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From Industry to Higher Education: Adapting the 'Seven Levers of Digital Transformation' and Their Applicability for the Digital Transformation of Universities

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Abstract

This paper examines the transferability of the "Seven Levers of Digital Transformation" by the Open Group to the higher education sector. The analysis reveals that a context-specific adaptation is necessary to address digital challenges. Anti-patterns such as lack of direction, long decision-making processes, and system failures are particularly relevant in smaller universities. The findings underline the usage of the Seven Levers of Digital Transformation and highlight importance of adapted industrial standards for digital transformation. Future research should focus on developing strategies to activate the levers and assess the suitability of other industrial models.

1 Introduction

Digital transformation remains a persistent challenge in higher education, with institutions showing varying levels of engagement and success. Increasing demands for standardization, faster implementation, and expanded digital services heighten the need for coordinated action (Rapanta et al., 2021). In contrast, the industrial sector benefits from established frameworks that provide structured guidance, suggesting that a systematic approach could also support universities (Joseph et al., 2024). This study investigates the applicability of The Open Group's "Seven Levers of Digital Transformation"

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to higher education. It explores whether sector-specific approaches are needed or if the Seven Levers can be effectively adapted, and which antipatterns emerge. The aim is to assess the current state of transformation in universities using this framework and to evaluate the relevance of industrial standards in academia. The findings highlight key areas for action and inform future research on standardization in this context. The study includes a theoretical overview, an analysis of existing initiatives, and resulting practical implications.

2 The Status of Digital Transformation in Higher Education and the Seven Levers as an Established Method

2.1 State of the Art for digital Transformation of Higher Education

Digital transformation has established itself as a challenge over the past decade (Heinzl et al., 2024). The pressure to implement digital strategies is growing, driven by opportunities for innovation, new working methods, and process standardization (Heinzl et al., 2024). While businesses pursue digitalization primarily for efficiency and profit, universities face broader technological, pedagogical, and organizational demands (Vogler, 2024; Bundesministerium für Bildung und Forschung, 2023). The COVID-19 pandemic accelerated technical implementation and revealed interdisciplinary challenges across IT, pedagogy, and social domains (Kaplan, 2022). As of 2024, universities still struggle to enhance the student experience, simplify administration, and modernize teaching (Rahmadi, 2024; Johnston et al., 2018). Despite extensive research, no unified standard for digital transformation in higher education exists, largely due to fundamental differences between university and business processes (Bygstad et al., 2022; Maz-Machado et al., 2016). Digitalization is seen as a driver of competitiveness through expanded digital participation in teaching and research (Bygstad et al., 2022). However, the lack of vision, strategic clarity, resources, and supportive culture hampers effective implementation (Aditya et al., 2021). Advancing transformation requires a robust foundation to evolve current practices and inform future discourse.

2.2 The Seven Levers of Digital Transformation – The Open Group

The Seven Levers of Digital Transformation serve as a framework for analyzing business models and value chains to identify interconnections and optimization potential (Hornford et al., 2017). Since the 1990s, IT driven transformation has advanced, accelerating with the rise of cloud services from 2012, which reshaped IT cost structures. However, high failure rates in early implementations persist (Hornford et al., 2017). A key challenge, according to The Open Group, is the absence of integrated strategies, resulting in fragmented initiatives and inadequate performance evaluation. Digital transformation follows a chain of aligned considerations that support strategic coherence, operational excellence, innovation, and enhanced customer experience (Hornford et al., 2017).
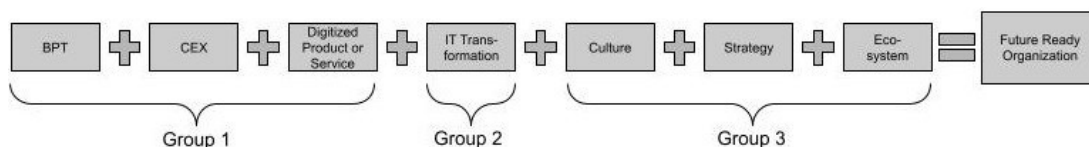
Figure 1: The Seven Levers of digital Transformation

Additionally, a grouping of the seven levers is defined (Figure 1) (Hornford et al., 2017):

- Group 1 - Continuously deliver products that are valuable to buyers or users.

- Group 2 - Interface between operational execution and strategy.

- Group 3 - Vision, culture, and partnerships of companies.

The Open Group recommends initiating transformations at the leadership level, thoroughly involving traditional processes and employees, and considering dependencies, technologies, and environmental factors (Hornford et al., 2017). The seven levers provide a structured framework for identifying problems and developing flexible methods for digital transformation that have been successfully implemented by established companies (The Open Group, 2024).

2.3 Digital Transformation through the Use of Established Methodologies in Higher Education

The need for comprehensive digital transformation in teaching and research is acknowledged by most universities (Ludvigsen & Dæhlen, 2020). However, a universally applicable methodology for digital transformation is still lacking, which exacerbates the challenges, particularly due to the high decentralization and complexity of universities (Pucciarelli & Kaplan, 2016). The Higher Education Reference Model (HERM) illustrates the complex dependencies within academic institutions (Nauwerck et al., 2022). Specific adaptation measures are required to develop suitable strategies. Previous attempts to transfer successfully proven methods from the private sector failed due to the insufficient consideration of university-specific digitalization requirements (Pucciarelli & Kaplan, 2016). Nevertheless, adapted approaches from the business sector, considering the state of research, remain promising (Bygstad et al., 2022). HERM standardizes the structures, and strategic elements of universities and provides insights into the differences in business capabilities (Hartmann & von der Heyde, 2024). It facilitates a deeper understanding of university structures and supports a strategic shift in dealing with digitalization standards. Models like HERM adapt universal methodologies to the "Higher-Education" ecosystem to develop digitalization strategies. There are already specific approaches for measuring success and digital readiness (Jannica Budde et al., 2023). For example, the international DigiReady+ project group is working on using suitable framework to categorize the digital maturity of higher education institutions based on data. This enables institutions to perform evidence-based self-assessments, which help derive actionable insights for future improvements (Chounta et al., 2024). The challenges of digital transformation highlight the relevance of already established methods for universities. A holistic understanding of their complexity requires consideration of the specific type of digitalization, the core fields of higher education and the ability to measure and categorize successes. HERM makes valuable contributions in this. The seven levers of the Open Group offer a standardized applicable methodology with moderate entry barriers, which can be enriched through HERM.

3 Digital Transformation in Higher Education: An Analysis of Current Efforts in the Context of the Seven Levers of the Open Group

The specifics of the value chain in universities are described, while the HERM provides a clear representation of the core value chains and illustrates their interconnections (Bygstad et al., 2022). The methodology of the seven levers, as shown in Figure 1, is applied to universities in order to analyze the

current digital transformation approaches, identify specific areas for success, and demonstrate the applicability of established industrial standards.

3.1   Lever 1: Business Process Transformation (BPT)

The first lever, Business Process Transformation (BPT), stresses the need for comprehensive digitalization of operational processes, involving all stakeholders. In manufacturing, linking data across departments enhances efficiency, customer insight, and service offerings. Digital integration is essential for leveraging technologies like AI and ML to improve customer experience (Hornford et al., 2017).

For universities, BPT requires efficient process management, automation, and digitalization along the value chain to optimize data quality, decision-making, and technology use. The HERM model highlights universities' value creation focused on education, research, and services rather than product development (Nauwerck et al., 2022).

Universities often implement isolated digital solutions, such as chatbots for student orientation, but face a growing need for a holistic process view. This includes aligning interdisciplinary processes between education and research, optimizing service coordination, and designing end-to-end student processes (Auth et al.). Neglecting BPT leads to unclear value chains, repeated process redesigns, and inefficient automation. Without BPT, AI and bots cannot be effectively utilized (Hornford et al., 2017). Although German and international universities increasingly adopt AI, they often lack a comprehensive process overview, reflecting a common anti-pattern amid rising complexity in higher education digitalization (Cox, 2021).

3.2   Lever 2: Customer Engagement and Experience (CX)

The second lever focuses on understanding, developing, and enhancing competitiveness through the entire experience and engagement process of customers and partners. Effective digital transformation requires connecting internal processes to gain deeper insights and foster emotional bonds. A common issue is the lack of an end-to-end process, resulting in negative customer perceptions (Hornford et al., 2017).

In contrast to companies, universities do not interact with typical customers and partners, but with diverse stakeholder groups such as students, researchers, stakeholders and cooperation partners (e.g. companies, associations and other universities) (Baker, 2015; Friedrich & Budde, 2024). To address this diversity, universities should adopt a holistic "student, research, and cooperation journey" model based on the customer journey. However, current focus remains predominantly on students during teaching, overlooking the initial selection phase and the crucial roles of researchers and partners (Alenezi, 2021). Integrating these groups into a unified customer experience (CX) strategy enhances stakeholder value, fosters long-term engagement, and supports continuous data-driven improvements (Bond et al., 2018).

The Open Group warns that neglecting CX risks losing customers, a concern relevant to universities and their student populations (Hornford et al., 2017). In Germany, student numbers are stagnating due to demographic shifts (Statistisches Bundesamt, 2024), while internationally, growth is predicted but remains below pre-pandemic levels (National Center for Education Statistics, 2023). Given the limited current impact of CX efforts, universities must prioritize this lever and implement targeted strategies to retain researchers and partners for sustained benefits.

3.3   Lever 3: Product or Service Digitalization

Developing successful products and services is increasingly complex due to rising expectations, evolving trends, and diverse customer needs. Digital technologies enable new business areas by collecting and analyzing customer data, allowing precise responses, trend anticipation, and continuous

improvement (Hornford et al., 2017). Data-driven approaches combine qualitative insights with quantitative data to enhance competitiveness and create long-term value (Hornford et al., 2017). In universities, digitalizing products and services requires clearly defining offerings that are continuously adapted based on data to meet user needs. Without such strategies, quality gaps and user dissatisfaction may harm competitiveness, student enrollment, research reputation, and employer branding (Hornford et al., 2017). University products span education, research, collaboration, student services, and societal contributions. Traditional compulsory services coexist with innovative digital offerings like online teaching platforms, which are vital for competitiveness and increasingly student-centered. Digital service maturity varies widely among institutions (Bygstad et al., 2022).

Failure to continuously adapt university offerings undermines value propositions, reducing competitiveness and reputation. Globally, there is a growing focus on leveraging student satisfaction, though improvement opportunities remain (Kanwar & Sanjeeva, 2022). A comprehensive catalog of products and services is essential to guide universities, as exemplified by IT service frameworks in higher education (EDUCAUSE, 2024).

3.4 Lever 4: IT and Delivery Transformation

The IT and supply transformation lever represents the central link and is related to all other levers (Hornford et al., 2017). As part of the transformation process, the focus is on adapting the status quo to the current expectations and needs of market participants and users. This requires a comprehensive restructuring of the organization. The restructuring is primarily supported by the use of modern IT technologies in order to make processes as efficient as possible. Distributed infrastructures, cloud technologies, strategies for coordinating services outside the company boundaries and suitable support structures are required to keep pace with market dynamics (Hornford et al., 2017).

The IT infrastructure at universities is still strongly characterized by traditional operating models that are associated with a high level of manual administrative effort. These existing structures are in clear contrast to the requirements of modern, digitalized IT landscapes. The resulting delta represents a significant inhibiting factor for the digital transformation of universities and makes the development towards a digital university considerably more difficult (Mohamed Hashim et al., 2022). In addition, the digital transformation requires higher IT expenditure and the integration of "as-a-service" models to increase efficiency and scaling. In the face of growing data volumes and anomalies, universities need to adapt IT security strategies and develop ethical data processing policies to ensure integrity and confidentiality (Mohamed Hashim et al., 2022). This results in the need for a reformation of the existing IT landscape. The future IT landscape must be able to guarantee a scalable infrastructure. To be able to react quickly to changes within its own architecture, e.g. for the use of new technologies, and to be able to derive precise decisions based on data.

The lack of implementation of lever 4 - IT and delivery transformation - leads to reduced agility and promotes the risk of ill-considered decisions (Hornford et al., 2017). In an international context, the extent of the realignment of the IT landscape is largely dependent on the financial resources available to the university. The literature illustrates the urgency and necessity of reforming the IT landscape on a global level (Akour & Alenezi, 2022). Best practices for IT transformation at universities emphasize that a successful digital transformation goes beyond purely technological aspects. In addition to IT itself, the landscape (processes, digital services and user-centricity) must also be adapted to ensure effective implementation. A best practice approach is the simultaneous implementation of IT service management (ITSM) and enterprise architecture management (EAM). This promotes coordination between company management and the IT department (business IT alignment) and helps to optimize the use of IT services (Kraus et al., 2024).

3.5   Lever 5: Organizational Culture

Organizational culture is a critical lever for successful transformation. A culture fostering innovation, risk-taking, and data-driven decisions enables the shift from stable processes to scalable, adaptive structures. In digital transformation, existing assumptions must be challenged, and new approaches continuously explored. Top-down and bottom-up efforts are essential to create a culture that empowers employees to innovate and take risks to meet future demands (Hornford et al., 2017).

This lever directly applies to higher education, where digital transformation demands new structures, processes, and value-based adjustments. Effective communication and participation are essential to broaden universities' scope, with engagement from all organizational levels crucial to shaping a digital university (Ehlers, 2021).

Despite recognizing this need, many universities resist cultural change due to rigid hierarchies, entrenched decision-making, and skepticism toward digital technologies and agile methods (Deacon & Laufer, 2024). he Open Group attributes resistance to professional incompetence and lack of personal responsibility (Hornford et al., 2017). Globally, universities exhibit low ownership due to hierarchical traditions, which must be overcome to strengthen accountability across all levels (Brankovic & Cantwell, 2022; Deacon & Laufer, 2024).

3.6   Lever 6: Strategy

The sixth lever addresses how organizations adapt to changing markets and user needs through informed investment, ongoing strategy revision, and process decisions. Central factors include technology integration, culture development, and portfolio adjustment. Although technology accelerates transformation, success relies primarily on judgment and experience (Hornford et al., 2017).

Large universities are particularly well positioned to develop and implement dynamic strategies, as evidenced by the rapid evolution of online education strategies during the pandemic. This experience highlights that strategies must be regularly reviewed and adapted to remain effective. Technology plays a central role in university strategic plans, supporting the entire value chain (Jamah et al., 2022). In contrast, smaller institutions have struggled to keep pace, often scaling back digital offerings such as online teaching and digital research infrastructure (Jamah et al., 2022).

Digitalization without aligned organizational strategy risks system failure (Hornford et al., 2017). Nevertheless, smaller universities recognize their deficits and plan long-term investments in infrastructure to prevent further backlog and manage student expectations (Schleef, 2009). This gap exists nationally and internationally, though financially stronger universities tend to invest more strategically in modern technology (Hashim et al., 2021).

3.7   Lever 7: Ecosystem

An ecosystem consists of diverse actors including organizations, companies, customers, users, and partners who collaborate within a value network to create collective value. While not fully controllable, ecosystems offer strategic advantages. Effective ecosystem or business model design requires a holistic understanding of the value chain to address internal and external challenges. Instead of reinventing their models, organizations can optimize existing structures to remain competitive. Ecosystem collaboration fosters market stability and customer loyalty (Hornford et al., 2017).

In the university context, the ecosystem includes students, faculty, researchers, industry partners, and society, all contributing to education and innovation. Integrating economic models supports core functions such as research, teaching, and training and facilitates necessary transformation (Elkana & Klöpper, 2012). Ongoing internationalization and technological change drive this transformation, with international collaboration and ecosystem openness playing a central role. Financial constraints

significantly affect transformation capacity, requiring strategic prioritization to secure synergies, reflecting typical misalignment patterns of the ecosystem lever (Hornford et al., 2017).

Without alignment, ecosystem synergies risk being lost. Universities are modernizing ecosystems via digital tools, innovation hubs, and global networks. Development varies, with some institutions advancing ecosystems while others struggle with internal restructuring and international collaboration. Despite resource constraints and resistance, a clear shift toward open and dynamic ecosystems is underway (Hornford et al., 2017). Large scale industry collaborations are accelerating this trend, fostering global cooperation between academia, industry, and policymakers (Zhuang & Shi, 2022).

4 Key Findings

This paper discusses the question: "Does digital transformation in the higher education sector require the establishment of new, specific approaches, or can the 'Seven Levers of Digital Transformation' developed by the Open Group be adequately adapted, and what anti-patterns emerge in the context of higher education?" The context-specific adaptations are necessary, with the extent varying depending on the lever. A brief example of the scope of these adaptations – Lever 6 ("Strategy") is relevant in both areas, while Lever 3 ("Product or Service Digitalization") in higher education requires a clear definition and description of the value chain. The Open Group identifies anti-patterns for each lever that characterize poor transformations (Figure 2).
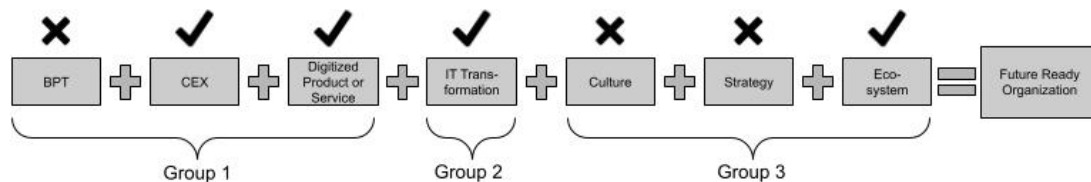
Figure 2: Detectable anti-patterns in the overall view

At the international level, Levers 2, 3, 4, and 7 of digital transformation in higher education are evident, with their manifestation and intensity strongly dependent on the size of the institution and available financial resources. In contrast, for Levers 1, 5, and 6, the anti-patterns defined by the Open Group can be observed. The anti-pattern of Lever 1 ("Business Process Transformation") manifests as a lack of direction, caused by the absence of a comprehensive overview of processes, which hinders the effective use of modern technologies. Lever 5 ("Culture") reflects the traditional structures of the higher education sector, which are evident in long decision-making processes and a lack of accountability. However, professional incompetence is not observed in this context. Lever 6 ("Strategy") illustrates the anti-pattern of system failure, particularly in smaller institutions, where the simultaneous use of traditional and modern systems leads to resource overload. This is also reflected in the international setback in digital offerings after the COVID-19 pandemic. The analysis confirms that the seven levers originally developed for industry by the Open Group are applicable to higher education, but context-specific challenges and anti-patterns need to be addressed. The results highlight the relevance of industrial standards for the digital transformation of higher education, with the key role lying in the adequate contextualization. Furthermore, the presented anti-patterns constitute a relevant field of investigation and intervention for higher education in an international context. This paper focuses on the applicability of the seven levers of the Open Group and emphasizes the need to examine additional industrial standards for their consistency and usability in the higher education sector. Future research should provide a detailed analysis of the levers to identify specific activation measures. Additionally, a systematic examination of the identified anti-patterns is needed to evaluate their presence within

institutions and define individual targeted prevention strategies. A combination with the data-informed framework for digital readiness (DigiReady+) could complement its application. To further validate the practical applicability of the Seven Levers, a case study demonstrating their effective implementation at a specific university would provide valuable insights. Moreover, additional digital transformation industry standards should be expanded through the HERM model and validated for their suitability for higher education.

5 Summary

Digital transformation is already underway in the higher education sector but faces major challenges such as poor business-IT alignment and slow decision-making. This paper investigates whether the "Seven Levers of Digital Transformation" by The Open Group are suitable for higher education, identifies observable anti-patterns, and assesses the need for sector-specific approaches. The analysis confirms their general applicability but highlights the need for contextual adaptation, influenced by institutional size and financial conditions. Anti-patterns related to "Business Process Transformation" (lever 1), "Culture" (lever 5), and "Strategy" (lever 6) are observable internationally and lead to disorientation, delays, high costs, and strategic gaps. Institutions should analyze these patterns and develop targeted prevention strategies. The Seven Levers offer a useful guideline, but specific areas require deeper consideration. Future research should focus on actionable measures, integration with the DigiReady+ framework for digital maturity self-assessment, and the practical application of the levers in a university case study. The relevance of further transformation standards, extended by the HERM model, should also be evaluated.

6 Acknowledgements and resources

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