

ARTICLE

Tracing Digital Transformation Through Failure Micro-Foundations in High-Reliability Organizations

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Abstract

For over thirty years, scholars have examined the operational complexity and resilience of high-reliability organizations (HROs). In recent years, however, these organizations have encountered mounting market pressures that demand digital transformation (DT), reshaping both their organizational identity and value creation approaches, while still upholding stringent standards of reliability and safety. This research presents a longitudinal, qualitative single-case study of a leading European utility provider to explore how HRO identity interacts with digital transformation. The study highlights the inherent tensions between the pursuit of innovation and change, and the ongoing necessity of stable, dependable operations. Findings reveal that clashes between established HRO identity and the core demands of DT generate perceived threats within the IT workforce, prompting defensive behaviors that risk undermining the transformation journey. From this, we propose a process model that illustrates how identity misalignment emerges and influences outcomes during large-scale DT initiatives in HROs. By focusing on these dynamics, the study contributes to DT literature by emphasizing the role of bottom-up organizational processes in shaping success or failure, particularly through the IT function's interpretation of identity.

Keywords: high-reliability organizations; digital transformation; organizational identity; human dynamics; self-protective behavioral strategies

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1. Introduction

“If one avoids engaging in redundant or complex tasks, the risk of reorganization, loss of status, or diminished expertise becomes imminent. Transparency carries its own risks; in many cases, complexity ensures survival.” (IT Expert)

High-reliability organizations (HROs) – entities that deliver critical societal services such as defense, energy, food supply, water, and communication in highly technical and potentially hazardous environments (Rochlin, 1996) – have been extensively examined in organizational and information systems research (Weick, 1987; Weick et al., 2008; Orlikowski & Barley, 2001). In the current digital era, HROs, similar to other organizations, face new market dynamics that necessitate digital transformation (DT) to remain competitive and adaptive (Egan, 2011; Demirkan et al., 2016). Emerging technologies offer considerable potential to enhance HROs’ agility, reliability, efficiency, and safety—for instance, through Digital Twins (O’Dwyer et al., 2020; Salvi, Spagnoletti & Noori, 2022), Internet of Things (Jabłoński & Jabłoński, 2022; Shahat, Hyun & Yeom, 2020), and Artificial Intelligence (Jabłoński & Jabłoński, 2022; McInerney et al., 2022). Yet, realizing these opportunities often requires profound organizational change through DT (Vial, 2019). Such transformation challenges the very essence of HROs’ identity (Albert & Whetten, 1985; Wessel et al., 2021), which emphasizes stability and error-free operations (Bierly, Gallagher & Spender, 2014). Since DT involves risk-taking and organizational flux, it may directly conflict with this established identity (La Porte, 1996; Weick et al., 2008), thereby functioning as a barrier to change (Brown & Starkey, 2000; Christianson et al., 2009; Kogut & Zander, 1996). Thus, HROs face a dual challenge: harnessing the benefits of DT while maintaining their core identity grounded in reliability. Despite the significance of this tension, limited studies have explicitly addressed the role of identity in shaping the outcomes of DT within HROs.

This study particularly investigates the IT function’s role in this dynamic. Recent IS literature underscores the critical influence of employees—especially IT professionals—in enabling successful DT initiatives (Kirton & Robertson, 2018; Venkatesh et al., 2017), alongside the need for strong business-IT alignment (Chau et al., 2020; Liang et al., 2017). In HROs, IT staff are pivotal in managing technologies essential to complex and secure operations (Butler & Gray, 2006; Carlo, Lyytinen & Boland, 2012; Orlikowski & Barley, 2001). Therefore, we examine the question: *How does organizational identity, as understood by the IT workforce, shape the digital transformation process in HROs?*

To answer this, we conducted a longitudinal participatory field study in a European energy company undergoing DT to respond to a shifting energy market. The transformation not only failed to achieve anticipated performance improvements but also triggered reliability incidents. Our findings reveal cross-level interactions where identity misalignment fueled defensive collective behaviors among IT staff, ultimately undermining the DT process. We present a process model illustrating how such misalignment generates tension and how the IT workforce, when confronted with uncertainty, may mobilize organizational identity to resist transformation efforts.

This research contributes in three ways. First, it challenges the dominant focus on top-down strategies in DT literature (Hess et al., 2016; Kohli & Johnson, 2011; Mann, Karanasios & Breidbach, 2022) by showing how bottom-up processes may not simply complement but instead conflict with organizational change (Chanas, Meyer & Hess, 2019). Second, it enriches strategic IS research by highlighting underexplored aspects of IT workforce dynamics beyond capability-building, particularly how their cognitive and emotional responses affect transformation outcomes (Eden et al., 2019; El Sawy et al., 2016). Finally, it extends theories of strategic change in HROs (Weick & Sutcliffe, 2005; Weick et al., 2008) by demonstrating how organizational identity can foster self-protective behaviors that obstruct the realization of DT benefits.

2. Material & Method

Although many organizations encounter challenges related to security and operational reliability, certain sectors—including energy, food, finance, defense, communication, and water supply—operate under intensified pressure to maintain flawless performance (Rochlin, 1996). These entities are referred to as High-Reliability Organizations (HROs) due to their emphasis on uninterrupted and dependable service delivery (Weick, 1987; La Porte, 1996). HROs must consistently avert catastrophic failures even in environments characterized by extreme risk and complexity, as interruptions to these critical services can generate profound societal consequences (Weick et al., 2008; Bourrier, 2011).

Within the scholarly literature, HROs are often portrayed as atypical organizations (Navajas et al., 2013), prioritizing operational reliability above efficiency (La Porte, 1996). Their functioning is defined by multilayered processes, complex technological interfaces (Rochlin, 1996), and built-in redundancies that safeguard operations against potential errors (Busby & Iszatt-White, 2014). Furthermore, these organizations rely on highly trained personnel who manage their activities under demanding and frequently hazardous circumstances (Ericksen & Dyer, 2005).

As in other domains, HROs are undergoing rapid digitalization aimed at enhancing agility, safety, efficiency, and reliability. However, this increasing integration of digital technologies also introduces novel challenges associated with digital transformation (DT), which will be elaborated in the following sections (Salovaara et al., 2019).

Digital transformation (DT) has emerged as one of the most prominent themes in current information systems (IS) research (Wessel et al., 2021), as evidenced by the sharp rise in scholarly contributions published in leading IS journals (e.g., Chanas et al., 2019; Länämaki et al., 2020; Teubner & Stockhinger, 2020). Yet, similar to other trending topics, the term has often been applied inconsistently across the literature. Hanelt et al. (2021) point out that research on DT lacks consensus on its precise definition and boundaries. Wessel et al. (2021) echo this concern and attempt to clarify the construct by drawing explicit comparisons with IT-enabled Organizational Transformation (ITOT).

Transformation itself has been described by Besson and Rowe (2012) as “a process that engenders a qualitatively different organization” (p. 103). Such transformation arises when an organization’s “deep structure”—the fundamental arrangements that define its organizational components and recurring activity patterns—undergoes change (Silva & Hirschheim, 2007; Gersick, 1991). ITOT, therefore, refers to the reshaping of these foundational structures through the use of, or reliance upon, information technology (Besson & Rowe, 2012; Gregory et al., 2015; vom Brocke et al., 2020).

According to Vial (2019), DT represents an extension of ITOT, differing mainly in scale, scope, and pace. Other scholars (Hanelt et al., 2021; Li, Su, Zhang & Mao, 2017; Piccinini et al., 2015) also propose definitions of DT that align closely with ITOT, leading to conceptual ambiguity (Wessel et al., 2021). To resolve this, Wessel et al. (2021) define DT through its impact on an organization’s value proposition and identity: while ITOT largely reinforces an existing value proposition and identity, DT redefines these elements by embedding “digital” as a core dimension. In this view, DT entails the creation of a qualitatively different organization in which digital technologies fundamentally reshape both value creation and organizational identity (Baiyere et al., 2020; Wessel et al., 2021).

Digital transformation (DT) carries profound implications for organizations, as it demands fundamental structural and cultural change while business operations must continue uninterrupted. As Baiyere et al. (2020, p. 242) aptly describe, DT resembles “changing the wheel on a moving vehicle.” Achieving this requires organizations to balance seemingly contradictory goals, such as combining IT innovation with operational efficiency, and fostering agility while maintaining stability (Gregory et al., 2015). In essence,

organizations must simultaneously sustain ongoing activities and pursue transformative changes that reshape technologies, processes, and value propositions.

This tension is particularly acute within high-reliability organizations (HROs). Although DT promises significant advances in both processes and products, it demands collective action from top executives, middle managers, and employees to drive multiple changes concurrently (Maedche, 2016). Such initiatives not only involve integrating new technologies into daily operations but also call for deeper organizational transformation. For HROs, this often entails structural adaptation, cultivating leadership styles, and embedding risk-aware behaviors (Singh & Hess, 2017). Furthermore, effective DT requires attention to the pace of solution deployment, the granting of autonomy, the cultivation of trust, and the acceptance of occasional failures (Demirkan et al., 2016). Embracing these elements also implies coping with a degree of temporal instability, which is necessary for digital innovation to flourish in traditionally stability-oriented environments.

The implementation of digital transformation (DT) in high-reliability organizations (HROs) creates unique challenges for IT functions, particularly regarding how their activities align with broader organizational goals. Although information systems research has long examined the trade-offs between innovation and reliability (e.g., Guillemette & Paré, 2012; Peppard, 2018), limited attention has been paid to the distinct issues HROs encounter. Drawing on Weick et al.'s (2008) framework of principles that underpin reliability, we identify three major tensions between HRO identity and the requirements imposed by DT, with a specific focus on their implications for IT.

The first tension concerns **stability versus innovation**. HROs prioritize continuity and risk avoidance (Weick, 1987), yet DT initiatives often push for rapid innovation, especially in customer-facing processes, which introduces new categories of reliability risks (Bierly et al., 2016; Demirkan et al., 2016). IT staff face uncertainties regarding the impacts of new routines, the stability of digital solutions, and interactions with external stakeholders (Singh & Hess, 2017). This can complicate sensemaking (Weick, 1993; Weick & Sutcliffe, 2005) and lead to misaligned requirements (Kane et al., 2017). Reconciling routine-based reliability, which emphasizes error prevention, with mindfulness-based reliability, which focuses on adaptive responses, poses a significant dilemma (Butler & Gray, 2006).

The second tension involves **internal versus external resource reliance**. HROs have traditionally built resilience by maintaining substantial in-house expertise (Weick et al., 2008). DT, however, frequently depends on outsourcing and cloud services (Garud & Karunakaran, 2018). While bimodal IT governance (Gartner, 2014) proposes splitting traditional IT and digital IT units, outsourcing core operations (mode 1) risks undermining the organization's reliability identity (Haffke et al., 2017). Reduced reliance on internal expertise challenges a foundational HRO principle of "deference to expertise" (Weick et al., 2008), and the use of temporary or external staff may increase vulnerability (Eriksen & Dyer, 2005).

The third tension is between **complexity and simplicity**. While HROs are accustomed to operating with intricate processes to ensure reliability, DT often demands simplified IT architectures to foster agility (Van Oosterhout et al., 2006; Grebe et al., 2016). Measures such as decommissioning legacy systems (Rezazade Mehrizi et al., 2021) may enhance flexibility but simultaneously disrupt established practices central to HRO identity. This tension often generates workforce resistance and stress (Sanchez & Zuntini, 2018).

Overall, the literature suggests that DT challenges the deeply embedded reliability-oriented identity of HROs, especially within their IT functions. Enabling DT thus requires not only technological adaptation but also cultural and structural adjustments to risk orientation, ensuring competitiveness while preserving operational safety (Bollard et al., 2017). To explore these dynamics further, we conducted an in-depth case study.

Table 1. Tensions between HRO Identity and DT Requirements.

HRO Identity	DT Requirements
<p>Focus on stability</p> <ul style="list-style-type: none"> - sensitivity to operation and situational awareness - supervision, knowledge sharing in the front line - monitoring of complex technology, analysis of near misses - preoccupation with failure <p>Reliance on internal resources and experts</p> <ul style="list-style-type: none"> - commitment to resilience through redundant IT resources - maintaining internal IT capabilities and controls - focus on absorbance and bouncing back from incidents - deference to internal expertise - expertise rather than authority, delegation to the best expert - keeping skills sharp and up to date <p>Complexity</p> <ul style="list-style-type: none"> - reluctance to accept simplification - multiple points of view, frameworks - simple diagnoses are rejected 	<p>Embracing innovation</p> <ul style="list-style-type: none"> - adopting digital solutions for value chain creation - speed in solution delivery and “customer centricity”/experience enhancement - risk appetite to pursue innovation objectives - mitigation strategies to accept instability <p>Reliance on external resources</p> <ul style="list-style-type: none"> - “two-speed-IT” governance - relying on third party IT providers - focusing on innovative and powerful external IT solutions - hiring temporal experts/workforce - divestments, outsourcing of services - defending cost benchmark levels <p>Simplicity</p> <ul style="list-style-type: none"> - simple system design (Agile, LEAN) - process integration - simple and agile IT architecture, - decommissioning of legacy systems - report concerns without fear of blames

3. Results & Discussion

A longitudinal qualitative method was employed to capture detailed discourses and process-level data from various organizational layers throughout different stages of digital transformation over a two-year period (Vogus & Rerup, 2018). The study was designed as a single-case approach (Yin, 1994), focusing on a European utility company referred to as *EnergyCo* (pseudonym). The firm’s top management initiated a transition from its long-standing reliability-oriented operational model toward digitalization and innovation.

EnergyCo recognized the urgency of moving from fossil-based energy dependence to sustainable energy solutions, which required participation in a more decentralized energy system combining both centralized and renewable sources. This transformation also expanded the ecosystem to include new stakeholders such as homeowners, collectives, technology providers, and platform owners. To address these challenges, the company integrated digitalization and business model innovation as the foundation of its strategic renewal.

The new digital strategy was built upon five pillars:

1. **Data analytics** – collecting, storing, and analyzing large and diverse data streams.
2. **Partnerships** – leveraging digital platforms for secure and rapid collaboration across diverse stakeholders.

3. **Operations** – deploying tools for monitoring and optimizing assets ranging from solar panels and wind turbines to pumps and transformers.
4. **Customers** – enhancing customer-centricity through apps, portals, and multi-channel interactions.
5. **Employees** – improving workplace digital experience to promote agility and flexibility.

Ultimately, this shift redefined EnergyCo from a traditional fossil-fuel energy supplier into a sustainability-driven organization with a broader value proposition. While fostering innovation and agility, the firm simultaneously emphasized the importance of operational continuity by maintaining secure, stable, and compliant IT services as a foundation for business reliability.

3.1. Data collection

EnergyCo, a European utility firm with approximately 20,000 employees, was among the pioneers in adopting digitalized processes. Its IT department—responsible for critical operational technologies—was tasked by executive management to lead the digital transformation (DT) across corporate divisions. Hence, the primary data were drawn from this IT unit and its workforce.

Fieldwork was conducted across several countries (Sweden, Finland, Denmark, Germany, Poland, and the Netherlands), combining interviews, workshops, direct workplace observations, and access to internal documents. The first author, acting as a designated observer, collected data from June 2016 to August 2018 through executive meetings, team discussions, and transformation planning sessions. This access provided not only real-time observations but also corporate records such as transformation plans, behavioral guidelines, and competence-development requirements.

In total, 92 employees contributed: 21 one-on-one semi-structured interviews, six group workshops (10–25 participants each), plus supplementary meetings and workplace observations. Interviews lasted 45 minutes to two days, guided by open-ended protocols around people–process–technology themes. Data included handwritten notes, photographs, and documents (emails, reports, IT incident logs). Triangulation was ensured through validation sessions with executive management, allowing feedback on interpretations and conclusions.

3.2. Data Analysis

The analysis followed a qualitative inductive methodology (Gioia et al., 2012), supported by grounded theory (Corbin & Strauss, 2015). Initially designed to study DT in HROs, the project revealed unexpected behavioral patterns: employees engaged in seemingly legitimate practices that, in reality, obstructed the transformation. This led to an iterative process of refining interview protocols and collecting approximately 600 files of notes and images.

Coding was conducted in stages: first-order categories derived from open coding, then aggregated into second-order themes, which informed the theoretical model of identity misalignment in DT. Constructs like “organizational identity” and “digital transformation” were grounded both in prior theory and empirical induction, while the emergent construct of “self-protective behavior” was identified through recurring employee narratives.

To ensure credibility, the team applied peer reviews, negative case analysis, methodological triangulation, and multi-author coding. External validity was enhanced by presenting findings to consultants and HRO experts, confirming the broader relevance of observed tensions such as identity conflicts, fear, and self-protective behavior in DT efforts. The results are visualized in Fig. 1 and detailed in Table 2.

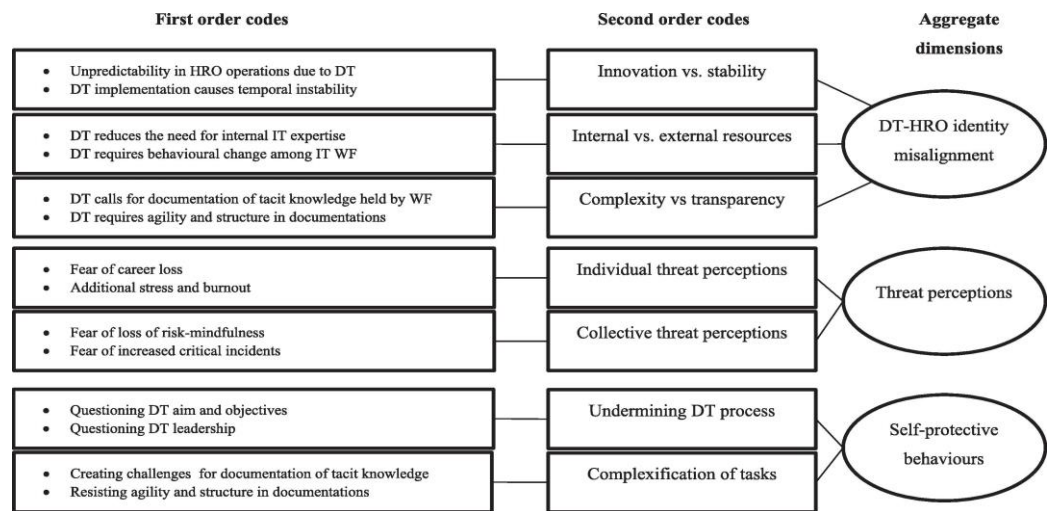


Figure 1. Data structure

Table 2. Illustrative quotations.

Aggregate Dimension: DT-HRO identity misalignment	Second Order Codes	First Order Codes and Illustrative Quotations
Innovation vs. stability	Increased uncertainty	<ul style="list-style-type: none"> “Currently employees live with uncertainty about their role, cointroduction to new IT environment and employment security.” Our managers are at risk, they are losing touch with us, what is really happening in operations and how this transformation affects us...” “The volume of critical incidents is dramatic compared to previous periods, and we are still not in control to prevent them from happening. Among several IT stabilization initiatives...improvement of change management will significantly contribute to preventing critical incidents caused by change. Obviously, we are very poor in risk and impact assessment. In the current change management version, risk assessment is not even mandatory!” “In 2018, we have processed 6.866 changes... 3.769 (55%) were classified as normal changes and 2.951 (43%) were classified as standard changes... This could indicate that we are underestimating the impact of changes in too many cases... They are actually suffering the current instability!”
Internal vs. external resources	DT implementation causes temporal instability	<ul style="list-style-type: none"> “Our colleagues are quite aware as to which of their team colleagues are getting hired, fired or promoted and why...”

Aggregate Dimension: DT- HRO identity misalign- ment	Second Order Codes	First Order Codes and Illustrative Quotations
DT requires behavioural change among IT WF		<ul style="list-style-type: none"> • “Organisation is not well staffed; theory not meeting practice; many workshops taking place to design “something” ...” • “...convince managers that we may need some colleagues to let go in respectful way. Not everybody can or willing to transform and stay with us.” • “We need to change HR hiring strategy...hires for attitude and soft/interpersonal skills, as well as new digital transformation technical (hard) skills. Define clearly performance expectations, coach employees to overcome difficulties connected with change and build skills and new knowledge. Implement principles of continuous learning, continuous improvement and continuous innovation...” • “We have to support the [organisation] in the larger change programs such as divestments, change programs and more. We have good track record from previous work, where we have acquired competence and experience. “ • “We have to defend our cost benchmark level and be money smart in what we do. This is an area where the red-tape challenge is apparent. It is important to question and remove all waste we have,. • “It is about a culture shift... from the management perspective, we are very slow... if we don’t change, we will be out of business.” • “Digital transformation is the ability to constantly adapt to an environmental condition, which is constantly changing at high speed...we need to be more curious... go outside of our comfort zone, explore things that we are not comfortable with...” • “We need to enable improvements...improving the quality and increasing the frequency of desirable behaviors in our IT. We need to search for approaches and tools for how to achieve this. “ • “...ohh no! I have been doing this in this way for 20 years! I don’t want to change! “We need to

Aggregate Dimension: DT-HRO identity misalignment	Second Order Codes	First Order Codes and Illustrative Quotations
Complexity vs transparency	DT calls for documentation of tacit knowledge held by WF	<p data-bbox="908 327 1485 394">develop a new risk appetite framework without getting stomach pains.”</p> <ul style="list-style-type: none"> <li data-bbox="858 439 1485 689">• “Every month, I walk into office and I encounter a new set of IT cultural values, that are prominently displayed on the walls. But then I look carefully how my colleagues and managers really behave, which tells us exactly what we actually need to know about our cultural change initiative.” <ul style="list-style-type: none"> <li data-bbox="959 707 975 730">○ <li data-bbox="858 741 1485 846">• “We have big dilemma on how to get transparent workplace without compromising security (confidentiality)...” <li data-bbox="858 891 1485 1070">• “Decisions [incl. agenda from IT MT] shall be communicated... establishing good communication flows via N2-N5 enable involvement of IT teams... shifting minutes of the meeting into action/decisions...” <li data-bbox="858 1115 1485 1249">• “Open and honest communication, because lack of open communication leads to low morale, to disengagement of workers and all in all, it is very bad for business...” <li data-bbox="858 1294 1485 1854">• “...I got the impression that two aspects which I regard as extremely important for change management and for stability were blotted out. Maybe they were taken for granted... Maybe my extrapolation from my own experience turns out to be inappropriate. And, I don’t want to accuse a whole organization of being, organizationally as well as procedurally, highly unprofessional... However, we cannot afford to believe we could get by without documentation. As soon as this has been realized, we must do an inventory, describe what information must be available and what documentation still needs to be created... To make a long story short, we at [company name] are poor in documentation.” <li data-bbox="858 1861 1485 1928">• “This digitalization is taking lot of impersonal nature of many work situations.” <li data-bbox="858 1935 1485 2110">• “Unfortunately, at IT, it is sufficient for an application to go live when the application owner is satisfied with its functionality while IT operations are not considered an approval authority. For the sake of customer satisfaction, we make
	DT requires agility and structure in documentations	

Aggregate Dimension: DT-HRO identity misalignment	Second Order Codes	First Order Codes and Illustrative Quotations
Complexification of tasks		<ul style="list-style-type: none"> more concessions than any hosting provider can afford. Especially, we demand no proper documentation! Be assured, only such documentation would enable change management to see the whole picture and to assess what a request for change really triggers."

Table 3. (continued)

Aggregate Dimension: Threat perceptions	Second Order Codes	First Order Codes and Illustrative Quotations
Individual threat perceptions	<p>Fear of career loss</p> <p>Additional stress and burnout</p>	<ul style="list-style-type: none"> " We all know that planned change will trigger unhappiness among those who are affected by it. Some colleagues may have to give up their current role, job or certain tasks, work habits that have been comfortable. Others may have to move to another team, break up teams and move to another kind of work with new routines." "It is hard to express your fears and concerns with transformation to people around or below you. You do not want to appear stupid or uncertain." "We are very good at burning out our people. Very often, stress and depression become pervasive, and physical health suffers as well. Very often, we are setting very high expectations for already busy agendas." "Allow errors... and be able to take criticism, unpleasant news, feedback without getting stressed or too emotional. Develop emotional intelligence for digital transformation. Learning to manage stress, your communication, actions, even when you feel the most negative and painful news, the emotions are hitting you... We need to develop a strategy on how to foster a more humane and successful organization and take away silos, unnecessary hierarchy and the negativity." IT Advisor (7): "The IT organization is in stress... learn to relax and engage in cooperation." IT Executive Meeting: "Unanticipated stress might grip your team as a transformation takes old... We more suggestions on how to deal with difficult situations and stress..." "... manage emotional well-being of your team to prevent anticipated effects or to address and minimize "brain drain" – left of IT talents and key players."

Aggregate Dimension: Threat perceptions	Second Order Codes	First Order Codes and Illustrative Quotations
Collective threat perceptions	Loss of risk-mindfulness	<ul style="list-style-type: none"> “With the increased openness and standardisation, we have an increased security threat we need to understand and balance well. IT security is often perceived as an obstacle.” “Reliability is the very basics for our operation. Our customers must have trust that the systems work, and we are a reliable partner in all what we are doing... The first is the need to safeguard a stable and secure operation. We must never be at ease and hope the operation will be stable, but actively work on a daily base to assure and take measures it is. Let us not forget this.”
	Fear of increased critical incidents	<ul style="list-style-type: none"> “The volume of critical incidents is dramatic compared to previous periods, and we are still not in control to prevent them from happening. Among several IT stabilization initiatives...improvement of change management will significantly contribute to preventing critical incidents caused by change. Obviously, we are very poor in risk and impact assessment. In the current change management version, risk assessment is not even mandatory!”

Table 4. (continued)

Aggregate Dimension: Self-protective behaviours	Second Order Codes	First Order Codes and Illustrative Quotations
Undermining DT process	Questioning DT aim and objectives	<ul style="list-style-type: none"> “I challenge you to talk about our IT goals and digital transformation strategy... in every-on-one and team meetings. Everyone will be better off because, if management can explain our goals... at least 70 percent of our IT team has no idea what we in IT are trying to do...” “Instead of giving mandates, they should set expectations clearly, ask for commitments, no compliance. Our managers have intense focus on today’s performance with little regard given to what we need to do tomorrow, next week, ... years.”
	Questioning DT leadership	<ul style="list-style-type: none"> “We get so lost in the sea of urgent activities like end-user issues, problems with suppliers, and critical incidents that we do not find time for competence development activities, studying and learning opportunities... learning always plays second fiddle, we always put our work first.” “Many of us are thrown into new positions, get no coaching or support for our new role. We are thrown into the deep end of the

Aggregate Dimension: Self-protective behaviours	Second Order Codes	First Order Codes and Illustrative Quotations
Complexification of tasks	Creating challenges for documentation of tacit knowledge	<p>pool...management by fear. We have to deliver, hit the goals, no matter what and how!" (WF)</p> <ul style="list-style-type: none"> • "For good work, you get only more work as a reward... we have no time to celebrate success...in our department, we have a couple of examples of toxic leadership, such as "Empty chair leadership"; "Teflon Manager is where issues do not stick but are transferred to another department; "Instability Attractors"; "Management by PowerPoint"; "Liquid statements leadership", where commitments are missing ... "Soap syndrome"; sabotage or non-collegial behaviors..." • "There is little or no appreciation for what we are doing... For good work, you get only more work as reward... We have no time to celebrate success... Managers often steal our ideas and take credit..." • "I have never seen go-live approvals other than those from the budget owners who had paid for their solutions and were willing to pay their SLAs. We run everything; we are customer satisfaction heroes!" • "The higher ranking the decision maker is, the more catastrophic a system can be; nevertheless, it will go to production without reservation. Mines can be laid everywhere because technical approval instances and rules are missing. Whether everything else will go live seems to be only a question of budget and insistence. And approving something while standing at the coffee machine is a great demonstration of being important." • "If you stop doing unnecessary things and complicated tasks, you will be subject of reorganization. You will lose importance and expert status." • "If our people are not trusting of what is happening with their concerns, they do not give feedback. Then our annual review survey will be positive and not provide any valuable feedback, useful information." • "I got the impression that two aspects that I regard as extremely important for change management and for stability were blotted out. Maybe they were taken for granted... However, we cannot afford to believe we could get by without documentation. To make a long story short, we are poor in documentation."

Aggregate Dimension: Self-protective behaviours	Second Order Codes	First Order Codes and Illustrative Quotations
Resisting agility and structure in documentations		<ul style="list-style-type: none"> • “I don’t mind bringing a last example. When [business division] in [city] ordered external consultancy last year, it was clear that these consultants needed feeding. Unfortunately, there was no usable documentation to hand over. The only option I had was to schedule lots of meetings where we tore the information out of the participants. I am glad that I will never have to approve changes to those undocumented systems.” • “We are not able to solve things this summer, it will take time... this is a long-term thing...” • “Employee engagement, intention to stay, productivity and customer satisfaction are the biggest challenges...” • “Let us look at agile development projects, too. Those which I support have their stories in Jira and have maybe drawn a few, high-level, nice-looking PowerPoint slides, which are to impress non-technical managers, but which are 100% useless for making architectural decisions. And, that’s it in our agile world! Documentation is simply considered as not being agile enough to cope with it...Many decisions are taken by a group in which I doubt that proper architectural evaluation has been done... If I am right, then we have no clue where the naval mines are floating around...”.

3.3. Findings

This section outlines the results of our analysis regarding the organizational dynamics that hindered EnergyCo from realizing the intended outcomes of its digital transformation (DT). From the outset, noticeable tensions emerged between executive management (EM), line management (LM), and the IT workforce (WF) as the HRO initiated the transformation process.

Early in the DT initiative, a number of closed meetings were held between EM and the HR department to define specific goals for integrating innovative digital solutions, particularly the adoption of Cloud technologies through third-party providers. These confidential discussions, however, quickly attracted the attention of the IT WF. Perceiving a lack of transparency and potential risks to their professional roles and organizational identity, IT staff began to display both collective and individual forms of self-protective behavior.

Our findings demonstrate how the very nature of the initiative, combined with its perceived misalignment with EnergyCo’s identity, generated feelings of threat among IT employees. These identity-related concerns fueled defensive responses that, over time, undermined and eventually derailed the digital transformation efforts within the organization.

3.4. DT and identity challenges at EnergyCo

A cornerstone of EnergyCo's digital transformation (DT) strategy was the implementation of Cloud-based technologies to provide scalable capacity, cost efficiency, and organizational agility in responding to market demands. However, this approach was perceived as conflicting with fundamental high-reliability organization (HRO) principles.

3.4.1. Concerns over instability and declining risk awareness.

The shift to new digital systems required the IT workforce (WF) to replace legacy technologies and adopt integrated operational models. Failures in IT systems, particularly in critical services, frequently resulted in service outages. Although root-cause analyses were initiated, findings often revealed limited ability to clearly identify problems, leading to recurring incidents. As digital changes accelerated, operational reliability declined, amplified by high workloads and staff turnover. IT staff frequently described their operations as a "fire-fighting model," reflecting reactive responses rather than proactive risk management.

3.4.2. Concerns over loss of IT expertise.

Another challenge emerged regarding the anticipated reduction of reliance on internal IT expertise, particularly with outsourcing plans. While executive management (EM) emphasized the necessity of transformation for survival, IT staff perceived the changes as undermining their professional identity and expertise. The introduction of digital tools such as cloud, IoT, and data analytics disrupted traditional skill sets, leaving employees feeling unsupported, pressured to adapt, and uncertain about their future roles. Many staff members expressed frustration about abrupt role changes without adequate training, leading to declining morale, disengagement, and turnover.

3.4.3. Concerns over undocumented processes.

The DT process was further hindered by a lack of structured documentation of key operational processes, which are essential for organizational reliability. Knowledge often resided informally within staff rather than in formal handbooks. This gap complicated outsourcing efforts, as external consultants struggled without sufficient documentation. Agile teams, while employing tools like Jira, often prioritized speed over detailed architectural documentation, resulting in concerns over long-term stability and risk visibility.

In summary, EnergyCo's DT efforts encountered significant obstacles related to instability, loss of expertise, and insufficient documentation, all of which undermined both operational reliability and employee identity within the transformation process.

3.5. *Threat Perceptions among IT Workforce*

Interviews revealed that the anticipated transformation created uncertainty regarding employees' future roles, eroding trust and fueling dissatisfaction within IT teams. Executives acknowledged that planned changes would inevitably disrupt work routines, team structures, and established roles, which generated resistance and disengagement. Employees reported difficulties in expressing concerns openly due to fear of appearing weak or uninformed, while line managers observed that strained relationships with supervisors were prompting resignations.

The transformation intensified perceptions of identity threat, as IT staff felt their established expertise and organizational standing were undermined. Management often avoided addressing these emotional concerns directly, leading to stress, burnout, and health issues. Although executives sought coping strategies—such as promoting emotional intelligence and reducing workplace toxicity—such efforts proved insufficient, as they conflicted with the workforce's strong HRO-oriented identity.

3.6. *Self-Protective Responses*

In reaction to these perceived threats, IT staff engaged in two primary defensive behaviors: **(1) undermining leadership and DT objectives** and **(2) resisting task simplification**.

3.6.1. Undermining leadership and DT objectives.

IT employees frequently challenged the goals and communication of executives, demanding clearer explanations of DT's purpose and expected outcomes. Many complained about limited transparency, inconsistent leadership styles, and lack of recognition for contributions. Executives were often seen as detached ("working in Ivory Towers"), focusing on budgets and customer satisfaction rather than operational realities. Approval processes were circumvented, either by hierarchical power or customer-driven urgency, undermining procedural rigor and increasing risks.

3.6.2. Resistance to task simplification.

Many IT professionals resisted adopting simplified digital tools and processes, perceiving them as threats to their expertise, identity, and organizational relevance. Complex routines were deliberately preserved as they reinforced their value within the organization. Simplification, by contrast, was associated with potential reorganization, role reduction, or loss of expert status.

In sum, the workforce's protective actions—questioning leadership legitimacy and resisting simplification—further stalled the DT process, illustrating how identity threats and misaligned management responses generated organizational resistance.

3.7. *Toward a micro-foundational model of human dynamics in the digital transformation process*

The analysis highlights several foundational constructs that shaped the trajectory of EnergyCo's digital transformation (DT), particularly as it clashed with the IT staff's strong HRO-oriented identity. Drawing from these findings and the literature reviewed in Section 2, a model (illustrated in Fig. 2) was developed to portray how destructive dynamics emerge and persist, creating a vicious cycle that ultimately hinders the realization of the intended benefits of DT. Although senior leadership envisioned DT as a pathway to enhancing agility, fostering innovation in response to environmental change, and simultaneously reinforcing operational reliability, the chosen management and communication approach activated counterproductive processes within the IT workforce, which together reduced overall performance. These negative dynamics are deeply rooted in the misfit between the IT function's reliance on HRO identity and the requirements imposed by DT at EnergyCo.

For instance, the emphasis of DT on innovation entails accepting temporary instability and greater exposure to risk—factors necessary to adopt novel practices, processes, structures, and technologies (Hargadon & Douglas, 2001; Ananyin et al., 2018). Conversely, the IT workforce's HRO orientation is anchored in maintaining uninterrupted operational stability, risk avoidance, and a constant vigilance toward potential failures (Weick et al., 2008). As a result, their practices center on detecting errors, overseeing complex technologies, and reporting near-miss analyses. From this perspective, actions such as adding complexity to processes appear justified, but in reality, they restrict opportunities to harness new digital technologies. Another defining feature of HRO identity is its emphasis on "deference to expertise" (Weick et al., 2008), which prioritizes decision-making by technical experts rather than formal authority. This orientation provides IT staff with additional leverage to challenge and undermine the objectives of DT. Overall, the model illustrates how perceived threats activated self-protective responses that were further reinforced by the IT unit's HRO identity. Such behaviors were likely to intensify when early DT outcomes were disappointing (e.g., more critical incidents), partly because those

very behaviors contributed to the setbacks. Ultimately, these self-protective dynamics derailed the transformation initiative.

4. Conclusions

Our inquiry began with the question of how Digital Transformation (DT) initiatives within High Reliability Organizations (HROs) are shaped by the IT function's perception of organizational identity. By examining processes and behaviors at the individual level, this study contributes to strategic IS research by shedding light on the mechanisms through which misalignments in identity can obstruct DT efforts in HROs. The process model we developed (see Fig. 2) highlights the core tension between the HRO-oriented identity and the requirements of DT, illustrating how this misalignment generates threat perceptions among IT staff, the resulting behavioral responses, and the concrete ways these reactions hinder the successful execution of DT.

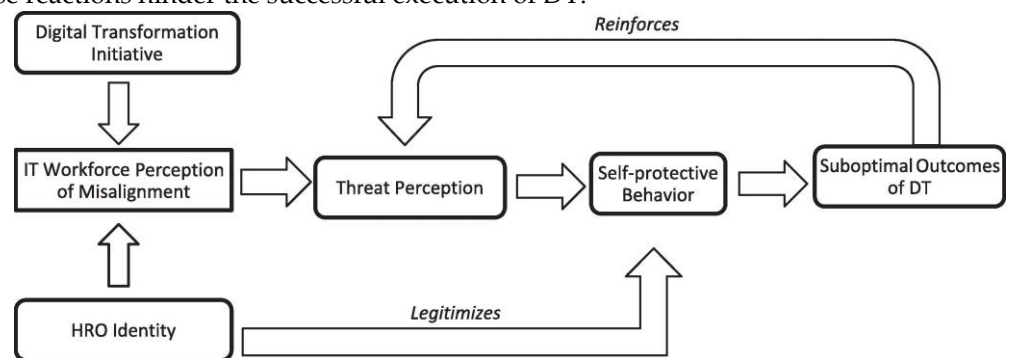


Figure 2. A process model for micro-foundations of DT failure.

4.1. Theoretical contributions

Our study makes three central theoretical contributions. First, it enriches the discourse on Digital Transformation (DT) by demonstrating how divergent bottom-up processes can intersect with top-down directives, shaping the overall success or failure of DT initiatives. Contrary to the common view of DT as a primarily top-driven process (e.g., Frankiewicz & Chamorro-Premuzic, 2020), our findings reveal the obstacles executives face when collective resistance emerges from within the IT function. The case study highlights that if strategic IT units are not fully aligned with the DT agenda, even well-intentioned strategies and senior management's efforts may prove ineffective. While prior research emphasizes the positive influence of bottom-up engagement in facilitating DT (e.g., Chanas et al., 2019), our analysis exposes how destructive dynamics can emerge when the objectives of DT conflict with those of core strategic units. From a micro-foundational perspective, our process model illustrates two opposing mechanisms: while digital technologies and top management initiatives are expected to enhance performance, these gains can be neutralized—or even reversed—by individual and collective reactions at lower organizational levels.

Second, the research contributes to ongoing debates about the role of the IT workforce in contemporary organizations (Lowry & Wilson, 2016; Salge & Polykarpou, 2022). By underscoring the need to actively involve IT staff in transformation efforts, we emphasize the challenge of balancing innovation with the continuity of reliable operations—what Baiyere et al. (2020) describe as “changing the wheel on a moving vehicle.” Given the IT function's critical role in DT, managing transformation requires an ambidextrous approach that reconciles inherent paradoxes (Gregory et al., 2015; Wimelius et al., 2021). Our work further extends research on the human side of large-scale IS implementations (Eden et al., 2019; El Sawy et al., 2016), and advances micro-foundational studies in IS management (Essén & Värlander, 2019; Saldanha et al., 2020) by identifying how sub-rational behaviors among IT staff emerge and evolve collectively. The protective responses

triggered by DT-related threats expand upon organizational ecology theory concerning adaptive strategic change (Besson & Rowe, 2012), demonstrating how IT staff perceptions of threat can ultimately outweigh executive management's DT strategies.

Third, this paper contributes to HRO literature (Weick & Sutcliffe, 2005; Weick et al., 2008) by offering a fine-grained processual account of the obstacles involved in implementing strategic change within such organizations. Specifically, our study shows how the organizational identity of HROs reinforces assumptions and beliefs that discourage initiatives involving risk, innovation, or instability. While earlier research often overlooked operational-level issues in failed strategic transformations, our analysis emphasizes the dual pressures faced by managers: maintaining operational reliability while simultaneously enacting change (Farjoun, 2010). Drawing on population ecology theory (Besson & Rowe, 2012; Hannan & Freeman, 1977), we demonstrate that HROs' strong emphasis on stability may evolve into an organizational incapacity to adapt effectively. These organizations are not unaware of the need for change, but rather face profound difficulties in modifying their complex systems without undermining reliability. Our focus on organizational identity complements Wessel et al.'s (2021) conceptualization of DT as a shift toward embedding digitalization as a central element of the organization's value proposition and identity. In this context, misalignments of identity intersect with individual and collective anxieties, fostering behaviors that undermine and ultimately derail DT initiatives.

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