Design and Validation of a Framework for Sustainable Digital Transformation in the Context of Strategic Management

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digital transformation, digital business strategy, corporate sustainability, strategic management, design science research

1. Introduction

Due to digital technologies' unprecedented and disruptive impact, companies across all industry sectors must adjust corporate structures, processes, functions and business models to stay competitive [1]. The retail industry exemplifies the phenomenon of digital transformation (DT), where established retailers, like Toys'R'Us and RadioShack, have succumbed to the rapid rise of e-commerce giants like Amazon and Alibaba, ultimately resulting in their bankruptcy. Digital technologies such as the Internet of Things (IoT), artificial intelligence (AI), analytics, big data and mobile devices are one of the main drivers for companies to engage in DT [2]. With the widespread availability of those technologies, entry barriers into the market are fading, decreasing the competitive advantage of traditional companies [3]. Besides rapid technological development, sustainability has emerged as a significant concern due to the alarming rate of environmental degradation, climate change, and social inequalities [4]. The need to balance economic growth with environmental and social responsibility has become a pressing issue across various sectors. Thus, the digital transformation strategy of a company can serve as a central point to integrate and advance sustainability efforts [5].

2. Research questions and objective

This dissertation seeks to assist companies in realigning corporate structures, culture, and strategies to compete in a dynamic, customer-centric environment driven by digital technologies. It involves developing a set of principles, practices, and recommendations for organizations to follow when implementing DT initiatives. The framework attempts to facilitate the adoption of sustainable practices, align them with an organization's strategic objectives and contribute to its long-term success. The focal point of the framework is to empower companies to achieve

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their sustainability goals rather than emphasizing a specific sustainable methodology. Using design science research (DSR), the artifact will be the documented framework, consisting of digital readiness, technology adoption and organizational culture as constructs. Models could be sustainability frameworks or change management and technology adoption models, illustrating the relations between the constructs. The artefact might be validated by applying process modelling methods, most likely in the aviation, logistics or banking industry.

Research Questions (RQ):

RQ1: How can sustainability aspects be incorporated into digital transformation strategies?
RQ2: What methods and tools support the planning and execution of sustainable digital transformation initiatives?

3. Relevance, related research and contributions

Even with enough financial resources at a company's disposal, there is no guarantee for a successful DT, as expressed by a 70% failure rate [6]. GE, for example, attempted a digital transformation by creating a new business unit, GE Digital, and investing heavily in big data analytics and machine learning. However, despite significant investment, GE failed to establish itself in the new market due to its size, unattractiveness for talented personnel, targeting an unrealistic time frame, inability to keep up with fast developments of smaller startups, and a misinterpretation of the corporate culture [7]. GE is only one of many examples, as Kodak, Blockbuster and Sears showcase. Besides the complexity of DT, many companies believe that becoming more environmentally friendly will harm their competitiveness and profitability [8]. However, research shows that sustainability can lead to cost savings, increased revenue, and new business opportunities. Early adoption of sustainable processes and practices can provide a head start over the competition when guidelines become law [8].

3.1. RQ1

In contrast to IT strategies, concerned with the internal IT infrastructure, digital transformation strategies (DTS) take a broad perspective on the business, focusing on transforming products, processes and organizational structures affected by new technologies [9]. While businesses must adapt quickly to customer demands, competitors and technological innovations, DTS is responsible for defining goals and measurements that enable fast responses [10]. Since DTS still lacks clarity [11], there is a need for active research on "[...] digital transformation strategies across different industries [...]" [9]. Despite being complex and crucial for the success of digital transformation initiatives, DTS can act as the central point for implementing sustainability in various DT areas [5]. Even though digitalization has the potential to reduce waste and help companies meet the expectations of stakeholders and consumers [12], there is an urge for more literature on digital transformation and sustainability [13]. Research in this area varies from the United Nations ESG goals [14] and technological implications [15] to factors limiting sustainability in DT [12]. While there have been investigations on the implications and opportunities of environmental sustainability, [4] stress that further research also needs to

consider social and economic sustainability. With the increasing use of technologies such as AI, blockchain, and big data, there is the potential to disrupt traditional work structures and create a separation of the human workforce [16]. RQ1 will contribute to the body of knowledge in two ways. First, the research question aims to mitigate the vagueness of DTS [11] by identifying parallels and differences across industries. Second, it points out the potentials and limitations of incorporating social, economic and environmental sustainability into DTS, adding to the increasing demand for sustainable DT [4, 13].

3.2. RQ2

RQ2 focuses on integrating sustainability-related aspects of RQ1 into existing tools that support sustainable digital transformation initiatives. Dynamic capabilities and enterprise architecture management (EAM) are common tools investigated in the context of DT. While EAM can be a valuable tool to support the implementation of DTS [17], literature on EAM is still underrepresented as an instrument to steer DT endeavours [18]. In order to serve as a valuable instrument of DTS, enterprise architecture management must expand its scope to include the value-oriented mapping between digital strategies and business models [19]. As current EAM practices and frameworks often do not act as a valuable tool to support the dynamic nature of DT initiatives [19], dynamic capabilities enable quick adaptation to changing market conditions, customer needs, and technological advancements. They involve the development of new skills, processes, and technologies, as well as the ability to integrate these capabilities seamlessly into the existing digital ecosystem [20]. Concerning sustainability, it is crucial to integrate environmental, social, and economic aspects into digital transformation strategies while ensuring they are adequately measured. However, these aspects can conflict with corporate interests or with each other. Sustainable Business Models-Canvas can be a valuable tool for creating new business models or adapting existing ones to incorporate digital technologies and promote sustainability [21]. Measuring key performance indicators (KPIs) such as energy consumption and carbon emissions, e-waste reduction, and social impact is essential. For instance, a company could track the amount of energy consumed and carbon emissions generated during the digital transformation process, monitor the amount of electronic waste produced and recycled, and evaluate the impact of the transformation on society in terms of job creation, economic growth, and access to technology [22]. By doing so, organizations can make informed decisions to promote sustainable development while leveraging the benefits of DT.

4. Research methodologies

Design science research will be applied to develop innovative solutions to real-world problems by creating artefacts that can be applied in practice [23]. The methodology emphasizes rigour and relevance, meaning that the solutions must be based on a solid theoretical foundation while simultaneously being practical and valuable for real-world problems [23]. In IS research, this method already makes up a significant portion of publications [24] and has been recently applied in digital transformation DSR [25]. The method will be used to create a framework that is theoretically sound and applicable in practice. Figure 1 presents the conceptual DSR approach for designing, executing, and evaluating a framework for sustainable digital transformation.

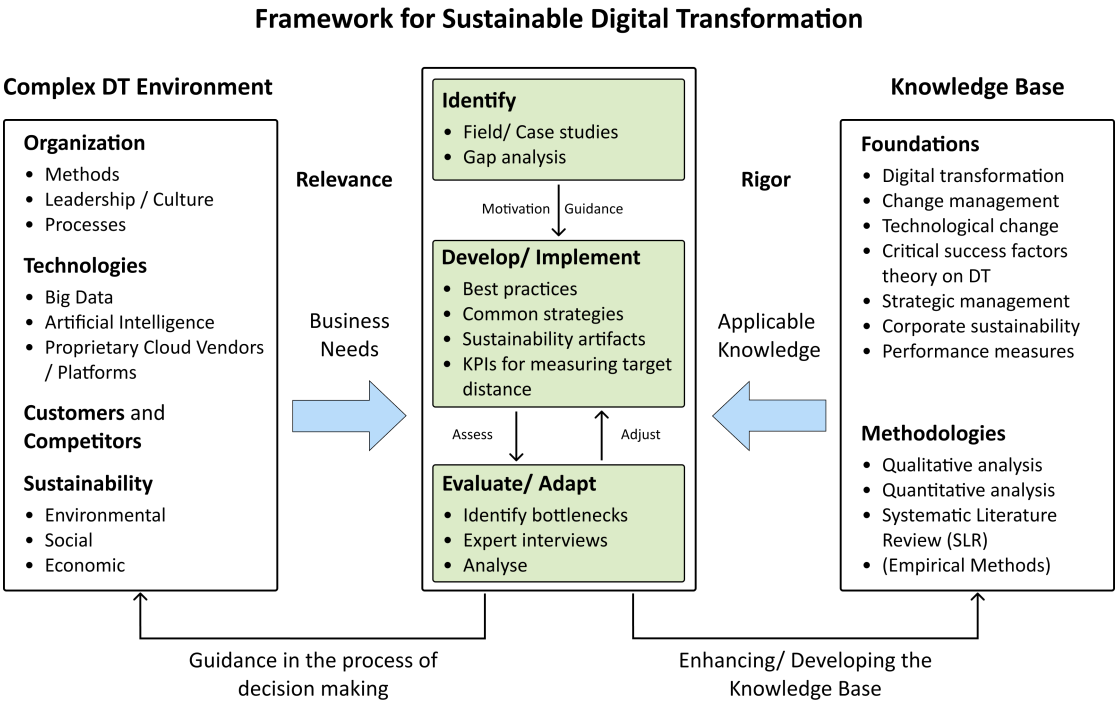

Figure 1: Framework for Sustainable Digital Transformation

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