

Fostering Synergies: The Interplay of Digital Transformation and Sustainability through Dual Innovation

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Abstract

Organizations today face the dual challenge of digital transformation and sustainability imperatives, yet information systems research has often treated these domains unevenly. This study introduces the concept of “*similarity transformation*” to describe the mutually reinforcing relationship between digital and sustainability transformations. Grounded in dynamic capability theory, the research examines how organizations can develop the necessary skills to align these two strategic priorities. Using qualitative interviews with leaders experienced in managing both types of change, we construct a capacity framework that identifies key dynamic capabilities for successful similarity transformation. The findings offer practical guidance for organizations and a conceptual foundation for future research on integrated transformation strategies.

Keywords

Similarity Transformation, Sustainability Transformation, Digital Transformation, Dynamic Capabilities

1. Introduction

Organizational settings are vulnerable to ongoing change and crises in contemporary society (Ellström et al., 2022). The pandemic accord has accelerated digital transformation across every aspect of society. At the same time, the intensifying environmental crisis has sparked conversations about sustainability transformation, two significant emergencies that have generated strong transformational forces (Boh et al., 2020). According to Ollagnier et al. (2021), organizations that embrace both changes in a complementary manner tend to fare better than those

that only address one transformation. However, it is not easy and requires specific skills to combine sustainability and digital transformations, a concept that has only lately been called “similarity” transformation (Ollagnier et al., 2021; Balta et al., 2022). Developing these crucial dual transformation capabilities is challenging for many firms since they do not have the required expertise or leadership.

To clarify our use of terminology, we adopt the term *similarity transformation* to describe the evolving interplay between digital and sustainability transformations within organizations. This term was chosen deliberately to reflect a process in which two distinct yet interrelated change trajectories unfold in structurally analogous ways. Unlike existing terms such as dual transformation or twin transition, which often imply parallelism or symmetry, similarity transformation emphasizes relational alignment and adaptive convergence. Drawing on mathematical principles—where similarity transformations preserve core structure while allowing for variation in scale or orientation—we utilize this concept to illustrate how organizations can maintain strategic coherence while navigating differentiated pressures. This framing offers a more precise lens for understanding the dynamic capabilities required to integrate digital innovation with sustainability imperatives. Developing these crucial dual transformation capabilities is challenging for many firms because they lack the required expertise and leadership.

Forcadell et al. (2020), Acciarini et al. (2022), and Del Rio Castro et al. (2021) all state that research on the necessary skills for digitization and environmental transformation has progressed differently, maybe because it draws on different domains. To be more precise, there has been an unequal distribution of resources between the two major shifts in IS research (Zimmer & Jarvelainen, 2022). Work on digital change has flourished in the last decade (see, for example, Plekhanov et al., 2022; Hanelt et al., 2021). However, sustainable change has received surprisingly little attention (Lehnhoff et al., 2021). There has been a simplification of sustainability to its ecological components rather than an integration of its comprehensive viewpoint, which accounts for environmentally friendly, community, and economic advancement, as a result of one transformation being prioritized over the other when digitalization and sustainability are both being leveraged at the same time (Maffei et al., 2019; Demartini et al., 2019). Research initiatives like Green IT (Lehnhoff et al., 2021; Kranz et al., 2015; Veit & Thatcher, 2023) and Green IS (Watson et al., 2010; Sarkis et al., 2013; Kranz et al., 2015) have proven, however, that technological remedies can contribute to attaining sustainability goals.

Because of the potential for symbiosis between digital and sustainability transformation, problems involving digitalization and sustainability are too intricate to be addressed in isolation. Insights into the implications of sustainability transformation on digital transformation may be made possible by digital transformation, and solutions for digital transformation may be shaped by sustainability transformation, leading to fresh modalities of value manifestation. Research in IS has the potential and obligation to foster a shared knowledge of the dual transformation

construct to illuminate the mutually beneficial interplay between technological and resilient transformation. Acquiring the fundamentals of dual transformation is just the first step; recognizing what skills are necessary is crucial. According to O'Reilly & Tushman (2008), Wade & Hulland (2004) and Teece et al. (1997), they pertain to a predictable sequence of actions involved in utilizing assets to generate and deliver products or services. These skills are essential for initiating and carrying out dual transformation in the scientific and clinical communities. Thus, the authors propose the following research question in light of the given context: Can we define similarity transformation and list the skills businesses require to implement it? Both research question components are consecutive because they expand upon one another. Because the idea of dual transformation is still relatively new in information systems research and has not been fully defined, the authors lay the groundwork for developing dynamic similarity transformation capabilities by creating the dual transformation construct.

Our investigation into the research issue is of significant importance. We begin by comparing and integrating digital and sustainability transformation viewpoints. We then establish and define the similarity transformation construct, setting clear boundaries for associated ideas (Podsakoff et al., 2016). Subsequently, we examine the pertinent skills based on dynamic capability theory (Teece et al., 1997), leading to the development of a similarity transformation capacity framework. This was achieved through investigative interviews with key individuals who demonstrated exceptional management and innovative thinking in the domains of digital or sustainability change, thereby leading to similarity transformation. It is crucial to note that most firms have not yet successfully achieved similarity transformation.

Our study uncovers various dynamic similarity transformation skills that have long been overlooked and are crucial. It also establishes a broad understanding of this process, which has three significant ramifications:

- 1) It lays the groundwork for additional theory on similarity transformation by offering the IS domain a chance to take a clear and rational path forward in expanding our understanding of digital and sustainable transformation.
- 2) Our second finding is understanding the digital transformation space with an eye toward future activities prioritizing sustainability.
- 3) We organize investigations towards sustainability transformation by stressing the importance of digital transformation as a facilitator.

Our research emphasizes the practical need to identify and comprehend critical dynamic capacities to launch dual transitions in businesses.

2. Theoretical Foundation

2.1. Similarity Transformation Potential

Typical competencies are necessary for businesses to manage manufacturing processes, coordinate recurring procedures, and operate well in competitive environments (Teece, 2014). When identifying emerging markets or novel products, such

as in the case of digital innovations, organizations need dynamic capabilities to construct, combine, and set up ordinary assets and capabilities (Piccoli & Ives, 2005; Winter, 2003; O'Reilly & Tushman, 2013). When accepted, dynamic capabilities can bring about positive outcomes for a company. These talents boost their ability to do three things: 1) spot emerging trends and possibilities; 2) develop rapid choices that are market-oriented; and 3) handle problems in an organized manner (Teece, 2007; Barreto, 2010). Effective organizational transitions rely on dynamic capabilities, which drive change to maintain an edge over others.

Much recent IS literature (e.g., Steininger et al., 2022; Huber et al., 2022) has focused on dynamic capacities. Huber et al. (2022), Bharadwaj (2000), and Wade & Hulland (2004) are only a few examples of the works that explore dynamic capabilities as they pertain to digital technology integration, deployment, and linkage with additional resources such as people. In addition, there are two supplementary views on dynamic capabilities that have been largely used in IS research: one is the orientation view, and the other is the value generation role view. First, according to three lines of inquiry in IS literature (Doherty & Terry, 2009; Wade & Hulland, 2004; Felipe et al., 2019), dynamic capabilities can be categorized according to their direction. First, dynamic capabilities are deployed from within a company to cater to customer needs, including technical skills and information systems infrastructure. Second, there are dynamic capabilities that have an eye toward outside influences, including adaptability to markets and the ability to handle interactions with other organizations. Lastly, there are dynamic capabilities that are required to incorporate these two types of capabilities; these include things such as forming collaborations and information systems planning and management. Secondly, the function of dynamic capabilities in creating value has been distinguished by dividing them into core and supplementary capabilities within the framework of IS (Huber et al., 2022). Innovative services and product solutions are the main emphasis of core capabilities, which directly impact value development. Conversely, complementary capabilities are concerned with enhancing support procedures and collaboration; as a result, they indirectly affect value generation by making core capabilities more effective.

This work expands upon previous IS research by defining *dynamic capabilities* as an organization's capacity to do three things in the face of constantly changing environments: 1) identify possibilities and dangers in the environment, 2) decide based on those possibilities, and 3) use typical abilities and resources to turn those possibilities into actuality (Teece, 2007; Teece et al., 1997; Steininger et al., 2022) as the foundation of similarity change, digitalization and sustainability transformation are addressed here, together with pertinent studies on related dynamic capabilities.

2.2. The Shift to Digital

For decades, IS academics and practitioners have been fascinated by digital transformation (El Hilali et al., 2020; Konopik et al., 2021; Kraus et al., 2022). As a

result, Wessel et al. (2021), Bharadwaj et al. (2013) and Karnebogen et al. (2021) link such transformation to organizational confidence, plan of action, and value generation. Hence, emerging digital technologies that reshape organizations and offer new value creation will drive new value creation (Karnebogen et al., 2021). IS researchers and professionals have provided numerous definitions for digital transformation, showcasing its multifaceted nature (Markus & Rowe, 2023). Vial (2019) defines digital transformation as enhancing an entity through technological advances. Information, computer, communication, and networking technologies are all rolled under the digital umbrella (Bharadwaj et al., 2013). Processes, company departments, or other aspects of an organization may substantially modify their features due to their implementation (Vial, 2019). Digital transformation, according to some academics (for example, Kreuzer et al., 2022; AlNuaimi et al., 2022; Wessel et al., 2021), affects the generation of value and extraction, allowing for entirely fresh models of digital business. Kraus et al. (2022) and Chanias et al. (2019) put it plainly; this could affect many stakeholders and settings used by organizations. Another anticipated outcome of digital transformation is the birth of brand-new types of businesses. Potential players in this space include startup businesses looking to get an edge in the market and established companies undergoing internal changes.

Dynamic competencies such as digital leadership, strategy, and culture have been studied during digital transformations (Weritz et al., 2022; Keller et al., 2022; Konopik et al., 2021). Examples of dynamic capabilities include gathering and analyzing information during digital transformation, such as Industry 4.0 implementation (Santos & Martinho, 2019) or process automation (Kırmızı & Kocaoglu, 2022).

Additional instances involve utilizing creative digital infrastructure, including environmentally friendly data centers and cloud-based computing, and an ongoing funding model for such facilities to support digital transformation. Digital infrastructure lays the groundwork for dynamic capabilities like modular process design. This study reviews dynamic similarity transformation capabilities, recognizing and supplementing digital transformation insights. In line with Hanelt et al. (2015), Vial (2019), and Wessel et al. (2021), digital transformation is a method of organizational transformation that enhances organizational digital technologies' performance and could impact its ability to generate value and identity.

2.3. Transition to Sustainability Practices

Similar to digital transformation, sustainability transformation is a method of change within an organization that signifies a shift in perspective in the context of multifaceted transformation (Lahtinen & Yrjola, 2019; Dyllick & Muff, 2016). Both academics and industry professionals are now keenly interested in sustainability transformation initiatives (Peters & Simaens, 2020). Based on Dyllick and Muff's (2016) definition of a genuinely sustainable organization, this effort aims to make a practical difference in significant and pertinent sectors for humanity

and the environment. This idea served as the foundation for our research because the authors' taxonomy classifies companies into three distinct stages of sustainable maturity according to three criteria: input, process, and output. Furthermore, Dyllick and Muff (2016) argue that entities with an outside-in view enable a greater interest, which is characterized as helping people and the global community overall, their primary objective. Companies engage in sustainability transformation by assessing and incorporating the environment around them. In addition, companies that seek to address urgent problems by creating novel approaches to business and strategy are undergoing sustainable transformation (Geissdoerfer et al., 2018; Bocken et al., 2014). Therefore, sustainability initiatives open doors to novel ideas and commercial potential. The need to transform business models to promote sustainability has increased significantly. Given that various sustainable business strategies are available nowadays, reducing resource use is central to the circular economy model, which has recently gained popularity (Zeiss et al., 2021; Ortega-Gras et al., 2021).

Researchers have looked at the dynamic skills needed to implement environmentally friendly company policies or competitive approaches (Mousavi et al., 2018; Gimpel et al., 2020), promote resilient innovation in processes, or embark on employee sustainability education. Integrated sustainable practices into daily operations and the foundation of systematic management of life cycles is made possible by dynamic sustainability capabilities (Bianchi et al., 2022). This enables companies to incorporate sustainability features into the lifespans of products (Yazici, 2020, for example). Dynamic sustainability skills extend into formalizing structural processes to include the necessary parties. Product owners or developers working together with specialized sustainability units are improved by integrated frameworks.

We first define *sustainability transformation* as a multifaceted, intricate organizational change affecting ecological, social, government, legislative, and individual facets (Seidel et al., 2014; Oghazi & Mostaghel, 2018; Lahtinen & Yrjola, 2019). The ultimate objectives of integrating sustainability into an organization are cost reduction, improved competition, sustained economic viability, and transforming into a feasible, permanent contributor to the community and the corporate landscape.

3. Methodology

3.1. Similarity Transformation Construct Design

An essential component of similarity transformation theory, conceiving it allows for organizing complicated processes with a shared vocabulary, improving interaction among practitioners and academics (Podsakoff et al., 2016). Based on the work of Podsakoff et al. (2016) and Suddaby (2010), we pursued four significant phases in building a framework to determine the critical aspects of similarity transformation. We defined similarity transformation before moving on to sustainability transformation and digital literature. We expanded on the complemen-

tary relationship between these concepts and identified domains of contextual applicability by drawing on this supporting evidence. Secondly, we derived a fresh meaning for similarity transformation and clarified its connection to related earlier concepts by abstracting pertinent aspects of similarity transformation into a robust conceptual generalization. Thirdly, we proved that the similarity transformation concept is consistent with our theory. Despite the linear presentation above, the conceptualization of similarity transformation was an ongoing and dynamic process that ultimately yielded a thoughtful construct that incorporates crucial features and draws attention to the differences and similarities with previous studies. We had regular, in-depth meetings as an author team to remain consistent in the development of conceptualization. External IS experts and professionals from companies striving to become dual transformers also provided their input for consideration.

3.2. Building the Similarity Transformation Capacity Model

We used qualitative empirical data from practitioner interviews to study the dynamic capacities of similarity transformation (Sarker et al., 2018). Qualitative approaches assist in uncovering new study areas (Miles & Huberman, 1994). The interpretation-centric approach to data and the logic-driven process vis-à-vis discovery, as well as inductive and deductive methods, characterize such methodologies (Sarker et al., 2018). We adopted this interpretation-centric approach largely due to our perception of the informants as knowledgeable actors. The people we interviewed are later referred to as “lead rapporteurs”. We included lead rapporteurs in data collection, analysis, and result reporting to identify novel concepts and relationships. Since we used representative data and constructed a framework, our reasoning was inductive.

3.3. Procedures and Informants

We interviewed 18 decision-making executives involved in digital, sustainability, and innovation responsibility from 12 Singaporean firms from diverse sectors from January to June 2024 in Zoom exploratory interviews. Since sustainability, digital, and dual innovation span industries, we chose an industry-agnostic stance. This approach allowed us to capture cross-sectoral insights and identify dynamic capabilities that transcend sector-specific constraints, offering a broader understanding of similarity transformation across diverse organizational contexts.

Lead rapporteurs worked for successful digital or sustainability transformations and may have considered merging elements. A sustainability-first or digital-first transition has given firms new capabilities and valuable information. Several firms unintentionally used sustainability and digital transformation synergies without consciously pursuing a similar transformation. Some companies recognize the necessity and value of digitalization for sustainability (e.g., disclosure of information for environmental sustainability charting or sustainability for digital transformation (e.g., transitioning from traditional data hubs to eco-friendly cloud plat-

forms promotes sustainable technology practices and reduces the environmental impact).

Once the pioneer participants were recruited through individual connections, we proceeded with chain-referral sampling. Because the companies were only loosely related to one another (e.g., via environments, supply chains, or familial links), we could make some connections during our interviews. The resulting sample may be partially representative, but it is a tried-and-true method for identifying and interviewing prominent individuals who can throw light on a topic. We stopped forging ahead when collecting additional information no longer yielded valuable insights. We conducted the interviews in English via video conference. On average, they lasted 25 - 40 minutes. We videotaped and recorded all interviews with the lead rapporteurs, giving their approval so that we could analyze them later.

We explained the task at hand and its goal before every interview. We designed repetitive interview instructions based on dynamic capability studies (Teece et al., 1997). We guided the contextual interviews using interview instructions and etiquette that covered our study question without leading the informants. In the first block, we introduced our lead rapporteurs to the research topic, emphasizing the organizational importance of sustainability and digital transformation. In the second block, we focused on specific activities related to similarity transformation, where we asked the lead rapporteurs to enumerate and deliberate on their digital and sustainability projects. The goal was to uncover organizational elements that promoted dynamic dual innovations. Final remarks from lead rapporteurs were scheduled for the last block.

3.4. Evaluation of Information

We employed a motif-identifying methodology to extract qualitative data from the interview transcripts and categorize the text into pertinent themes, concepts, and overall dimensions (Gioia et al., 2013). We continually examined and juxtaposed novel groupings as they formed and analyzed their relationships by alternating between reviewing the literature and analyzing the data. The information was examined using MAXQDA, a tool for qualitative data analysis. As we categorized, we employed recording to jot down ideas based on quotes from lead rapporteurs. Open, axial, and selective coding were the three phases of the coding process (Corbin & Strauss, 1990). Despite the sequential presentation below, our examination process was flexible and repetitive, addressing all factors simultaneously. When further interviews failed to alter the fundamental categories and correlations, we coded additional information and refined our conclusions. Following this, we describe in depth the three stages of coding (open, axial, and selective) that led to the extraction of foundational concepts, the development of overarching themes, and the compilation of comprehensive elements.

We carefully analyzed transcripts of interviews and underlined key text passages in the first-order evaluation, which used informant terminology similar to

the initially collected data. The initial 14 interviews yielded 210 principal codes. We classified primary codes by major informant content assertions during open coding. Using key informants' terminology, we categorized 17 first-order ideas (Gioia et al., 2013). We frequently found writers reading informants' terminology differently during coding. If codes could not be agreed upon, we reviewed the transcripts, discussed them, and formed a shared understanding and decision guidelines. We interviewed four more people during the inquiry. Three new first-order categories arose from frequent comparison and evaluation. We then checked if all detected capabilities met our dynamic capacity definition.

We deleted the first three-order categories because they were conventional capabilities. Ultimately, we obtained 16 first-level concepts. Following Gioia et al. (2013), we compared and contrasted the codes (akin to Corbin and Strauss's (1990) axial coding) and explored the corresponding research. Based on Wade and Hulland's (2004) outside-in/inside-out capacity classification, we interpreted our data by determining if emerging trends indicated notions that could help us clarify the findings. We continually looked for dynamic relationships and data-to-theory associations, easing the criticism that qualitative research often fails to show how data pertains to theory. We formed four abstract second-level themes from first-order notions.

Our last step was to conduct selective coding by reviewing all themes in light of the pertinent research (Teece, 2014; Steininger et al., 2022; Huber et al., 2022). We further reduced the resulting second-order themes to two aggregate levels and incorporated and polished them into greater theoretical structures.

4. Findings

4.1. A Framework for Similarity Transformations

We established the similarity transformation framework as a basis for deriving related transformation capabilities. This step was essential as similarity transformation remains a new addition to Information Systems research, and its implications have yet to be completely elucidated. Separately, we expanded upon the fundamental digital and sustainability transformation premises per the criteria on construct clarity provided by Podsakoff et al. (2016) and Suddaby (2010). The two viewpoints that constitute similarity transformation—Digital transformation promotes sustainability and sustainability drives digital change—are defined and discussed in greater detail by drawing on information gathered from sustainability and digital transformation research.

Digital transformation facilitates sustainability in two key ways. First, it promotes ecological responsibility through Green IT initiatives that enhance the environmental friendliness of digital technologies, as noted by Veit & Thatcher in 2023. This includes strategies like IT life cycle management, as discussed by Loeser in 2013, and the implementation of eco-friendly data centers and environmental management systems to establish a sustainable IT infrastructure. Secondly, sustainable development through digital technologies refers to the beneficial outcomes

of adopting digital technology to improve company sustainability. Digital transformation enables the explicit creation of innovative information to track sustainability limits and anticipate sustainability opportunities (Ortega-Gras et al., 2021). Sensors can connect physical items to the Internet of Things. Networks like this create enormous quantities of data related to the environment that artificial intelligence machines can process. Furthermore, artificial intelligence systems can find helpful trends in massive, unorganized data (Padmanabhan et al., 2022). Notwithstanding, trends can guide sustainable transformation design decisions, which produce fresh information sources (Miranda et al., 2022). Digital technology allows us to handle complicated economic and ecological problems concurrently. They are necessary for data-driven decisions, sustainability investments, and new business model options (Ortega-Gras et al., 2021).

Sustainability transformation directs digital change in two distinct approaches. Firstly, sustainable transformation informs the development of feasible digital transformation approaches addressing technological, corporate, and social factors (Acciarini et al., 2022). Developing sustainable digital transformation options can significantly alter a company's mission and approach to value creation (Hernandez-Chea et al., 2021). Instead of staying egocentric (Vial, 2019; Karnebogen et al., 2021), sustainability transformation can redirect attention toward objectives that transcend the company's frontiers (Hernandez-Chea et al., 2021). Dyllick and Muff (2016) assert that the company and society derive value from their contributions. Unsurprisingly, organizations begin considering issues proactively and prioritize the circularity of their services or goods. They work toward reducing resource input by emphasizing reuse and recycling, thereby promoting environmental sustainability (Zeiss et al., 2021). Secondly, sustainable transformation raises the overall acceptance of innovations. Digital transformation generates continual change and creates substantial tensions between the new and the old since it necessitates organizational adaptability and a new mindset. Consequently, digital transformation tends to be more unsuccessful than it might potentially be, and its multifaceted drivers and impacts are little understood (Gurbaxani & Dunkle, 2019), particularly, by team members whose active support is indispensable for driving organizational transformation. Sustainability transformation may assist in inspiring staff members to participate in transformative initiatives.

Figure 1 reveals the comprehensive, transformative, and profoundly collaborative interconnection between sustainability and digital transformation, an interplay that one often overlooks when focusing on each element separately. Similarity transformation involves executive leadership and every branch of the organization working together (Wessel et al., 2021; Dyllick & Muff, 2016). Furthermore, similarity transformation integrates both the work and results of each transformation by treating them equitably. It has an opportunity to redesign the company, changing its sense of self while generating benefits more significant than the sum of its parts. Hence, the similarity transformation framework is defined to lay the groundwork to support subsequent similarity transformation research and capac-

ity development, vis-à-vis a similarity transformation that improves a company through combining digital technologies for sustainability and sustainability for digital advancement.

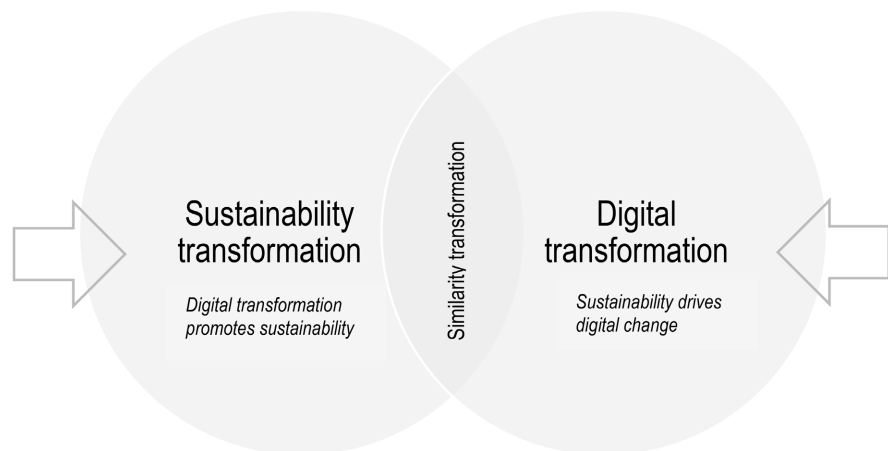


Figure 1. Similarity transformation blends digital and sustainability benefits.

4.2. Similarity Transformation Construct

Referring to Baiyere et al.'s (2020) illustrative view of changes in organizations, a similar process of change is like charting a course through labyrinthine twists. By embracing these principles, e.g., integrating, leveraging, and ensuring sustainability transformation is the opportunity (and purpose for digital transformation) and adoption, organizations can navigate the labyrinth of the similarity transformation and emerge successfully, future-proofing their operations and contributing to a more sustainable world. Accordingly, firms must develop and implement dynamic similarity transformation capabilities in all four capacity areas to successfully 'take off' into this journey.

We propose the similarity transformation capacity framework to demonstrate dynamic similarity transformation capabilities. **Figure 2** shows our framework comprising two top quadrants (core competencies) and two lower quadrants (auxiliary competencies). We discuss our framework's overall structure, beginning with the composite dimensions (core and auxiliary competencies) and peripheral competencies (second-level themes). Second, we discuss dynamic similarity transformation capabilities from the first level.

With the aid of similarity transformation capabilities, firms can harmoniously integrate sustainability and digitalization approaches. This integration, a product of collective effort, is crucial for initiating dual innovation. The construct must dynamically transform in a similar way, fostering changes in organizational activities. This concept, initially discussed by Teece (2007, 2014) and Piccoli & Ives (2005), forms the basis of our division of skills into core and auxiliary competencies, which is rooted in the locus of transformation. The study, conducted by Huber et al. in 2022, further emphasizes the collaborative nature of this process. Each quadrant, a testament to the power of collaboration, facilitates the other,

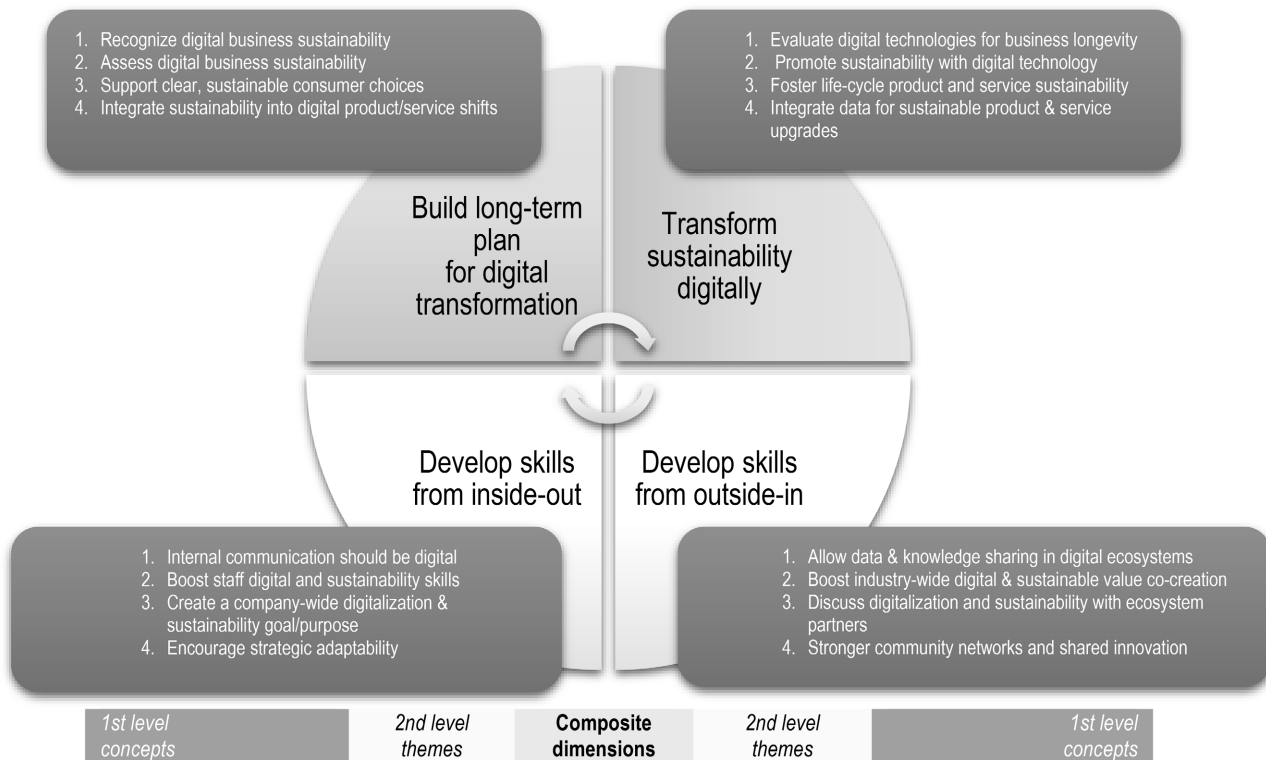


Figure 2. Similarity transformation capacity framework.

with the two halves of the quadrant complementing each other. Moving on to the top two quadrants, these are the core competencies that directly impact the value generation of the firm, underscoring the importance of collective effort. They determine the availability of innovative products or services. Together, these competencies include an organization-wide and externally focused digital and sustainable transformation strategy. Sustainability transformation offers a road map to digital transformation with the ultimate objective of making it long-term. By utilizing digital transformation to achieve sustainability goals, this category captures the capabilities of dynamic similarity transformation. Conversely, digitalizing sustainability transformation denotes using digital transformation as a catalyst for sustainability transformation. Dynamic similarity transformation capabilities are included in this category, which expedites the adoption of digital technology to capitalize on sustainability-focused strategies.

The remaining two categories (lower two L-R quadrants) are auxiliary competencies, which indirectly increase core competencies' performance and enable the organization to create value. Auxiliary competencies include internal and external capabilities. Developing inside-out capacities means responding to market needs and possibilities. Developing outside-in capacities means anticipating market needs through collaborations. Support includes managing change practices like strengthening shared creativity and robust social connections.

Organizations must integrate core and auxiliary competencies to meet today's evolving and complicated corporate setting. In particular, the essential skills ap-

pear to be two purposeful value-creation areas, but they interconnect and demonstrate their true worth through real-world connections. The first-level dynamic similarity transformation competency utilizes inherently sustainable digital innovations, corresponding to its direct parallel implementation of digital innovations to cultivate sustainability routines or procedures. Digital technologies can solve sustainability problems, like transitioning to green cloud services instead of operating huge, energy-intensive server farms, and encourage environmentally friendly habits like using a smart application that allows staff to take the metro rather than drive. The dynamic similarity transformation capacities encourage sustainable-related, informed rational choices for consumers and encourage ecological consequences for products and services across their entire life cycle interplay. Only by collecting, analyzing, and sharing product and service life cycle data can a company enable transparent choices for consumers. Our framework has 16 dynamic similarity transformation possibilities in the four quadrants. **Table 1** and **Table 2** offer concise explanations and instances derived from the interviews conducted with our lead rapporteurs, illustrating each capacity for dynamic similarity transformation.

Table 1. Core competencies.

2nd level themes	1st level concepts	Dynamic similarity transformation capacity summary	Relevance of lead rapporteurs' excerpts
Build a long-term plan for digital transformation	Recognize digital business sustainability	Digital business strategies require the ability to anticipate consumer demands and prioritize sustainability.	As people demand digital items, companies will adapt accordingly. Digitization benefits us. We must integrate sustainability to meet future demands from consumers.
	Assess digital business sustainability	Organizational agility in adopting new clean technologies, such as green cloud computing.	Our reliance on the cloud is growing, particularly in servers that aim for complete emission-free operation.
	Support clear, sustainable consumer choices	Organizations' transparency in providing sustainability-related information regarding products and services to consumers.	We are committed to providing consumers with carbon footprint statistics for our products and services.
	Integrate sustainability into digital product/service shifts	Organization's capacity to integrate sustainability and digital concepts early in the innovation stage.	Sustainable innovation must be prioritized from the start. Developers must realize this. Sustainable issues are taken into consideration from start to finish.
Transform sustainability digitally	Evaluate digital technologies for business longevity	Organizational abilities to use digital technologies for sustainable business models.	Digital technology allows for business innovation. We believe digital transformation is everything. Energy, climate change, environment, and sustainability motivate us.
	Promote sustainability with digital technology	Organizational competence to utilize digital technologies for environmentally friendly practices and procedures.	Digital technology, including IT and algorithms, is utilized to arrange delivery tours and optimize itineraries

Continued

Foster life-cycle product and service sustainability	Organizations can assess the sustainability impact of their products and services throughout their lifespan, from obtaining resources to disposal.	Finding information from suppliers is challenging and time-consuming, as is the carbon footprint of natural resources requested from a certain provider.
Integrate data for sustainable product & service upgrades	Data and scenario thinking enable organizations to forecast demand and create sustainability solutions.	More data helps us understand consumers and offer innovative products and services. According to our market analysis, consumers want less packaging. We have been planning a low-plastic packaging solution for our frozen meat for some time.

Table 2. Auxiliary competencies.

2nd level themes	1st level concepts	Dynamic similarity transformation capacity summary	Relevance of interview excerpts
Develop skills from inside-out	Internal communication should be digital	Organizational capacity to create digital data exchange sites and foster collaboration.	Our digital communication platform allows for knowledge sharing. We gain knowledge and foster understanding through collaboration.
	Boost staff digital and sustainability skills	Organizational capacity to develop talent and create training initiatives.	The concept of lifelong learning is one we seek to expand upon.
	Create a company-wide digitalization & sustainability goal/purpose	Organization's ability to weave digitalization and sustainability values into its vision and goals.	We defined the digital and sustainable vision top-down as a CEO topic, but it is also implemented bottom-up using agile methodologies like objectives & outcomes. Awesome that it comes from both sides.
	Encourage strategic adaptability	Organization's ability to foster a culture of continual change, adaptability, and mobility	Keeping up with change requires a continuous flow of skill exchange, from curiosity to execution, iterative rehearsal, and learning from encounter to optimize the notion and designs over time.
Develop skills from outside-in	Allow data & knowledge sharing in digital ecosystems	To facilitate data migration between organizations and systems, open standards are necessary	Our dependence on external partners is increasing. Our greater willingness to collaborate and data exchange necessitates external exchange in the supply chain. Business is rendered impossible without it.
	Boost industry-wide digital & sustainable value co-creation	Organization's capacity for forging an alliance of partners to develop and expand entrepreneurial concepts across industries	Our organization aims to implement the innovative concept of shared output of value in the food sector. Over time, the goal is to create an ecosystem. We are seeking collaborators to advance this idea, but specifics are restricted.
	Discuss digitalization and sustainability with ecosystem partners	Organizations can actively involve ecosystem allies in sustainability by incorporating appropriate standards into selection	In the value chain, we aim to establish transparency as a baseline.
	Stronger community networks and shared innovation	Ability to freely innovate and overcome internal and external impediments to cooperation in an organization	We host a discussion forum for entrepreneurs to present on significant issues and a lab for collaborative ventures in innovation.

5. Discussion

Multifaceted problems with digitalization and sustainability mandating coordinated approaches inspired this study. We set out to unearth and highlight the mutually beneficial possibilities of a similarity transformation—specifically, the integrated alignment of both transformations—rather than viewing digital and sustainability transformation as two distinct problem and solution arenas. Consequently, we laid the groundwork for a similarity transformation capacity framework by establishing a shared definition. This framework details the critical dynamic capabilities that businesses require for successful similarity transformation. Our work enhances both the field of IS and descriptive knowledge about similarity transformation.

We significantly contributed by defining and conceptualizing the similarity transformation framework, which integrates digital and sustainable transformation approaches:

- 1) Academics can better communicate by establishing a shared vocabulary with concise explanations.
- 2) It lays the groundwork for researchers to study similarity transformation empirically.
- 3) It encourages more innovation and creativity in developing the theory behind similarity transformation.

Several prominent IS publications have addressed topics related to sustainable development, digital responsibility, social progress and conservation, digital resiliency, and digital accountability (Recker et al., 2022; Tan & Nielsen, 2022). Notwithstanding these concerns, researchers have not thoroughly investigated the possibilities of integrating IS, digitalization, and sustainability strategies. In light of this, our research contributes to the IS field, focusing on finding solutions to today's social and environmental problems. In our work, we merge digital and sustainability into a single organizational transformation, treating the two concepts equally based on previous research. This integration relies on existing hybrid constructs that incorporate digital social innovation, digital responsibility, Green IS, Green IT, and circular economy. While constructs such as Green IS, circular economy, and digital social innovation have advanced our understanding of sustainability-oriented digital initiatives, they tend to focus on specific domains—technological solutions for environmental goals, resource efficiency models, or socially driven innovation. In contrast, *similarity transformation* offers a broader integrative lens that captures the dynamic, reciprocal alignment between digital and sustainability transformations at the organizational level. Rather than emphasizing one domain or outcome, it foregrounds the structural resemblance and adaptive interplay between two strategic imperatives. This distinction allows similarity transformation to serve as a unifying framework for identifying cross-cutting capabilities that enable organizations to evolve holistically in response to complex societal and technological pressures.

As a further contribution, we put together a similarity transformation capacity

framework that reveals the relationship between sustainable transformation capacities and the ever-changing digital landscape. Although we have responded to Feroz et al.'s (2021) request for additional studies on the skills necessary to move companies' business models toward environmental sustainability, we tried to broaden our focus beyond just capacities focused on transformation. This was achieved by drawing on important previous studies that addressed the ever-changing skills needed for digital change (e.g., Soluk & Kammerlander, 2021; Konopik et al., 2021; Ellstrom et al., 2022) or transforming sustainability (e.g., Buzzao & Rizzi, 2021). Consequently, our framework incorporates both viewpoints and enhances the existing flexibility with particular capacities for dynamic dual innovation. In order to "integrate information into sustainable product and service innovations," as suggested in this work, the dynamic capacity for "getting ready for efficient utilization of a large data volume" (Konopik et al., 2021; p. 9) is necessary. As a result, our research deepens our comprehension of the capacity of dynamic similarity transformation, which helps businesses combine digital and sustainability efforts.

We identify dynamic core and auxiliary capacities in our framework. Yet, Wade and Hulland (2004) identified collaboration and social and cultural abilities that influenced our support capacity, which was divided into "develop skills from inside-out" and "develop skills from outside-in". Soluk and Kammerlander (2021) recognized dynamic capacities for external and internal transformation catalysts. We added the idea of sustainability. Finally, our lead rapporteur's interviews reinforced our findings by connecting them to real-world instances and linking theoretical and practical research.

These core and auxiliary competencies can be meaningfully mapped onto the foundational components of dynamic capability theory. For instance, competencies such as environmental scanning, ecosystem engagement, and transparency initiatives reflect sensing capabilities, enabling organizations to detect opportunities and threats across digital and sustainability domains. Skills related to strategic adaptability, talent development, and value co-creation allow firms to seize opportunities, mobilize resources, and implement innovative solutions. Finally, competencies involving internal communication, goal alignment, and collaborative innovation support the reconfiguration of capabilities, helping organizations restructure processes and integrate sustainability with digital transformation. This mapping reinforces the theoretical grounding of our framework and demonstrates how similarity transformation builds upon and extends dynamic capability theory.

6. Theory Implications

Our analysis has three theoretical implications. We build the twin transformation concept and develop dynamic similarity transformation capacities to 1) lay the groundwork for similarity transformation theory and practice. Our findings encourage: 2) a digital transformation study to embrace sustainability transformation

recommendations; and 3) a sustainability transformation study that looks at digital transformation as a potential driver.

To supplement current sustainability and digital transformation research, we treat sustainability and digitalization equitably. By assembling descriptive similarity transformation components, our similarity transformation construct and capacity framework establishes a theory for analysis. Our theory answers the question of “What is” this novel similarity transformation occurrence, providing knowledge that academics in different fields will see about the IS discipline. It can also launch interdisciplinary research efforts on similarity transformation through an integrated lens. We can develop analytics theories into explanatory or prescriptive theories for explanation, design, and execution, as [Gregor & Hevner \(2013\)](#) suggested. Future studies can use our theoretical basis to experimentally investigate the impact of a sustainable transformation-guided intention on digital transformation or digital transformation-enabled understanding of sustainability transformation effectiveness. Our study requires greater integration and multidisciplinary approaches since a single discipline cannot solve critical global concerns. Thus, digital and sustainable transformation academics may collaborate, critique, and discuss further.

Our research on the similarity transformation construct and its capacities has significance for digital transformation investigation on the broad (general) and micro (internal) levels of change in organizations ([Wessel et al., 2021](#); [Baiyere et al., 2020](#)). In general, our study extends [Wessel et al.’s \(2021\)](#) process-based model of change by requiring a deeper grasp of an organization’s digital transformation motivations. Technology drives digital transformation, according to [Wessel et al. \(2021\)](#). Our research extends [Wessel et al.’s \(2021\)](#) observations by looking at the firm’s aggregate effect as an enabler of digital transformation, including ecological and social sustainability. [Wessel et al. \(2021\)](#) argue that digital technologies reformulate an organization’s approach to value creation for micro-level transformation. The study corroborates this discovery and introduces a third catalyst: organizational sustainability. Organizational sustainability:

- 1) Can reformulate the core advantage;
- 2) Gives digital transformation a sense of purpose;
- 3) Directs the development of digital transformation strategies that consider technological, corporate, and social variables.

We leverage digital transformation to address complex sustainability transformation concerns, building on past research. In particular, we enhance [Dyllick and Muff’s \(2016\)](#) prominent business sustainability typology. This typology has three sustainability transformation stages. We found that allowing digital transformation views requires a fourth stage. For example, globalization urging for digitalization or an ecological challenge pushing towards sustainable development could drive a dual innovation at this stage. Our findings also impact [Dao et al.’s \(2011\)](#) Integrated Sustainability Framework, which stresses the role of IT in ensuring business sustainability and is extensively adopted. Two features of our re-

search reinforce and broaden their framework. Firstly, we discover dynamic similarity transformation characteristics that enable digital transformation-based sustainability solutions to improve businesses' sustainability. According to Dao et al. (2011), organizations should incorporate sustainability into their core operations, products, and services. Secondly, we discuss digital technology sustainability and digital transformation issues. To demonstrate the similarity transformation capacity "use digital innovations that promote sustainability practices", we add the idea of making digital transformation sustainable to Dao et al.'s (2011) assertion to create capacity that encourages green technologies and processes. Companies can focus on digital and sustainability change with our dynamic similarity transformation solutions.

7. Practical Implications

Our research has two main practical implications. Our findings help businesses evaluate current practices and formulate a strategy to build their similarity transformation capacities by presenting a fresh, all-encompassing view of the relationship between sustainability and digital sustainability transformation.

Firstly, our study gives professionals an all-encompassing understanding of the framework and guidelines for similarity transformation. We offer professionals a new strategic perspective by systematically recognizing and cultivating similarity transformative elements and creating related abilities. As one lead rapporteur said, *"At the strategic level, the subject is essential; however, as a corporation, we are not yet clear on the framework or the standard procedures"*. We think businesses can help solve global challenges. Professionals can use our similarity transformation capacity framework to drive dual innovations in their business entirely. Another lead rapporteur plainly said, *"Certainly, both developments are acknowledged. The practical linkage becomes evident, and we must concretize these discerned tendencies and entanglements soon"*.

Secondly, to better define and express their similarity transformation ambitions, firms should combine strategic digital and sustainability aspects into their vision, purpose, and values. Our dual transformation development and ability framework enables firms to evaluate their transformation capacities. This will illuminate the organization's dual innovations. It will further assist management in building dual transformational skills. By implementing an organization's vision, our approach helps create an organization-wide path for similarity transformation capacities. Knowing an organization's long-term future, including its value creation goal, helps establish and translate essential similarity transformation capacities.

8. Limitations and Future Research

Like any research undertaking, ours has limits. The first constraint is the breadth and depth of the interviews (usually one person per company). More lead rapporteur interviews per company and business sector would explain the similarity transformation capacity framework by emphasizing context-dependent possibili-

ties or limitations that affect the capacity's practicality. The exploratory aspect of this study—consulting lead rapporteurs to find similarity transformation capacity not yet documented in the literature—is its second drawback. Reading about digital or sustainability transformation characteristics can assist in identifying similarity transformation potential. The third drawback is that we generated the similarity transformation capacity framework from a fixed perspective without considering chronological or context interdependencies. Establishing an analytical perspective to illuminate the sequence of similarity transformation capacities could reveal their chronological interdependencies.

Our findings suggest that there is room for further investigation into the twin transformation interplay in light of the given definition of the concept and the described dynamic similarity transformation capacities. To aid firms in their similarity transformation, there are several potential avenues for future research. One possible avenue for further study is creating a model of maturity that might serve as a roadmap for successful similarity transformation. With this, businesses could gauge how far along the path to similarity transformation they are and what steps they need to take to acquire the necessary skills. Secondly, researchers could develop and study appropriate assessment methods to determine the factors associated with dual transition preparedness or effectiveness. By doing so, organizations can provide the groundwork to transition into dual transformers. Third, academics could undertake case studies to uncover additional evidence regarding related modifications. The ability to demonstrate ordinary twin change abilities and to derive context-specific traits of similarity transformations are both supported by empirical insights.

9. Conclusion

Organizational transformation is like a dynamic river constantly flowing and modifying its path. Organizations, like rivers, must evolve to thrive in their environment. Given today's significant challenges, the equal integration of digital and sustainability transformation allows the similarity transformation to take off, similar to responding concurrently to global catastrophes such as climate change. In this paper, we define the similarity transformation construct, which refers to the creation value relationship between sustainability and digital transformation activities that benefit a business. We introduce a capacity framework for organizations to dual transform to further this symbiotic relationship. Our study lays the groundwork for IS academics to participate in this symbiosis, advancing theories and bringing sustainability to the forefront of IS research. Our study provides tangible advantages to organizations on their journey to becoming dual transformers by identifying and comprehending essential capacity, in addition to an analysis of the amplifying synergy underlying sustainability and digital transformation for research.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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