, and expectation alignment. A study by Seo (2013) highlights that the unique organizational dynamics of universities necessitate tailored ERP implementation strategies, emphasizing the importance of aligning system functionalities with institutional governance and user expectations (Seo 2013). Furthermore, an article from Al-Badi and Khan (2022) discusses lessons learned from ERP implementations in large universities in Africa, underscoring the critical role of comprehensive user training programs in facilitating successful system adoption and aligning user expectations with system capabilities. Additionally, a study evaluating the impact of ERP systems in higher education in Asia found that user training and support are pivotal in enhancing user performance and satisfaction, thereby influencing the overall success of ERP adoption in HEIs. These studies collectively suggest that effective ERP implementation in HEIs is contingent upon robust governance frameworks, comprehensive user training initiatives, and strategies aimed at aligning system capabilities with user expectations. Unlike corporate ERP implementations, where process efficiency is the primary driver, HEI stakeholders prioritize usability and integration with academic workflows (Abugabah and Sanzogni 2010).

Furthermore, prior research indicates that the role of leadership and stakeholder engagement in ERP implementations significantly influences system adoption and long-term success (Esteves and Pastor 2001). Studies comparing ERP adoption in HEIs across developed and developing nations reveal variations in implementation strategies, regulatory influences, and cultural factors impacting stakeholder engagement (Asemi and Jazi 2010).

A key limitation in previous HEI ERP research is the lack of comparative studies across regions, with most analyses being single-institution case studies or literature reviews (Coskun et al. 2022; Rajapakse and Thushara 2023). This study addresses this gap by integrating findings from a case study at TU Berlin, Germany with qualitative insights from multiple HEIs in European countries, such as Denmark, Austria, Luxembourg and also with HEIs from Hong Kong and USA, thereby broadening the applicability of CSFs to different institutional contexts.

2.1 ERP implementation in higher education institutions

Enterprise Resource Planning (ERP) systems are increasingly implemented in Higher Education Institutions (HEIs) to support administrative functions such as finance, human resources, procurement, and research administration. While the general goals of ERP adoption, e.g. process integration, transparency, and data consistency, are comparable to those in corporate settings, HEIs constitute a distinct organizational context that significantly shapes implementation dynamics. A defining characteristic of HEIs is their decentralized and participatory governance structure, in which decision-making authority is distributed across central administration, faculties, departments, and collegial bodies. In contrast to hierarchical corporate organiza-

tions, HEIs operate under conditions of institutional autonomy, co-determination, and legal regulation, which constrain the extent to which standardized ERP processes can be imposed (Abugabah and Sanzogni 2010; Pollock and Cornford 2004). In the German context in particular, public universities are subject to complex regulatory frameworks (e.g., public budgeting law, civil service regulations, data protection requirements), which strongly influence administrative processes and limit managerial discretion (Leyh et al. 2017). These structural conditions give rise to a pluralistic stakeholder environment, where academic staff, administrative units, IT departments, and university leadership hold differing degrees of power, legitimacy, and influence. Faculty members typically possess high professional autonomy and legitimacy but limited formal authority over ERP decisions, whereas administrative and IT units are responsible for system selection and configuration. This asymmetry creates recurring tensions between system standardization and locally embedded practices, making stakeholder coordination a central challenge of ERP implementation in HEIs. An additional source of complexity arises from the coexistence of ERP systems and Student Lifecycle Management (SlcM) solutions. While ERP systems in HEIs primarily support administrative back-office functions, SlcM systems are designed to manage student-related processes such as admissions, enrollment, examinations, and degree management. Although some overlap exists, particularly in student finance or personnel administration areas, ERP and SlcM systems follow different logics, user groups, and process priorities. In practice, this separation often leads to parallel workflows, fragmented data landscapes, and unclear responsibilities between administrative and academic domains (Seo 2013). Importantly, the interaction between ERP and SlcM systems is frequently shaped by organizational compromises rather than by coherent process design, further intensifying coordination challenges. Prior research on ERP adoption in HEIs has emphasized the importance of stakeholder alignment, governance adaptability, and user training as critical contextual factors (Al-Badi and Khan 2022; Al-Amin et al. 2023). However, these factors cannot be understood independently of the institutional setting in which they occur. In German HEIs, stakeholder-related challenges are not merely a consequence of resistance or lack of engagement, but are deeply intertwined with regulatory constraints, decentralized authority structures, and the coexistence of heterogeneous process logics. This study therefore focuses explicitly on stakeholder perspectives as an entry point for understanding ERP implementation dynamics in HEIs, while acknowledging that these perspectives are shaped by broader institutional and regulatory conditions.

2.2 Stakeholder theory as a lens for ERP adoption

Stakeholder theory provides a valuable framework for analyzing ERP implementation in HEIs. Originating from Freeman et al. (2010), stakeholder theory posits that organizations must consider the interests of all actors who can affect or are affected by their actions. In ERP projects with HEI context, this includes not only top management and IT staff, but also faculty, administrative personnel, and students. Building on the typology of Mitchell et al. (1997), stakeholders differ in their power, legitimacy, and urgency. HEIs are characterized by a pluralistic stakeholder environment, where academic staff may hold high legitimacy but limited formal power, while IT

and administrative units often have more direct control over system decisions. This asymmetry makes stakeholder engagement a central challenge in ERP implementation. Prior ERP research has often focused on managerial perspectives, emphasizing success factors such as change management, project leadership, and technical integration (Rosacker and Olson 2008). However, end-user perspectives – particularly from faculty and departmental administration – are often underrepresented (Leyh et al. 2017). These groups assess ERP systems not only based on functionality, but also based on their usability, adaptability to academic workflows, and alignment with disciplinary autonomy. This study applies stakeholder theory as an analytical lens to investigate how different actor groups perceive, influence, and experience ERP implementation processes. It focuses not on generalized success, but on the relational dynamics and perceived alignment that shape stakeholder acceptance and engagement.

2.3 Critical success factors from a stakeholder perspective

Critical Success Factors (CSFs) are commonly used to assess the conditions that facilitate or hinder ERP implementation. Traditional CSFs include top management support, user training, change management, and communication (Al-Amin et al. 2023; Rosacker and Olson 2008). However, most CSF frameworks are developed from project management or IT governance perspectives and do not differentiate between stakeholder groups. For example, while IT departments may prioritize process automation and standardization, faculty members often value system flexibility, pedagogical support, and minimal disruption to academic routines (Tarhini et al. 2015). Students, in turn, may focus on usability and access to services. This variation implies that CSFs should not be treated as universal metrics but interpreted through the lens of stakeholder roles and expectations. This study responds to the need for more differentiated, stakeholder-sensitive CSF analysis in HEIs. By integrating multiple stakeholder voices across institutions, it offers insights into how institutional actors perceive and prioritize success factors during ERP implementation.

2.4 Revisiting IS success models in the HEI context

The DeLone and McLean IS Success Model (2003) is frequently applied to evaluate information system effectiveness based on dimensions such as system quality, information quality, and user satisfaction. While the model has been used in ERP research, its applicability to HEIs is limited unless adapted to account for stakeholder diversity and institutional context (Pollock and Cornford 2004; Seo 2013). This study does not adopt the model as a strict evaluative framework but draws on its emphasis on perceived usefulness and service quality as dimensions relevant to stakeholder assessment. It further extends the discussion by highlighting how stakeholder roles, governance structures, and power dynamics shape these perceptions. In line with Rizkiana et al. (2021) and Gabryelczyk and Roztocki (2017), we argue that ERP implementation in HEIs must be understood not only as a technical project but as a social negotiation process involving competing interpretations of success. Therefore, the concept of "success" in this study is interpreted as perceived institutional fit

and stakeholder alignment rather than as measurable system outcomes. Building on recent literature, this study adopts a stakeholder-centered perspective that emphasizes the need to (1) prioritize stakeholder-specific concerns over generalized ERP success criteria (Halkhoree et al. 2024), (2) address the misalignment between managerial expectations and end-user experiences to reduce resistance (Tarhini et al. 2015), and (3) implement continuous engagement strategies to ensure that ERP systems remain adaptable to evolving institutional needs (Agyapong 2021).

3 Methodology

This study employs a qualitative, case-based research design that is anchored in a single in-depth case study and complemented by a cross-institutional qualitative survey. The purpose of this design is not to conduct a full mixed-methods or multi-case analysis, but to combine contextual depth with broader institutional sensitization regarding stakeholder-related challenges in ERP implementation within Higher Education Institutions (HEIs). The methodological focus lies on understanding stakeholder perceptions, roles, and interaction dynamics in a complex ERP implementation setting. The additional survey data serve to contrast and contextualize the case study findings across different institutional environments, thereby supporting analytical transferability rather than statistical generalization.

3.1 Research design

The research design consists of two components:

- A case study at the Technical University of Berlin (TU Berlin), based on 13 semi-structured expert interviews.
- A complementary qualitative survey conducted across nine HEIs in Germany and internationally.

The TU Berlin case study constitutes the analytical core of the research and allows for a detailed examination of stakeholder dynamics, governance structures, and implementation challenges in a real-world ERP project. The case was selected due to its size, organizational complexity, and representativeness of German public HEIs undergoing large-scale ERP transformation. The qualitative survey was intentionally designed as a supplementary component, not as a full multi-case study. Its purpose is to explore whether the Critical Success Factors (CSFs) identified in the TU Berlin case resonate across different institutional contexts and governance settings. By doing so, the survey provides cross-case contrast and enhances external contextualization, while methodological responsibility remains clearly anchored in the single-case design.

3.2 Data collection

At TU Berlin, interviews were conducted with a diverse set of stakeholders involved in the SAP ERP implementation, including project leads, sub-project managers, business process owners, and end-user representatives (see Table 1).

The interview guide followed the principles of structured qualitative content analysis (Mayring 2015; Gläser and Laudel 2010) and was tailored to the respective stakeholder roles. Interviews lasted between 35 and 90 min, were audio-recorded, transcribed verbatim, anonymized, and analyzed using Atlas.ti. To broaden the institutional perspective, a qualitative survey was distributed to ERP project stakeholders at other HEIs. Participants were recruited using purposive sampling via academic networks and professional conferences. The survey included both structured and open-ended questions focusing on:

- Stakeholder involvement during ERP implementation,
- Perceived system alignment with institutional needs,
- Major implementation challenges from the respondent's perspective.

The survey received nine valid responses from institutions in Germany, Denmark, Austria, Luxembourg, Hong Kong, and the USA. Table 2 provides an overview of respondent roles and country affiliations.

Table 1 Interview structure

	(Sub-)Project Lead	IT-Leadership	Process Expert	Key User
	A, B, C, D, E, F, G, H		K, L, M	I, J
Section I	Questions about the interviewee's ERP-related knowledge, role and responsibilities with regard to the SAP implementation. Specific focus on HEI governance, faculty involvement, and compliance requirements.			
Section II	Objectives, motivation regarding the ERP selection and implementation. Implementation phases. Justification for ERP adoption in an HEI setting, faculty governance impact, and student services integration.	IT Landscape, IT Security aspects, and non-functional requirements of the system, particularly in relation to academic data security (e.g., GDPR, research data management).	Requirements specification (actual and target processes), process-related transition to the new system. Specific adaptations for research grants, course registration, and academic services.	System utilization and user acceptance, including user resistance in an HEI setting, faculty training needs, and adaptation challenges.
Section III	Problems and challenges during the implementation of the ERP system in the respondent's area and how such problems were dealt with. Emphasis on academic decision-making bottlenecks, co-determination processes, and administrative resistance.			
Section IV	Individual experience and expectations (fulfilled/not fulfilled) of the new system. Unique challenges related to student and faculty expectations of ERP usability.			

Table 2 Survey respondents

Respondent	Country	Institution Size	Primary ERP System	Implementation Status	Implementation Period
R1	Germany	< 10,000 students	HIS eG	Completed	2021–2023
R2	Luxembourg	< 10,000 students	SAP	Completed	2016–2020
R3	Germany	10,000–50,000 students	HIS	Completed	2011–2015
R4	Denmark	10,000–50,000 students	Indfak	Ongoing	2021–2023
R5	Germany	< 10,000 students	HIS	Ongoing	Currently in progress
R6	Austria	< 10,000 students	SAP	Completed	2021–2023
R7	USA	< 10,000 students	Workday	Completed	2021–2023
R8	Germany	10,000–50,000 students	HIS FSV	Completed	Currently in progress
R9	Hong Kong	10,000–50,000 students	Ellucian	Completed	2000–2005

3.3 Data analysis

Interview and survey data were analyzed using inductive thematic coding. Codes were iteratively developed, refined, and aggregated into higher-level themes reflecting stakeholder-specific perceptions of ERP implementation and adoption. The TU Berlin case served as the primary analytic anchor, while survey responses were used for comparative validation and analytical sensitization. Rather than seeking frequency-based generalization, the analysis focused on identifying convergences and divergences across stakeholder groups and institutional contexts.

Recurring themes across both data sources included:

- variability in stakeholder engagement and its influence on implementation dynamics.
- differences in ERP acceptance between administrative, academic, and IT roles,
- the role of change management and training in shaping perceived system alignment.

This approach follows established qualitative research practices that emphasize contextual depth, interpretive rigor, and analytical transparency, while acknowledging the exploratory and non-generalizable nature of the survey component.

4 Findings on stakeholder-specific CSFs

This section presents the key Critical Success Factors (CSFs) influencing ERP implementation success in Higher Education Institutions (HEIs), based on qualitative data from TU Berlin and survey responses from nine additional HEIs. The analysis focuses on stakeholder-specific concerns across administrative, academic, and IT perspectives. Table 3 provides an overview of the core CSFs and their relevance across stakeholder groups.

Table 3 Summary of CSFs and stakeholder perspectives

Critical Success Factor (CSF)	IT Leadership & Project Management	Administrative & Operational Staff	Faculty & End-Users	University Leadership & Policy-Makers
Project Team and Resources	High concern over technical expertise and system configuration availability.	Concerned about staffing shortages affecting workflows.	Less direct impact, but dependency on IT support.	Ensures budget and project prioritization.
Project Management	Focus on system integration, process automation, and deadlines.	Needs structured task management and clear responsibilities.	Prefers flexibility in implementation timing.	Ensures strategic alignment with institutional goals.
Business Process Reengineering (BPR)	Optimizes ERP customization and system compatibility.	Adapts workflows to new ERP functionalities.	Strong concerns over usability and workflow adaptation.	Balances standardization with academic autonomy.
Communication	Needs clear communication between departments for technical implementation.	Essential for process alignment and operational adjustments.	Requires transparency to ensure acceptance and usability.	Must ensure communication strategy reaches all stakeholders.
Stakeholder Involvement	Engages IT and project teams in system setup.	Critical for smooth transition and adoption in administrative processes.	Early involvement reduces resistance and improves system adaptability.	Encourages institution-wide collaboration.
User Acceptance	Driven by system functionality and performance reliability.	Dependent on ERP usability in daily operations.	Resistance if system disrupts teaching/research processes.	Sees ERP as a long-term institutional investment.
Support from University Management	Requires strong executive endorsement to justify system integration.	Seeks consistent leadership backing for smoother implementation.	Feels excluded from decision-making if leadership is disengaged.	Provides governance and funding approvals.
Change Management	Needs structured transition plans and feedback mechanisms.	Requires training and adaptability programs.	Prefers gradual, transparent adjustments.	Ensures long-term institutional commitment.
Organizational Culture	Facilitates collaboration between IT, management, and administration.	Affects willingness to adopt system changes.	Determines receptiveness to new digital tools.	Shapes ERP as part of long-term strategy.

The findings highlight five recurring dimensions: project team composition and resourcing, process alignment and customization strategy, stakeholder engagement and change management, institutional support and sustainability, and variation in stakeholder-specific success perceptions. These dimensions are explored in the following sub-sections.

4.1 Project team composition and resourcing

Across both the TU Berlin case and the survey institutions, project team composition and resource availability emerged as a consistent theme influencing ERP implementation progress and stakeholder satisfaction. Participants highlighted issues related to

staffing continuity, availability of cross-functional expertise, and long-term project funding.

4.1.1 TU Berlin case findings

Multiple stakeholders (B, D, E, F, I) reported that the ERP project at TU Berlin was chronically understaffed. Limited full-time roles and temporary contracts led to high turnover, which disrupted project continuity. An IT administrator (C) noted:

> The project was constantly understaffed, given its complexity. We lost several key people mid-way.

A key barrier cited was the difficulty in recruiting personnel with hybrid expertise in both IT and academic administration. Interviewee A emphasized that many team members lacked experience with the academic governance structures and reporting requirements unique to HEIs. Stakeholders (L, F) stressed the importance of involving staff who could mediate between system capabilities and process-specific constraints:

> ERP implementation is not just an IT task, it's also about understanding regulations and academic processes.

Despite these challenges, some units at TU Berlin established informal peer-support structures to compensate for staff shortages. Interviewee K described how informal knowledge-sharing within departments helped bridge communication gaps between the central ERP team and decentralized faculties.

4.1.2 Survey findings

Survey data reflected similar patterns. Six of the nine responding institutions identified project team resourcing as a major implementation challenge. Table 4 summarizes common barriers and proposed mitigation strategies across institutions.

A respondent from a German university emphasized that staff were often only partially assigned to the project, which prolonged testing and integration phases. In Denmark, one participant noted that outsourcing core ERP components resulted in long-term vendor dependency due to weak internal knowledge transfer. In contrast, institutions that reported higher satisfaction scores had established dedicated project management offices (PMOs) with clear role definitions and cross-functional staffing. These teams typically included administrative domain experts, academic representatives, and IT specialists, which facilitated both alignment and communication. Table 5 compares the implementation experiences of TU Berlin with survey institutions, highlighting differences in team structure and stakeholder satisfaction.

A notable outlier was the institution from Luxembourg, which reported no staff turnover and the highest level of end-user satisfaction. As visualized in Fig. 1, this institution also scored highest in perceived training adequacy and lowest in user resistance.

Table 4 Key challenges and suggested improvements

Institution	Key Challenges	Suggested Improvements
Germany	Lack of training, insufficient management, weak communication, change resistance	More project management capacity, skilled planning, process modeling
Luxembourg	End-user resistance, insufficient leadership support, poor project management	Selecting the right integrator services, establishing a PMO team
Germany	End-user resistance, budget constraints	Improved budget planning, structured change management
Denmark	End-user resistance, lack of training, insufficient leadership support	More structured training and leadership involvement
Germany	Technical barriers, end-user resistance	Improved IT infrastructure, better end-user support
Austria	Usability and training issues	User-centered ERP customization, peer training
USA	Lack of training, insufficient leadership support, IT staff turnover	More IT support, continuous leadership backing, change management
Germany	Budget constraints, co-determination by staff council, personnel bottlenecks	Additional human resources, overtime commitment
Hong Kong	End-user resistance, lack of stakeholder involvement	Independent consulting, better evaluation of ERP options

Table 5 Case study vs. survey findings

Key Factors	TU Berlin Case Study	Survey Findings
Stakeholder Involvement	Limited, late involvement of faculty	Similar issues in most institutions
User Acceptance	Mixed, administrative staff adapted faster	Same pattern across survey responses
Training & Support	Insufficient, leading to resistance	Direct link between training and satisfaction
Change Management	Weak at the beginning, improved over time	HEIs with better change management reported higher success. Respondents with weak change management had to seek consultancy advice
ERP Customization	Required major modifications	Institutions with flexibility reported higher satisfaction

Fig. 1 End-user acceptance and training adequacy

The contrast with institutions that experienced frequent staff rotation underscores the importance of dedicated, interdisciplinary, and stable project teams for successful ERP implementation in HEIs.

4.2 Process alignment and customization strategy

A recurring challenge across both the TU Berlin case and the surveyed institutions was the alignment between ERP system functionalities and institutional processes. The degree to which HEIs adapted their internal workflows, or customized the system to fit legacy structures, had a significant impact on stakeholder perceptions and post-implementation effort.

4.2.1 TU Berlin case findings

At TU Berlin, several interviewees (G, H, L) emphasized that ERP implementation was hindered by attempts to reproduce existing administrative processes within the new system.

As Interviewee G stated:

> The more we customized the system to fit outdated processes, the more complications arose.

To address these issues, Business Process Modeling (BPMN) workshops were introduced during early project phases to support process analysis and reengineering. Interviewee L described these workshops as essential for identifying misalignments between current workflows and ERP system logic. However, participation in these workshops was uneven across departments, resulting in varying degrees of process readiness and buy-in.

Faculty representatives (M, K) criticized the perceived rigidity of ERP workflows, which often conflicted with academic governance structures. Meanwhile, the IT project team (A, C) reported that standardized ERP modules required extensive modifications to accommodate exceptions common in HEI environments, particularly in areas such as research funding workflows, teaching load assignment, and decentralized budget control.

The TU Berlin case illustrates how efforts to over-customize ERP systems, rather than adapting institutional processes, can lead to technical debt, stakeholder frustration, and long-term maintainability issues.

4.2.2 Survey findings

Survey respondents echoed these tensions. As shown in Fig. 2, institutions differed widely in their ERP modernization efforts. Some had implemented upgrades as recently as 2021–2023, while others still operated on systems from the early 2000s. Legacy infrastructure often necessitated high customization to bridge gaps between outdated processes and new systems.

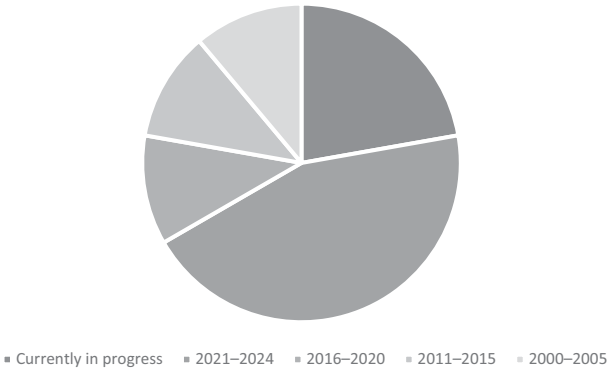
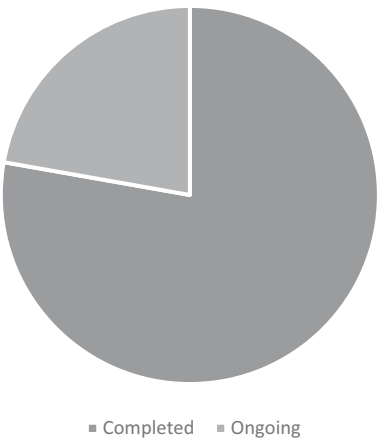


Fig. 2 Year of last major ERP upgrade

Fig. 3 ERP implementation progress across institutions



Respondents from Austria, Germany, and the USA reported extensive modifications to core modules such as finance and procurement, often to replicate established workflows. One participant from the University of Potsdam commented:

> We tried to make the ERP system fit our old processes, but that created technical debt and frustrated the vendor.

While the majority of institutions reported that their ERP implementation had been formally completed, Fig. 3 highlights that some universities are still in the process of deployment. Even for institutions that have officially completed their ERP implementation, many emphasized that continuous refinement and optimization remain necessary to address evolving institutional needs.

4.3 Stakeholder engagement and change management

Stakeholder engagement emerged across all data sources as a decisive factor influencing ERP implementation outcomes. Both the TU Berlin case and the survey results emphasized that insufficient involvement of key stakeholder groups contributed to resistance, system misalignment, and limited user adoption.

4.3.1 TU Berlin case findings

Several interviewees (C, F, H, I, K, M) noted that stakeholder engagement during the ERP project was inconsistent across departments and user groups. Faculty members (M, K) described a lack of meaningful involvement during early design and decision phases.

One faculty member remarked:

> Decisions were made at the top without considering how they affect daily academic operations.

Interviewee I highlighted delays in communication and change coordination:

> Information wasn't reaching the right people at the right time, especially not the people who were expected to use the system.

Three specific strategies were cited as helpful in overcoming stakeholder resistance:

1. Early and sustained involvement: Including administrative and academic users in workshops, testing, and rollout planning improved familiarity and reduced resistance (G, K).
2. Key user networks: Departments that designated trained 'power users' as internal multipliers (F, L) saw smoother transitions and fewer support bottlenecks.
3. Role-specific, iterative training: Rather than relying solely on onboarding sessions, ongoing support tied to users' specific work contexts improved adoption (C).

One project team member (C) noted:

> Onboarding sessions weren't enough. People needed targeted training at the point when they actually started using the system.

Overall, resistance was most pronounced in stakeholder groups who felt that the ERP system had been "imposed" rather than co-designed. Faculty representatives (M, L) described low system trust and expressed frustration with what they viewed as rigid, opaque change processes.

4.3.2 Survey findings

Survey responses from nine HEIs strongly supported the case study results. Institutions with higher levels of stakeholder engagement, especially early in the ERP lifecycle, reported significantly better alignment between system functionality and user expectations. One participant summarized:

> The ERP project was driven by IT and upper management. By the time we [end-users] saw the system, it was too late to change anything.

This pattern is visualized in Fig. 4, which shows that HEIs with broader stakeholder involvement reported higher ERP satisfaction and perceived usefulness, while institutions with limited participation (e.g., Austria, Hong Kong) faced lower satisfaction and higher misalignment.

Survey respondents identified recurring challenges related to stakeholder neglect:

- Insufficient early communication, particularly with faculty and administrative mid-levels.
- Lack of user-centric design practices.
- Uniform training programs that did not accommodate diverse roles and technical literacy levels.

Conversely, HEIs that adopted participatory design strategies, like co-design workshops, agile feedback loops, and pilot phases, reported higher user acceptance and

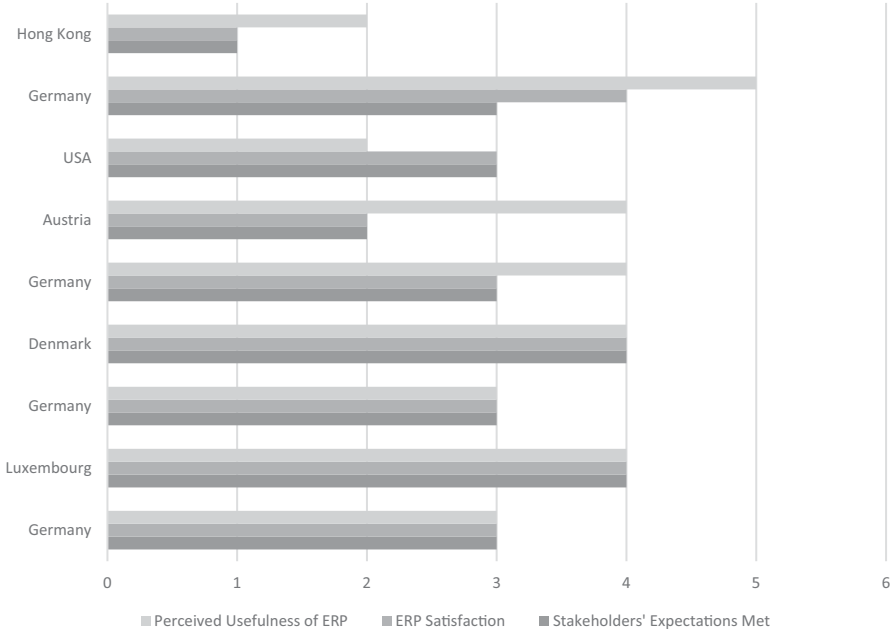


Fig. 4 Stakeholder involvement and ERP satisfaction scores

fewer post-implementation adjustments. These institutions recognized that stakeholder resistance varied by role: while IT and finance staff typically adapted quickly, faculty and decentralized administrators required tailored engagement and longer adaptation periods.

4.4 Institutional support and long-term sustainability

The long-term sustainability of ERP systems in Higher Education Institutions (HEIs) hinges not only on technical performance but also on the consistency of institutional support and the perceived legitimacy of leadership decisions by various stakeholder groups. The findings from both the TU Berlin case study and the multi-institutional survey suggest that visible and sustained leadership commitment plays a pivotal role in shaping stakeholder trust, mitigating resistance, and ensuring the continuity of ERP-related initiatives beyond the initial rollout phase.

4.4.1 Case study insights

At TU Berlin, institutional support was formally anchored through the establishment of a project steering committee, which included high-ranking decision-makers such as the Chancellor, CIO, and administrative directors. This governance structure was cited as a stabilizing factor, especially during phases of uncertainty or interdepartmental conflict.

Several interviewees (A, B, C) emphasized that executive visibility, like regular townhall meetings, strategic communications, and direct engagement with faculties, was instrumental in maintaining project legitimacy and motivating project teams.

However, other stakeholders expressed skepticism about the top-down character of leadership involvement. Faculty members (H, M) reported that executive decisions were often perceived as disconnected from the operational realities of academic work:

> From our perspective, leadership was supportive, but too far removed. We lacked a visible champion within our own faculty who could translate project goals into academic practice.

This gap between high-level governance and local departmental leadership weakened the perceived relevance of the ERP initiative, particularly among those not directly involved in project structures. The absence of decentralized champions also resulted in limited ownership within faculties and support units.

Sustainability challenges were further exacerbated by staffing limitations. Short-term project contracts led to high turnover rates, which in turn caused knowledge loss and disrupted support continuity. Some interviewees (D, E) noted that after the official rollout, dedicated project teams were dissolved too quickly, leaving departments without clear points of contact for system issues or improvement requests.

4.4.2 Survey findings

Survey respondents echoed these observations. Several institutions reported that their ERP projects lost momentum after the initial implementation phase due to leadership turnover, shifting priorities, or insufficient post-go-live structures. In contrast, HEIs that institutionalized long-term support structures, like ERP coordination units or cross-functional steering boards, were more successful in integrating ERP systems into routine operations.

In addition to resourcing challenges, Table 4 summarizes frequently reported barriers to ERP sustainability, including leadership disengagement and the absence of institutional continuity mechanisms. Respondents emphasized that ERP sustainability depends not only on funding, but also on visible executive commitment, retained expertise, and structured long-term support.

Key factors associated with sustained institutional support included:

- Stable governance structures (e.g., ERP boards, cross-departmental councils).
- Strategic anchoring of ERP within broader digitalization goals.
- Dedicated budgets for continuous improvement and system maintenance.
- Institutional memory through retention of key personnel or knowledge transfer mechanisms.

In some German universities, survey respondents highlighted the role of consortia like *HIS eG* as a means of pooling resources and maintaining system evolution collaboratively. This model was perceived as a buffer against both vendor dependency and institutional isolation.

Overall, the findings suggest that perceived sustainability is not only a matter of technical uptime or budget allocation, but also of stakeholder trust in long-term institutional commitment. When faculty and staff believe that leadership remains engaged and responsive, they are more likely to invest time in learning, adapting, and contributing to the ERP system's ongoing development.

4.5 Summary of key findings

The cross-case findings from TU Berlin and the survey responses across nine HEIs highlight recurring patterns that influence the implementation and adoption of ERP systems in higher education. While technical readiness and project planning are necessary, the success of ERP initiatives in HEIs is shaped most notably by stakeholder involvement, institutional structures, and the extent to which ERP systems align with academic and administrative practices.

The following key findings emerged:

1. **Stakeholder involvement is uneven across HEIs** Early and continuous engagement of stakeholders, especially faculty and mid-level administrators, was associated with higher levels of ERP system acceptance, alignment, and sustainability. Institutions relying on top-down decision-making and limited consultation faced higher resistance and post-implementation adjustments.

2. **Process alignment requires balancing standardization and institutional specificity** ERP implementations that sought to replicate legacy processes through extensive customization faced more technical challenges and integration issues. Institutions that treated ERP as an opportunity for administrative process redesign reported smoother implementation trajectories.
3. **Change management is central to user acceptance** Formal change management strategies, especially role-based training, key user networks, and targeted communication, played a critical role in building trust and lowering resistance. Institutions without structured engagement mechanisms struggled to convey the purpose and benefits of ERP systems.
4. **Perceptions of success vary by stakeholder group** While IT teams and central administrators focused on implementation milestones and system performance, end-users emphasized usability, support, and compatibility with academic workflows. This divergence highlights the importance of accounting for multiple definitions of "success" during and after ERP rollouts.
5. **Institutional leadership and long-term support structures matter** Leadership visibility and sustained commitment were seen as critical to reinforcing the legitimacy of the ERP initiative. Institutions that retained dedicated project teams, maintained feedback loops, and aligned ERP goals with broader digital strategies were better positioned to adapt the system to evolving needs.

These patterns were not only observed in the TU Berlin case but also across the nine surveyed HEIs. Table 5 provides a comparative overview, highlighting the extent to which key challenges and success factors were shared or differed across institutional contexts. The table reinforces the central role of stakeholder engagement, alignment efforts, and institutional support as determinants of ERP system effectiveness.

5 Discussion

The discussion synthesizes findings from the TU Berlin case study and the survey across multiple HEIs to evaluate the Critical Success Factors (CSFs) for ERP implementation. This section examines variations in stakeholder evaluations, the role of stakeholder engagement, and the broader implications for ERP success.

ERP implementations in HEIs are complex socio-technical projects where stakeholder priorities often diverge. IT teams and administrators typically focus on efficiency, standardization, and process automation, whereas faculty members and end-users emphasize usability, system flexibility, and workload adaptation. This misalignment often leads to resistance, low adoption rates, and dissatisfaction. By addressing the research questions, this section highlights the impact of stakeholder engagement, expectation alignment, change management, and institutional culture on ERP adoption. The study finds that sustained involvement of diverse stakeholders enhances ERP usability, reduces resistance, and improves long-term implementation success.

5.1 Answering RQ1: How do different stakeholder groups in HEIs evaluate the critical success factors for ERP implementations?

Stakeholder priorities differ notably across roles, as shown in Fig. 5, supporting the finding that stakeholder-specific needs must guide ERP implementation strategies. The case study at TU Berlin and survey responses suggest that IT decision-makers prioritize efficiency, standardization, and system integration, whereas faculty members and administrative staff focus on usability, training adequacy, and process adaptability. These distinctions align with existing research on ERP success factors in public-sector institutions (Abu Madi et al. 2024).

1. IT Leadership and Project Management Perspective.

- IT leaders prioritize technical robustness, integration, and process automation, considering ERP success synonymous with system reliability and process optimization.
- Survey responses from CIOs and IT project managers highlighted that clear project management and process standardization were critical for reducing implementation complexity and ensuring long-term sustainability.
- The TU Berlin case confirmed this view, as IT teams considered ERP successful if it improved cross-departmental efficiency and data consistency.

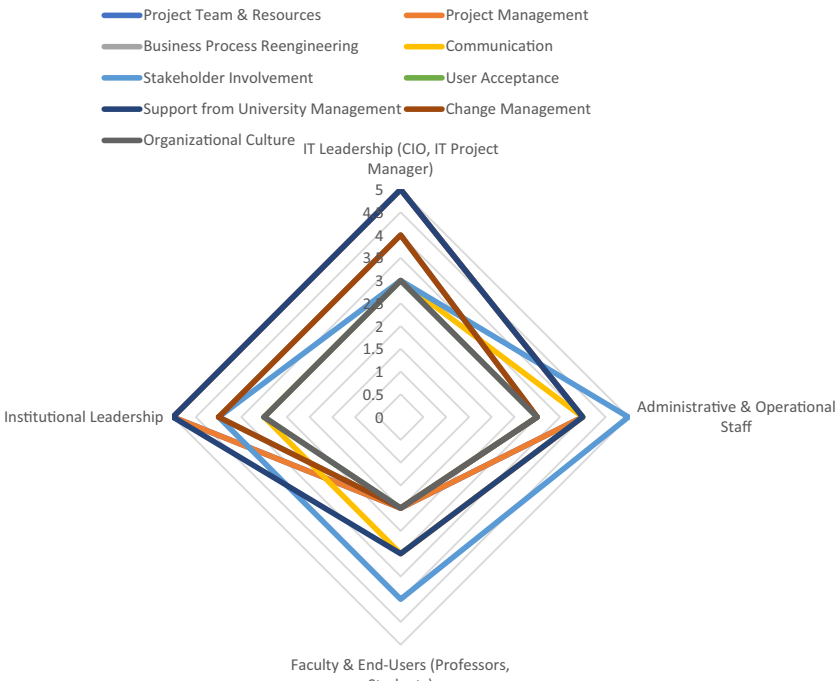


Fig. 5 Stakeholder perspectives on CSFs

2. Administrative and Operational Staff Perspective.

- Administrative stakeholders emphasized the importance of training, usability, and alignment with existing workflows.
- Many respondents rated change management strategies as insufficient, leading to resistance from administrative users who found the system complex and disruptive to established workflows.
- Institutions where training programs were tailored to specific user roles (e.g., finance, HR, student administration) reported higher levels of ERP acceptance.

3. Faculty and End-User Perspective.

- Academic staff and faculty members exhibited lower ERP acceptance rates, particularly when the system disrupted teaching or research-related workflows.
- Faculty respondents noted that communication and involvement in system design were often inadequate, leading to a lack of ownership and increased resistance.
- The case study highlighted that faculty members at TU Berlin expressed concerns over ERP's rigidity and lack of customization for academic functions.

4. Institutional Leadership and Policy-Makers Perspective.

- Leadership teams (e.g., university management, department heads) emphasized strategic alignment, regulatory compliance, and financial viability as top priorities.
- Institutions that received strong executive support for ERP projects reported higher levels of project momentum and better alignment between ERP functionalities and institutional goals.

These results reinforce prior studies (Al-Amin et al. 2023) suggesting that misalignment between stakeholder expectations and ERP functionalities is a leading factor in resistance and implementation difficulties. HEIs that accounted for stakeholder diversity in planning phases tended to experience fewer post-implementation usability challenges.

5.2 Answering RQ2: What role does stakeholder involvement play in the perceived success of ERP implementations in HEIs?

Stakeholder involvement plays a crucial role in the success of ERP implementations in Higher Education Institutions (HEIs). The findings from the TU Berlin case study and the survey across multiple HEIs indicate that the level of stakeholder engagement throughout the project lifecycle directly influences system adoption, user satisfaction, and the alignment of ERP functionalities with institutional needs. Institutions that ensured early and continuous participation of faculty, administrative personnel, and students reported smoother transitions, higher system usability, and fewer post-implementation modifications.

Table 6 Impact of stakeholder engagement levels

Stakeholder Engagement Level	Perceived Usefulness (1 Low−5 High)	User Acceptance (1 Low−5 High)	Resistance Level (1 Low−5 High)
High Engagement (Workshops, Feedback Loops, Pilot Testing)	4.5	4.3	1.8
Moderate Engagement (Some faculty & staff consulted)	3.8	3.6	3.0
Low Engagement (Top-down decision-making, minimal user input)	2.7	2.4	4.3

The TU Berlin case study revealed that early stakeholder exclusion led to delayed adoption and dissatisfaction among faculty members, who found the ERP system restrictive and misaligned with academic workflows. In contrast, administrative staff who were involved in the system design process exhibited higher acceptance rates, as the system was tailored to their operational needs. The survey findings reinforce this observation, with institutions that conducted stakeholder workshops, iterative feedback loops, and pilot testing reporting higher adoption rates compared to those that relied solely on top-down decision-making.

Table 6 illustrates the correlation between stakeholder involvement levels and key ERP adoption metrics, including perceived system usefulness, user acceptance, and post-implementation satisfaction. Institutions with low stakeholder involvement consistently faced higher resistance and a greater need for post-implementation system modifications.

The survey results further highlight that institutions that engaged faculty and students early in the selection and customization phases experienced higher satisfaction levels post-implementation. In contrast, HEIs that only consulted IT and administrative staff often encountered low acceptance rates among academic users, who struggled with ERP usability.

A significant takeaway from both the case study and survey is that stakeholder involvement mitigates resistance. Institutions that involved diverse user groups throughout the ERP lifecycle experienced lower resistance levels, as faculty, staff, and students felt a sense of ownership over the system. Moreover, institutions that prioritized ongoing training and communication efforts ensured smoother transitions by aligning system expectations with actual user needs.

5.3 Theoretical implications for ERP implementation in HEIs

This study does not propose a new theory of ERP success, but contributes to the understanding of ERP adoption in Higher Education Institutions (HEIs) by offering a stakeholder-centered perspective grounded in empirical data. Building on stakeholder theory (Freeman, 1984; Mitchell et al., 1997), our findings show that stakeholder groups, such as faculty, decentralized administration, and IT staff, evaluate ERP systems based on diverging priorities and perceptions. These differences are shaped by institutional roles, governance responsibilities, and proximity to daily system use. Rather than advancing stakeholder theory conceptually, the study provides empirical evidence for its relevance in public-sector ERP projects characterized by co-deter-

mination and fragmented decision-making structures, as found in German HEIs. Similarly, while the study refers to dimensions of the IS success model (DeLone and McLean 2003), it does not adopt it as a formal evaluative framework. Constructs such as perceived usefulness, service quality, and expectation alignment proved helpful to interpret stakeholder feedback, but were insufficient to explain adoption outcomes on their own. Instead, ERP implementation outcomes are conceptualized as perceived institutional fit and alignment with stakeholder needs. This reflects a context-specific understanding of success that accounts for organizational complexity and decentralization, elements often underrepresented in corporate IS success models (Pollock and Cornford 2004; Seo 2013). Moreover, the study addresses the well-known tension between standardization and customization not primarily as a technical trade-off, but as an organizational coordination challenge. In German HEIs, customization demands often emerge from fragmented legacy structures, faculty autonomy, and regulatory constraints. Our findings suggest that addressing these tensions requires early stakeholder negotiation and governance-sensitive adaptation strategies, rather than universal design principles. By highlighting these empirical insights, this study strengthens the contextual application of existing IS theories without overstating its theoretical scope.

5.4 Practical implications

The findings offer practical guidance for decision-makers and project leads managing ERP implementation in German HEIs. A central implication is the need for sustained stakeholder engagement throughout all project phases. Interview and survey data indicate that resistance often stems not from technical shortcomings, but from the perception that ERP decisions are disconnected from local academic and administrative practices. Effective engagement requires tailored formats such as role-specific workshops, transparent communication structures, and trusted contact persons in each faculty or unit. Second, our findings point to the limitations of one-size-fits-all training approaches. Many HEIs relied on generic onboarding sessions that failed to reach diverse user groups effectively. In contrast, institutions that implemented iterative, role-specific training formats and embedded “key user” concepts experienced smoother transitions. However, training alone is not sufficient; its effectiveness depends on timing, relevance to operational tasks, and alignment with local workflows. Third, the study underscores that customization decisions should not be approached solely as technical design issues. While standardization offers benefits for system efficiency and compliance, rigid enforcement may undermine acceptance in highly autonomous environments. Conversely, extensive customization may increase maintenance complexity. Rather than prescribing an ideal balance, the study recommends transparent, stakeholder-inclusive negotiation processes to manage these trade-offs. Finally, long-term sustainability requires institutional support structures that extend beyond go-live. These include ERP coordination units, cross-functional steering boards, and mechanisms for maintaining institutional memory in the face of staff turnover and project-based contracts. Especially in German HEIs, where governance is distributed and staff fluctuation is high, such structures are essential for ensuring continuity and system evolution.

6 Conclusion and future research

Implementing a cross-departmental ERP system in a stakeholder-driven organization such as a HEI is a complex and multifaceted undertaking. This study provides valuable insights into the varied perspectives of different stakeholder groups involved in ERP implementation, highlighting that the evaluation of CSFs and overall project success can significantly differ among these groups. The findings reaffirm that challenges such as stakeholder misalignment, governance structures, and usability concerns persist, yet they can be effectively addressed with a strategic, participatory approach.

The case study of TU Berlin revealed that while the project was perceived as a success by some stakeholders, others viewed it as problematic, illustrating the diverse and often conflicting objectives within stakeholder-driven environments. A key takeaway from this study is the importance of expectation alignment and strong management skills, including political and interpersonal competencies, to navigate these diverse stakeholder perspectives. Project managers must recognize the congruent and conflicting goals of all involved parties and work towards harmonizing these to achieve overall project success. Effective stakeholder involvement and communication are essential in reducing resistance and fostering acceptance of the new ERP system, particularly during the critical transition phase.

As digital transformation continues to shape academic institutions worldwide, ERP systems will play a pivotal role in enhancing operational efficiency and decision-making. The road ahead is filled with potential—by embracing stakeholder-driven implementation strategies and continuous adaptation, HEIs can harness ERP systems to their fullest potential. The findings offer several practical implications for HEIs and similar public sector organizations undertaking ERP implementations, emphasizing that well-known CSFs are not universally applicable and are often viewed differently by various stakeholder groups. Effective project management must therefore include a flexible approach to address unforeseen challenges, proactive error management, and extensive testing prior to system go-live.

From a research perspective, this paper highlights the need for future studies to incorporate stakeholder perspectives when exploring ERP implementations. While most existing research focuses on top management views, this study demonstrates the value of understanding the nuanced perceptions of subordinate stakeholder groups, who are directly impacted by the system but often have their voices overlooked. Future research should aim to empirically examine these interrelationships between CSFs and stakeholder experiences, using quantitative methods to make these dynamics measurable and actionable.

The conversation on ERP adoption in HEIs is far from over—it is only beginning. As universities navigate evolving digital landscapes, the need for adaptable, inclusive, and future-proof ERP solutions becomes increasingly clear. The lessons learned today will shape the ERP systems of tomorrow, ensuring that technology serves as an enabler rather than a barrier to academic excellence. Future research should continue to explore these themes, further investigating how inclusive management practices can enhance ERP project outcomes across diverse organizational contexts.

7 Limitations

This study has several limitations that should be acknowledged. First, generalizability is constrained, as the findings are based on a single case study at TU Berlin and a small qualitative survey ($N=9$ HEIs). While this design captures in-depth stakeholder perspectives, broader validation requires cross-institutional studies covering diverse governance models and national contexts. Second, the study relies on qualitative methods, which offer rich contextual insight but limit statistical generalization. Third, the study focuses on internal stakeholders, administrators and faculty, while external actors e.g. accreditation bodies and funding agencies are excluded. Given their significant influence on ERP adoption, future research should explore their perspectives to provide a more holistic view of institutional decision-making. Lastly, regulatory and structural conditions in public HEIs, like budgetary restrictions, data protection mandates, and public-sector employment law, pose additional complexity that limits the transferability of private-sector ERP strategies. These challenges are particularly pronounced in non-economic public services and require ERP approaches to be sensitive to institutional, legal, and administrative variation across countries (Pollock and Cornford 2004; Seo 2013).

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