

# Accounting for Unintended Consequences in IS Research: A Call to Action

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## Abstract

Unintended consequences in Information Systems (IS) research are typically examined only after they have surfaced in practice, often treated as isolated instances rather than being systematically identified and understood. This reactive stance constrains our ability to anticipate risks, recognize emerging opportunities, and build cumulative insights across studies. To assess the current state of IS research on unintended consequences, we conducted a scoping review of literature in the Association for Information Systems' Senior Scholars' Basket of Journals. Our review highlights significant gaps in how unintended consequences are defined, theorized, and systematically compared. To address these gaps, we propose three foundational considerations: (1) conceptual clarity, to refine definitions and delineate boundaries; (2) relational configurations, to analyze the interplay between actors, technologies, and contexts; and (3) temporal configurations, to capture the evolving nature of consequences over time. Building on these dimensions, we introduce a set of guiding questions designed to provide shared analytical vocabulary rather than a prescriptive framework. These questions enable researchers to more systematically identify, categorize, and compare unintended consequences across contexts, thereby fostering theoretical precision, facilitating cross-contextual learning, and supporting a more anticipatory and comprehensive understanding of the phenomenon.

**Keywords:** Unintended consequences, unexpected outcomes, unanticipated consequences, digital transformation, IT governance.

## 1 Introduction

This paper is a call to action for researchers in the Information Systems (IS) discipline to systematically account for unintended consequences in IS research. It urges scholars to revisit the origins of this phenomenon—now an emerging and increasingly vital research stream—and to critically examine how it has been enacted in contemporary IS studies. By doing so, we aim to offer new directions for future research that move beyond a reactive conceptualization.

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Historically, IS research has focused on the intended uses and benefits of technological innovations, often treating unintended consequences as anomalies addressed only after they surface in practice. This reactive stance reflects the broader inability of stakeholders to anticipate negative outcomes and harness unforeseen opportunities. This approach has contributed to a limited understanding of how and why technologies fail, are abandoned, or provoke workaround behaviors. For instance, IT project failures frequently stem from misaligned stakeholder expectations or overlooked organizational dynamics. Discontinuation of use may reflect a mismatch between system design and evolving user needs, while workarounds often arise when formal systems fail to accommodate real-world practices. These outcomes are not merely unfortunate side effects—they are manifestations of deeper conceptual and relational gaps in IS design and implementation.

We argue that unintended consequences are not inherently unforeseeable. Rather, they often stem from insufficient early-stage reasoning and a lack of comprehensive conceptualization. To advance the discourse, we assess the current state of research in IS on unintended consequences and identify key limitations in how the phenomenon is currently studied. Thereby, we propose three foundational considerations to deepen our understanding and to offer a framework for theorizing the dynamic and multifaceted nature of unintended consequences.

1. **Conceptual Clarity** – refining definitions and boundaries of unintended consequences.
2. **Relational Configurations** – examining the interplay between actors, technologies, and contexts.
3. **Temporal Configurations** – accounting for the evolving nature of consequences over time.

For practitioners, this paper highlights the importance of integrating anticipatory thinking into the design and deployment of IS solutions. By embedding foresight practices and scenario planning into early development stages, organizations can better mitigate risks and capitalize on emergent opportunities. Furthermore, the framework encourages IS professionals to adopt a more holistic view of system impacts—one that includes ethical, social, and long-term dimensions—thus fostering more resilient and responsible innovation.

## 2 Unintended Consequences: Origins and Use in IS

The concept of unintended consequences, although rooted in the 18th century, gained prominence in the 20th century through sociologists who viewed them as a common occurrence rather than an anomaly. Long before sociologists formalized the idea, thinkers such as Adam Smith, David Hume, and Montesquieu had already explored the unintended effects of policies, laws, and societal structures. Smith's "invisible hand" metaphor, for instance, illustrates how individual self-interest can unintentionally promote collective welfare—an early recognition of emergent outcomes beyond deliberate design.

Unintended consequences refer to outcomes or effects that arise from purposive social action but were not anticipated or intended by the actors involved (Merton, 1936). These consequences, which can be positive, negative or neutral, were neither intended nor desired when the decision or action was taken. However, such consequences arise from the "overflow" of action, namely, an action always does more than what was initially intended (Callon, 1998).

Merton (1936) was among the first to delineate various causes of unintended consequences in the social sciences, such as errors, conflicting values, short-term versus long-term interests, and ignorance. Merton (1936) also highlighted the complexity of causality in social actions,

arguing that consequences are often shaped by the interplay between individual intentions and the broader social environment. Building on Merton's foundational work, Baert (1991) extended the study of unintended consequences by introducing a structured framework that categorizes these outcomes along five key dimensions. The first dimension separates unintended consequences into two categories: those affecting individuals and those impacting society. The second dimension classifies these consequences based on their *value*, distinguishing between desirable, undesirable, and neutral effects and thereby challenging the tendency to equate “unintended” with “negative.” The third dimension focuses on the relationship between the consequences and the initial intentions behind them. The fourth dimension reveals the varied levels of predictability, spanning from unforeseen impacts to anticipated yet surprising results, and entirely unforeseen outcomes. The last dimension encompasses the temporal emergence of unintended consequences, occurring either during or after the action.

Building on these early developments, the IS discipline further appropriated ideas from the Diffusion of Innovations Theory (Rogers, 1998). This theory suggests that when innovations are adopted, the outcomes can be intended or unintended, as well as desirable or undesirable. Empirical studies in IS initially depicted unintended consequences as anomalies or contradictions (Robey and Boudreau, 1999). This view has been challenged by the duality of technology concept which indicates that different effects can emerge concurrently in various settings due to technology use (Orlikowski 1992). Over the past decades, different IS perspectives have been used to explain how unintended consequences unfold leading to a range of performance and economic consequences or social and ethical concerns (Markus and Robey, 1988; Boudreau and Robey, 2005; Walsham, 2012).

Table 1 summarizes some of these perspectives outlining their rationale and offering examples of studies used to investigate IT unintended consequences (Table 1).

Perspective	Rationale	Example of studies
Adaptive Structuration (AST)	Examines the change process from two vantage points: (i) the types of structures that are provided by advanced technologies, and (ii) the structures that actually emerge in human action as people interact with these technologies.	Orlikowski (1992) Markus and Robey (1988) Watson et al. (1988)
Socio-Technical	Considers both the technical artifacts and the social (e.g., psychological, cultural, and economic) contexts and sees outcomes as emerging from the interaction between the two.	Sarker et al. (2019)
Complex Systems Theories	Advances that Interactions among a diverse set of connected, mutually dependent, and adaptive agents in a sociotechnical system lead to the emergence of unexpected outcomes.	Benbya et al. (2006, 2020) Marjanovic and Cecez-Kecmanovic (2017)
Affordance Actualization	Investigates how the (non-) actualization of affordances produces unintended consequences.	Trocin et al. (2024)

*Table 1. Perspectives and Rationales*

While the existing literature on unintended consequences of IT spans multiple domains and technologies, it remains fragmented across research streams. To address this dispersion, we present a scoping review that synthesizes exemplar streams and offers a critical reflection on the state of knowledge.

### 3 Exemplar Streams of IS Research on Unintended Consequences

We searched for studies on unintended consequences of IT in the major IS journals listed in the Association for Information Systems' Senior Scholars' Basket of Journals, covering publications up to November 2024. Using targeted keywords such— *“Unintended consequences,” “unintended outcomes,” “unintended results,” “unexpected consequences,” “unexpected outcomes,” “unexpected results,” “unanticipated consequences,” “unanticipated outcomes,” “unanticipated results,”* — we searched article titles and abstracts to ensure a focused and relevant analysis. This search initially identified 72 papers. Upon reviewing the abstracts, we categorized them as follows: 31 did not study unintended consequences of IT despite the presence of relevant keywords; 28 reported unintended consequences as supplementary findings; and 15 focused explicitly on unintended consequences as their primary research topic. Among the latter 15 manuscripts, unintended consequences were most frequently examined in algorithmic systems (4 articles), and digital health systems (4 articles), followed by cybersecurity systems (3 articles) and other systems (4 articles). Although this represents a relatively small sub-sample in the IS domain, analyzing and synthesizing the 15 articles yields rich insights into the current understanding of unintended consequences from an IS perspective and highlights potential directions for future research. The extant literature on unintended consequences of IT can be grouped into three exemplar streams of research. In the following sections, we synthesize the findings of these articles in detail for each research stream.

The first research stream focuses on unintended consequences of algorithmic systems. We observe that research under this stream has mainly focused on the undesirable value dimension of unintended consequences. For example, Ma et al (2024) reveal that labelling social media news stories recommended by AI was not as beneficial as expected. In fact, such AI recommendation reduce belief in true news but have no effect on fake news. Similarly, Rinta-Kahila et al. (2021) offer a critical analysis of the Australian government's “Robodebt” program, which, despite its intent to streamline welfare debt collection, caused severe psychological distress and operational inefficiencies, exposing a lack of ethical foresight in its design. Additionally, Rana et al. (2022) point to operational inefficiency, employee dissatisfaction, and competitive disadvantage as critical flaws in AI-integrated business analytics, raising questions about the assumed benefits of such technologies. Monod et al. (2024) further challenge the prevailing narrative that AI is inherently beneficial, demonstrating how even well-intentioned designs can result in harm if workers are excluded from the design and implementation process. Collectively, these studies reveal a troubling pattern of unintended consequences stemming from a failure to account for human and organizational complexities in algorithmic systems. They highlight a strong emphasis on the negative value dimension, such as harm to users, ethical oversights, and operational inefficiencies, while giving less attention to the ways unintended consequences may arise in more complex, ambiguous, or even beneficial forms in algorithmic system use.

The second research stream examines the unintended negative consequences of digital health systems from both unintended desirable and undesirable outcomes. For example, Trocin et al. (2024) identify four user actions—flexing, bypassing, avoiding, and reorganizing—in Electronic Health Record (EHR) systems that lead to various unintended consequences. Flexing, bypassing, and avoiding result in undesirable outcomes, while reorganizing leads to desirable ones. These actions arise from the interaction between technological features and psychosocial or organizational factors, shaping users' perceptions and influencing unintended

results. The studies by He et al. (2023), Zhou et al (2023) and Yeongin et al. (2022) primarily focus on undesirable consequences. Specifically, He et al. (2023) investigate online aesthetic medicine platforms, revealing that monetary reward incentives intended to boost user-generated content often result in unchanged or reduced contributions, as users typically fulfill only minimal requirements. Similarly, Zhou et al. (2023) explore the emotional support provided by online health community platforms, finding that while intended recipients benefit, other users may suffer harm through social comparison. Their findings underscore the necessity of considering broader systemic impacts in platform design. Finally, Yeongin et al. (2022) examine the role of IT in healthcare decision-making. They find that while IT can enhance decision-making by facilitating risk information sharing with physicians, it also introduces legal vulnerabilities that encourage defensive medical practices. These unintended consequences can result in suboptimal healthcare delivery. Therefore, it is crucial for policymakers to carefully consider respective factors to maximize the benefits of IT while mitigating associated risks.

The third stream examines the unintended consequences of cybersecurity systems, focusing primarily on undesirable outcomes, that significantly affect users' compliance and trust. Wolff (2016) examined the complex dynamics of human-machine moderation, identifying unintended consequences, such as emboldening, disengaging, and spillover effects. The study demonstrates that while human-machine moderation effectively reduces harassment within the focal community by shielding users from harmful content, it inadvertently increases harassment toward perceived outgroup members and neighboring communities while also diminishing the number of unique contributors within the focal community. Similarly, Parks et al. (2017) introduced the concept of the "Imbalance Challenge," wherein the negative outcomes of privacy measures outweigh the positive benefits. This imbalance often leads individuals to disregard or misinterpret privacy guidelines, resulting in workaround behaviors that undermine overall compliance. Extending the discussion of unintended consequences in cybersecurity, Pienta et al. (2024) investigated how vulnerability assessments can unintentionally provoke feelings of betrayal among employees. Techniques such as simulated phishing attacks and email scanning—though designed to enhance organizational security—are frequently perceived as intrusive and punitive. These perceptions can foster a sense of "cybersecurity betrayal," prompting active resistance to cybersecurity policies and technologies. These studies reveal that unintended consequences in cybersecurity systems often arise from misalignments between technical interventions and users' expectations or values. This underscores the urgent need for more human-centered and anticipatory approaches in cybersecurity design and governance. Collectively, the findings highlight the importance of understanding the socio-technical dynamics behind unintended outcomes of designing systems and policies that foster trust and promote compliance.

Other studies primarily examine unintended negative consequences in the contexts of online community platforms, human resources information systems (HRIS), and mobile devices. Zhao et al. (2016) investigate how extrinsic rewards—such as virtual points and reciprocity—affect knowledge sharing in online communities. The study finds that while these rewards can boost participation, they can also create unintended consequences including undermining intrinsic motivations like enjoyment in helping others and knowledge self-efficacy. Nguyen et al. (2024) assess the impact of human-machine collaboration in moderating online communities. Although initially effective at curbing harassment, widespread implementation of such systems can lead to unexpected negative outcomes. In the HRIS domain, Maier et al.

(2013) examine the unintended consequences of implementing an e-Recruiting system at a global automotive supplier, focusing on its effects on HR employees' job satisfaction and turnover intentions. Their findings underscore the importance of employee perceptions and highlight the risk of decreased satisfaction and higher attrition if these systems are poorly received. Magni et al. (2023) examine the consequences of excessive mobile devices use for work during nonwork hours. Using resource drain theory, they reveal how family-work conflict and competitive climates can harm both productivity and well-being. The study calls for organizational policies that balance productivity with support for employees' mental health and personal boundaries.

Moreover, several studies reported unintended consequences as supplementary findings, with results primarily centered on user resistance (Kumar et al., 2022), low self-efficacy (Kang et al. 2021), privacy concerns (Fox & Connolly, 2018), diminished job satisfaction (Califf et al., 2020), increased workload (Bernardi & Exworthy, 2020), fragmented information sharing, strained relationships between healthcare actors and patients, and deteriorating work conditions (Kummer et al., 2017). Notably, most studies framed these unintended consequences as undesirable effects, often carrying a negative connotation. However, information systems can also yield positive unintended outcomes—what Merton (1936) termed “unexpected benefits.”. For instance, Petrakaki et al. (2012) found that the digital transmission of prescriptions empowered pharmacists to assume greater responsibilities, thereby enhancing their professional influence and expanding their scope of practice.

Based on the profound impacts of unintended consequences and their divergent interpretations in IS research, developing a deeper understanding of how these consequences unfold can significantly advance both IS theory and practice. Our review reveals a lack of consistency in how unintended consequences are conceptualized across studies. Many studies fail to provide a clear or explicit definition of unintended consequences, rendering the term ambiguous and its implications underexplored. Moreover, most of the literature frames unintended consequences simply as outcomes that were not intended, often neglecting the anticipatory dimension. These consequences are typically treated as generic and isolated events, relying on descriptive narratives of technology use without clearly articulating their focal point. Critical questions—such as “unintended by whom,” “for whom,” “in relation to what,” and whether these effects are temporal or evolve over time—frequently remain unaddressed. Among the studies reviewed, only Trocin et al. (2024) offer a robust and explicit conceptualization. They delineate both the direct and indirect effects of unintended and unanticipated consequences, emphasizing their multifaceted nature and the socio-technical interactions that shape them.

This conceptual gap underscores the need for future research to establish a more standardized framework for identifying, categorizing, and analyzing unintended consequences. Such a framework would enrich both theoretical and practical understanding of IS phenomena. Accordingly, we advocate for a more sophisticated and systematic approach to studying unintended consequences and their ripple effects within and across individuals and organizations.

## **4 Redirecting Future Research on Unintended Consequences**

Drawing on our synthesis of prior research, we propose three key directions for future research: (1) conceptual clarity, (2) relational configurations, and (3) temporal configurations. In response to recent calls for more robust theorizing on the unintended consequences of ITI

use (Markus and Robey, 2004; Trocin et al., 2024), each of our proposed directions offers valuable insights into how this topic can be advanced from a theoretical and methodological perspective.

#### 4.1 Towards Conceptual Clarity of Unintended Consequences

A review of current literature within the IS domain reveals persistent conceptual imprecision and terminological conflation in discussions of unintended consequences. Terms such as *unintended consequences* (e.g., Baert, 1991), *unanticipated consequences* (e.g., Merton, 1936; de Zwart, 2015), *unintended insights* (e.g., Jung et al., 2022), *perverse effects* (e.g., Hirschman, 1991), *latent functions* (e.g., Merton, 1968) or even *dark side* (e.g., Giermindl et al., 2022) are frequently used interchangeably, despite their conceptual distinctions. Unintended consequences encompass all outcomes that occur regardless of the actor's intentions, while unanticipated consequences refer specifically to outcomes that were not foreseen (Merton, 1936). This distinction matters: conflating these terms obscures cases where actors may anticipate but not intend certain outcomes—such as knowingly accepting trade-offs to achieve broader strategic goals (de Zwart, 2015). Recognizing these nuances is essential for developing a more precise and analytically useful vocabulary in IS research.

Moreover, the use of these terms often carries a predominantly negative connotation, which limits the broader potential to study unintended consequences in IS research. The prevailing assumption that unintended consequences are inherently negative is overly simplistic and fails to reflect their multifaceted nature (Trocin et al., 2024). Unintended consequences can be both positive, negative or neutral, with their perception often varying between stakeholder groups (Merton, 1936). For instance, the digital transmission of prescriptions may empower pharmacists by expanding their roles and increasing their professional influence (Trocin et al., 2024). At the same time, this implementation can inadvertently heighten stress and workload for employees who struggle to adapt to new workflows or face pressure to meet elevated productivity demands—an unintended but adverse outcome. Similarly, Markus and Robey (2004) describe how automated scheduling systems in customer service departments enable organizations to optimize workforce allocation and reduce downtime. Yet, employees frequently report frustration and diminished morale due to rigid schedules, reduced autonomy, and a heightened sense of surveillance.

Finally, building on the previous points, it is important to distinguish the concept of unintended consequences from related concepts such as IT project failure (Cecez-Kecmanovic et al., 2014), discontinuation of use (Soliman and Rinta-Kahila, 2020), and workarounds (Alter, 2014; Trieu et al., 2022). While these concepts may appear similar, they differ in focus and analytical lens.

- **IT project failure** typically involves comparing actual outcomes against predefined goals. In contrast, the study of unintended consequences centers on outcomes which were not intended.
- **Discontinuation of use** examines behavioral responses to certain effects, whereas research on unintended consequences investigate the effects themselves—whether social, technical, or organizational—that may trigger discontinuation if they are unintended.
- **Workarounds**, by definition, are deliberate deviations from prescribed processes. They are enacted in response to constraints or inefficiencies and may arise as a reaction to unintended consequences, but they remain intentional.

By clarifying these distinctions, we can better understand the unique analytical space that the concept of unintended consequences occupies within the broader discourse on IT systems and organizational behavior.

To fully grasp the nature of unintended consequences, it is essential to move beyond reactive responses and adopt a systematic, anticipatory approach. This entails mapping a broad spectrum of related concepts and outcomes—including positive consequences—while also recognizing the risks they may entail (Wolff et al., 2024). For example, technologies designed to enhance productivity may initially deliver on their promise but later trigger *revenge effects*, where the very efficiency they create introduces counterproductive complexities (Parks et al., 2017). Even positive unintended consequences are not guaranteed to remain beneficial over time; they can be appropriated or adapted in ways that introduce new challenges. By addressing these gaps, future research can more effectively identify and interpret diverse consequences—positive, negative, and dual—that emerge across varying contexts and among different stakeholders.

## 4.2 Towards Relational Configurations of Unintended Consequences

The current literature tends to treat unintended consequences as isolated occurrences, often relying on descriptive narratives of events related to technology use. While identifying unintended consequences has been a central focus, uncovering their origins is key to generating actionable insights and developing strategies to mitigate negative effects or leverage positive potential (Trocin et al., 2024). The emerging body of work on relational configurations (e.g., Bailey et al., 2022; Bradbury & Lichtenstein, 2000) offers a promising lens through which to examine the interdependencies across different stages for unintended consequences. A deeper exploration of this phenomenon can be guided by three critical questions: *unintended by whom*, *in relation to what*, and *unintended for whom*. These questions provide a structured framework for analyzing how unintended consequences emerge, the dynamics that shape them, and the stakeholders they affect.

The first question, *unintended by whom*, probes which actor or group did not intend—or perhaps anticipate—the observed consequence. This question underscores the subjectivity in defining what is unintended, as various stakeholders in a system often have differing expectations, intentions, and priorities (Trocin et al., 2024). Markus and Robey (2004) note that in the context of IT use, unintended consequences frequently emerge from misaligned intentions across designers, decision-makers, and users. Examining unintended consequences from multiple perspectives reveals that what is unintended and/or unanticipated by one group may be entirely expected—or even intended—by another.

*Unintended in relation to what*, shifts focus to the specific action, intervention, or process that precipitated the consequence. Addressing this dimension requires tracing the causal chain that links a purposive act to its outcomes. Merton (1936) highlights how purposive actions are embedded within complex systems, where outcomes often arise from the interplay between the original intent and external conditions. For example, Parks et al. (2017) illustrate how privacy safeguards introduced in healthcare organizations—intended to enhance compliance and confidentiality—inadvertently disrupted workflows due to poor system design. In this case, examining *unintended in relation to what* reveals how technological decisions, when misaligned with operational context, can yield consequences that diverge from original goals.

Finally, *unintended for whom*, examines the stakeholders affected by the consequence and their varied perceptions of its impact. Unintended consequences are rarely uniform in their effects;



thus, future research must identify which groups benefit and which are disadvantaged (Trocin et al., 2024). Markus and Robey (2004) note that IT interventions often produce dual outcomes, conferring advantages on some stakeholders while burdening others. For example, the deployment of telework technologies, may yield unintended advantages such as reduced overhead costs, yet simultaneously introduce unintended challenges for employees, such as isolation and diminished team cohesion. Understanding who experiences the unintended consequences and how these perceptions vary across stakeholders is critical for developing interventions that balance competing interests and mitigate harm.

### **4.3 Towards Temporal Configurations of Unintended Consequences**

In line with the second contribution, our analysis underscores the importance of adopting a multilayered and temporally sensitive approach to understanding unintended consequences (Fig. 1). Such an approach must account for four interrelated dimensions: stakeholders, the operational context of the technology, the outcomes of its use, and the implications of those outcomes, including their temporal dependencies. A comprehensive approach requires careful consideration of the diverse stakeholders involved, as their intentions, actions, and perceptions both shape and are shaped by the consequences that emerge (Trocin et al., 2024). These stakeholders include, but are not limited to, users, such as employees who directly interact with the technology; programmers, whose design choices influence its affordances and constraints; organizations, which define strategic goals and oversee implementation; and broader societal groups, which may experience indirect effects of technology deployment. Each stakeholder group has unique priorities, expectations, and degrees of influence, and their interactions can generate complex, often unanticipated dynamics.

Moreover, any meaningful analysis must account for the operational context of the technology itself—including its features, functionalities, and embedded assumptions (Parks et al., 2017). The design and affordances of technology play a critical role in shaping how it is used and appropriated by stakeholders. For example, Markus and Robey (2004) describe how features such as default privacy settings in scheduling systems can influence user behavior, either enable collaboration or inadvertently create barriers. This understanding becomes even more crucial with advanced technologies such as artificial intelligence (AI), generative AI (GenAI), and machine learning (ML), where automation, autonomy, and opaque “black-box” processes introduce new layers of complexity (Benbya et al., 2021, 2024; Benbya and Melville, 2025). These systems often produce outputs or decisions that deviate from original intentions due to their adaptive nature and reliance on vast, sometimes biased, data sets. Notably, such technologies frequently operate within interconnected environments, generating feedback loops that amplify unintended effects—ranging from stakeholder alienation to increased regulatory scrutiny.

Additionally, it's essential to examine the outcomes of technology use to understand what actually happens when stakeholders interact with a given system. While direct outcomes—such as efficiency gains, usability challenges, or shifts in work practices—often serve as the most visible indicators of unintended consequences, they represent only part of a more complex picture. A comprehensive understanding requires exploring the dynamic interplay between stakeholders, the technology itself, and the broader context in which it is embedded (Trocin et al., 2024). These outcomes may include not only operational changes but also deeper social and cultural shifts. Importantly, the interplay between a technology's design and its contextual deployment can produce effects that diverge significantly from its original intentions underscoring the need for a nuanced and context-sensitive analysis.

Finally, it is crucial to assess the broader implications of technology to understand how consequences extend beyond their immediate impact. These implications may include delayed financial effects for organizations often arising from unintended consequences such as increased workload, shifts in job satisfaction, or broader societal effects such as increased digital surveillance. This aspect highlights the importance of considering equity and fairness when evaluating the broader effects of unintended consequences.

The subjectivity of intentions, the complexity of actions, and the diversity of affected stakeholders underscore the dynamic nature of technology. Unintended consequences are rarely static; they evolve as initial effects trigger feedback loops and adaptive responses. Adopting a temporal lens is essential for capturing how these unintended consequences emerge, evolve, and interact across varying contexts. By accounting for these evolving dynamics, researchers can develop more effective strategies to anticipate, mitigate, and leverage unintended outcomes—ultimately promoting a more nuanced and sustainable approach to technology implementation and its wider societal implications.

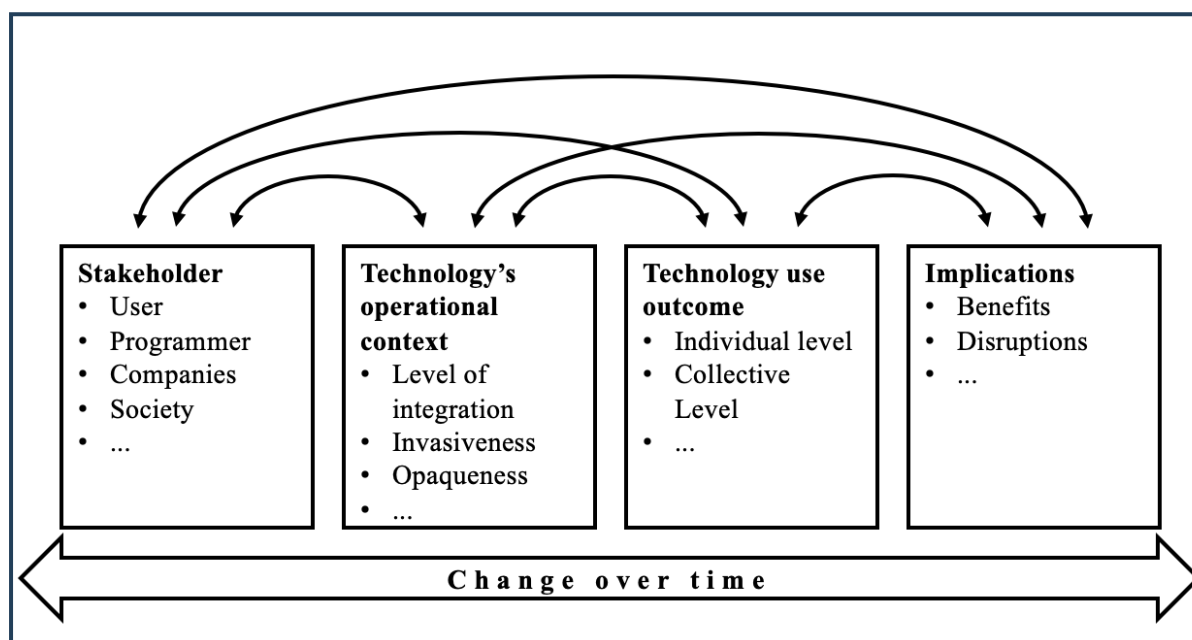


Figure 1. Temporal configuration of unintended consequences

To advance the study of unintended consequences, we identified three key areas of concern in the previous section: conceptual clarity, relational configurations, and temporal dynamics. These dimensions reveal critical blind spots in much of the existing literature, which often treats unintended consequences as isolated incidents—described in vague or ambiguous terms, and analyzed without attention to their evolution over time. Each area calls for deeper analytical engagement and reflexivity in how unintended consequences are identified, examined, and understood within sociotechnical systems.

To guide future researchers in investigating the nature and impact of unintended consequences, we provide a structured set of guiding questions that are not bound to any specific empirical context or theoretical tradition (Table 2). Rather than offering a prescriptive framework, these questions serve as a toolkit to help navigate the conceptual ambiguity that often surrounds unintended consequences. First, our questions facilitate cross-contextual comparisons by establishing a shared analytical vocabulary, allowing insights from one study to inform another, even across diverse organizational or technological settings. Second, our

Domain	Q #	Guiding Question	Description
<b>Conceptual clarity</b>			
	1	How is the term 'unintended' defined in the context under study?	Clarifies the meaning of the term and distinguishes it from related concepts such as unanticipated, accidental, or emergent effects.
	2	Is the observed outcome intended or unintended?	Differentiates between outcomes that were intended and unintended.
	3	Is the observed outcome anticipated or unanticipated?	Differentiates between outcomes that were foreseen and unforeseen.
	4	How can the consequence be described in terms of unexpected drawback, unexpected benefit, perverse result?	Challenges the presumption of harm and promotes exploration of diverse stakeholder perceptions.
	5	Is there conceptual overlap between the consequence and the response to it, and how can these be separated/integrated analytically?	Highlights the need to distinguish between the unintended effect itself, behaviors it triggers and potential revenge effects.
	6	What assumptions are embedded in the conceptual framing, and how do they shape what is recognized as unintended?	Encourages reflection on the theoretical lens used and its influence on identifying and categorizing outcomes.
<b>Relational configurations</b>			
	7	Who defines what is considered unintended?	Relates to the subjectivity of intention and highlights that unintendedness is not an objective attribute but shaped by actors' perspectives and interpretive frames.
	8	Which unintended consequences are visible from which viewpoint?	Engages with the positionality of observation, recognizing that consequences may appear differently depending on where and how one looks.
	9	Who defines the intentions that underpin the original purposive action?	Targets the foundational logic or rationale behind the original act, encouraging reflection on implicit beliefs that may shape both intentions and consequences.
	10	Whose intentions are (not) being realized?	Connects to actor heterogeneity, acknowledging that different actors (designers, users, managers) may have divergent or conflicting intentions in a shared system.
	11	How do different artifacts (actors, technologies, processes, systems) co-impact unintended consequences?	Relates to the relational configuration, moving beyond linear causality and towards understanding how networks of elements collectively produce outcomes.
	12	What power dynamics shape whose unintended consequences are prioritized or addressed?	Links to institutional and political dimensions, highlighting how responses to unintended consequences are influenced by structures of authority and influence.
	13	How do attempts to mitigate unintended consequences themselves generate further effects?	Reflects on recursive dynamics, encouraging attention to second order and cascading consequences.

Temporal configurations			
	15	How do initial outcomes trigger secondary or tertiary effects?	Focuses on cascading effects and feedback loops, where early consequences create new conditions that give rise to further unintended developments.
	16	Which unintended consequences are immediate, and which only become visible after extended use?	Differentiates between visible short-term disruptions and latent consequences that emerge gradually or in response to cumulative use.
	17	What mechanisms sustain or amplify unintended consequences over time?	Relates to feedback loops and path dependence, asking how certain outcomes persist or escalate rather than being corrected or absorbed.
	18	Which temporal dependencies are being considered when examining unintended consequences?	Clarifies whether the analysis captures pre-use expectations, immediate outcomes, delayed effects, or long-term implications, ensuring the full arc of the consequence is mapped.
	19	How do interactions between stakeholders evolve over time in shaping or responding to unintended consequences?	Highlights the dynamic and iterative nature of stakeholder relationships and how these interactions influence the development of consequences.
	20	What role does the technology's operational context play in shaping consequences over time?	Clarifies whether temporal development of unintended consequences relates to technological changes or changing organizational / social systems that potentially mediate / influence the emergence and persistence of the consequences.
	22	How are unintended consequences temporally distributed across stakeholder groups?	Examines whether certain actors are affected early while others encounter effects later, revealing asymmetries in the timeline of impact.

*Table 2. Guiding questions for exploring unintended consequences.*

questions support greater theoretical precision by encouraging authors to clarify core concepts, distinguish between related phenomena, and attend to the framing effects of their own analytical choices. Finally, our questions enable researchers to shift from post hoc descriptions of unexpected outcomes toward a more anticipatory and explanatory orientation. However, this set of questions should be viewed as a starting point rather than an exhaustive list. Emerging technologies (e.g., AI) and increasingly complex, non-standard social systems—such as platform-mediated work—may call for additional questions to be explored.

## 5 Conclusion

This provocation calls on IS researchers to critically revisit how we investigate unintended consequences. To support this effort, we present 22 guiding questions designed to help researchers and practitioners explore, anticipate, mitigate, and leverage unintended outcomes. These questions are grounded in a structured framework that offers a clear conceptual foundation for understanding unintended consequences, organized around three dimensions—unintended by whom, in relation to what, and unintended for whom—alongside their temporal dependencies. This framework enables a systematic examination of how unintended consequences emerge, the dynamics that shape them, and the stakeholders they affect. In doing so, this provocation contributes to a more nuanced and sustainable understanding of technology implementation and its broader implications.

From a practical standpoint, our work underscores the significant—and often overlooked risks—of unintended consequences in organizational decision-making. Once these risks are fully acknowledged, organizations can implement strategies to mitigate them across key phases, such as requirements gathering, agile development, and post-implementation monitoring. For instance, engaging a broad range of stakeholders—including those indirectly affected—can help surface potential issues early in the design process. Organizations can leverage tools such as scenario planning, impact mapping, and ethical assessments to identify possible downstream effects. This awareness can be integrated into the organization's learning culture through regular reflection, impact discussions, and maintenance of a dedicated ethics or risk backlog to monitor emerging concerns. Over time, building a repository of past challenges and fostering a culture of continuous learning and ethical reflection can support the development of more responsible and resilient systems.

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