

Reconceptualizing IT-enabled organizational transformation

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Abstract

Purpose – While organizations accomplish much of their work through executing organizational routines, the implementation of IT systems shapes and transforms organizations. The social constructivist perspectives – perception, interpretation, appropriation, enactment and alignment perspectives – provide a robust mechanism to study the social construction of IT implementation in IT-enabled organizational transformation (OT). Only a few studies have combined different social constructivist perspectives, while none have applied all five perspectives. This study applied the five social perspectives together to investigate the phenomenon of IT-enabled OT in a holistic and integrated manner.

Design/methodology/approach – Following the existing literature, we initially developed a framework to conceptualize IT-enabled OT as a cyclic process of the coevolution of organizational routines and an IT system. The framework integrates five social constructivist perspectives, suggesting that different perspectives focus on different implementation phases, and assumes an implicit sequence of applying the perspectives. We performed an interpretive case study and adopted a pluralist research approach to leverage the power of multiperspective inquiry by applying the proposed conceptual framework for a holistic investigation.

Findings – Extant literature on IT-enabled OT is based on a phase model of IT implementation, suggesting that the perception focuses on the adoption phase, the interpretation, appropriation and enactment perspectives focus on the use phase, and the alignment perspective focuses on the adaptation phase of a new IT system. This research challenges the distinction of five perspectives with focuses on certain phases, empirically demonstrating that all five perspectives are relevant during the entire implementation of an IT system, although with different weightings and emphases, which thus questions the understanding of IT implementation as a phased process.

Originality/value – The study proposes a theoretical framework to reconceptualize IT-enabled OT as a cyclic coevolution process of organizational routines and a new IT system, with the application of five social constructivist perspectives. The framework provides a holistic view of the coevolution process in a systematic manner by explaining how actors perceive, interpret, appropriate, enact and align a new IT system in their work routines, as well as how they align the new system and these routines with the social order and structures of the organization. Thus, this research challenges the existing phase model of the social construction of IT implementation and puts forward an alternative understanding of IT-enabled OT.

Keywords IT-enabled OT, IT artefact, IT implementation organizational change, Social constructivism, Perception, Interpretation, Appropriation, Enactment, Alignment

Paper type Research article

1. Introduction

The concept of IT-enabled organizational transformation (OT) describes substantial changes that occur to the work practices and structure of an organization during the implementation of a new IT system [1] (Orlikowski, 1996; Leonardi and Barley, 2010; Besson and Rowe, 2012; Hess *et al.*, 2020; Vial, 2019). The theoretical perspectives on IT-enabled OT have been classified into four paradigms (Orlikowski, 1996): planned change models, technological imperative, punctuated equilibrium models and social constructivist perspectives. Our research is positioned in the social constructivist paradigm as it considers actors' interactions



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within a continuous, cumulative, non-linear and emergent change process (Orlikowski, 1996; Leonardi and Barley, 2010). Emergent change is in particular relevant because unprecedented environmental, technological and organizational developments facilitate patterns of organizing, which cannot be prescribed by prior plans or intentions.

Information System (IS) scholars who study IT-enabled OT from constructivist perspectives generally hold that organizational change emerges from an ongoing stream of social actions in which actors respond to an IT system's affordances and constraints (Leonardi and Barley, 2010). Leonardi and Barley (2010) have approached IT-enabled OT from five social constructivist perspectives – perception, interpretation, appropriation, enactment and alignment – that focus on different phases of the implementation of a new IT system. However, only a few studies have combined some of the different social constructivist perspectives; no study has collectively applied all of them to examine the phenomenon of IT-enabled OT in a holistic manner (Orlikowski, 1996; Leonardi, 2007; Besson and Rowe, 2012).

Furthermore, most studies based on social constructivist perspectives are skewed toward studying social processes and ignore the evolution of the IT system in the implementation process (Leonardi and Barley, 2010). In order to address these challenges, we developed a conceptual framework that depicts IT-enabled OT as a coevolution process of organizational routines and a new IT system. The framework is grounded in the five social constructivist perspectives to investigate how actors perceive, interpret, appropriate, enact and align a new IT system with their organizational routines, and how they align the new system and these routines in their work with the social order and structures of the organization.

A qualitative interpretive case study was conducted in three organizational units of an academic institution, where data were gathered through participant observations and semi-structured interviews and further supplemented by a collection of secondary documentation and IT system artifacts. This resulted in a rich set of data reflecting the coevolution process of organizational routines and the new IT system as experienced by the employees and observed by the first author, who performed the investigation of the case organization. The application of a pluralist methodological approach enabled us to utilize the five-perspective conceptual framework for data analysis and interpretation of the study's empirical data.

The simultaneous application of the five social constructivist perspectives in our interpretive case study exposes a situated practice view on IT implementation by providing a holistic understanding of how IT-enabled OT unfolds in practice as a coevolution of organizational routines and a new IT system. This extends the IS literature on mutual shaping of routines and a new IT system by uncovering recursive interactions as mediated through perception, interpretation, appropriation, enactment and alignment. Our study also led to findings that challenge the existing understanding of IT-enabled OT as a phased process, in which the different perspectives focus on different implementation phases of an IT system. In contrast, we empirically demonstrate that all five social constructivist perspectives are at play during the entire implementation of an IT system and resulting IT-enabled OT without any implicit sequence. We thus put an alternative understanding forward and offer a number of propositions that result in a subtle yet significant change of the original framework. The revised framework provides a rich, nuanced and holistic account of IT-enabled OT, thus moving beyond the existing understanding of IT-enabled OT as a phased and sequential process.

2. Theoretical background

Concepts matter when positioning research. Therefore, the concept of IT-enabled OT deserves some introductory remarks. We defined it as describing substantial changes that occur to the work practices and structure of an organization during the implementation of an IT system. The concept has evolved over a long period of time (Besson and Rowe, 2012; vom Brocke *et al.*, 2021) and is currently controversially discussed in regard to what distinguishes it from the lately more popular concept of digital transformation (DT), see, e.g. the recent panels during

the European and the International Conference on Information Systems (Piccoli et al., 2024; Mosconi et al., 2024). However, neither a recent literature review of IT-enabled OT (vom Brocke et al., 2021) nor a recent editorial on the Frontiers in Digital Transformation Research (Wessel et al., 2025) and a problematization review of DT research clearly differentiate between the concepts (Ashrafi et al., 2025).

Discussing the concept of DT, Markus and Rowe (2023) speak of the DT conundrum, and Piccoli et al. (2024) even ask whether IS researchers have wasted the last decade of relabeling IT transformation research as DT. Vial (2019) defines DT as “a process that aims to improve an entity by triggering significant changes to its properties through combinations of information, computing, communication, and connectivity technologies.” Wessel et al. (2021) make a distinction between DT and IT-enabled OT and posit that DT leverages digital technology by (re)defining an organization’s value proposition that involves the emergence of a new organizational identity. They put forward that, in contrast, IT-enabled OT leverages digital technology by supporting the existing value proposition and enhancing an existing organizational identity. Following Wessel et al.’s (2021), our case organization underwent a process of IT-enabled OT through the coevolution of organizational routines and an IT system, and not a DT process, as no (re)definition of the organization’s value proposition and/or change of organizational (business) model and no emergence of a new organizational identity took place [2]. We thus place our study as part of the research stream that contributes to an understanding of IT-enabled OT.

2.1 Social constructivist perspectives on IT-enabled OT

As stated above, we position our research in the social constructivist paradigm and follow Leonardi and Barley (2010), who have approached IT-enabled OT from five social constructivist perspectives that explain the social construction of a newly implemented IT system: the perception, interpretation, appropriation, enactment and alignment perspectives. They argue that the five perspectives focus on different phases of the implementation of a new IT system and the accompanying transformation process, and distinguish an adoption, a use and an adaptation phase, and assume an implicit sequence of the application of the perspectives related to these phases. The five perspectives are summarized in Table 1.

Together, the five social constructivist perspectives provide a holistic and interconnected understanding of how OT unfolds through the implementation and use of a new IT system. The perception perspective focuses on the adoption phase and explains how shared attitudes, beliefs and values among organizational actors shape the initial adoption and acceptance of the new IT system (Vishwanath, 2006). Building on this, the interpretation perspective examines how actors draw upon existing assumptions, experiences and cognitive frames (Orlikowski and Gash, 1994) to make sense of the new IT system in unfamiliar work situations, often modifying prior understandings as the implementation progresses (Prasad, 1993, 1995;

Table 1. Social constructivist perspectives on OT

	Perception	Interpretation	Appropriation	Enactment	Alignment
Implementation phase of a new IT system	Adoption	Use	Use	Use	Adaptation
Social construction	Convergence of attitudes, beliefs and values	Transference of knowledge and modification of schemas	Emergence of patterns of deviations and conformity	Situated improvisations and evolution of work practices	Reconfiguration of roles and relationships

Source(s): Adapted from Leonardi and Barley (2010)

Yeow and Sia, 2008; Hsiao *et al.*, 2008). The appropriation perspective then focuses on how actors actively appropriate the new IT system in practice, highlighting that users may conform to or deviate from designers' intended uses by redefining system features and functionalities within their local work contexts (Leonardi and Barley, 2010). Extending this view, the enactment perspective emphasizes how recurrent interactions between actors and the new IT system give rise to evolving work practices, routines and emergent structures through situated human actions (Orlikowski, 1996, 2000). Finally, the alignment perspective focuses on the adaptation phase and examines how the use of the new IT system both shapes and is shaped by existing organizational structures, roles and relationships, leading to the reconfiguration of social and organizational order over time (Barley, 1990; Tyre and Orlikowski, 1994; DeSanctis and Poole, 1994; Sabherwal *et al.*, 2001). Collectively, these perspectives provide a comprehensive lens for understanding the recursive and socially constructed interactions between organizations and IT systems in the creation of new social and organizational realities, and thus are the foundation for our conceptual framework.

2.2 Conceptual framework for IT-enabled OT as a coevolution process

The second foundation of our study is laid by the perspective that organizations accomplish much of their work through executing organizational routines, where a routine is a repetitive, recognizable pattern of interdependent actions carried out by multiple actors (Feldman and Pentland, 2003; Pentland and Feldman, 2005). A routine is further conceptualized as consisting of two interacting parts: a routine's ostensive aspects represent its ideal or schematic form, its performative aspects capture specific actions, by specific people, at specific times and places. The concept provides a mechanism to study change in an organization by investigating how work practices evolve in an organizational routine (Nelson and Winter, 1982). IT systems are important to accomplish work in contemporary organizations (D'Adderio, 2011). They enable as well as constrain the performance of organizational routines. Enrolled as artifacts in the composition of an organizational routine, they play a fundamental role in its creation and evolution (Pentland and Feldman, 2008). On this background, we argue that IT systems are represented by and influence both the ostensive and the performative aspects of an organizational routine in a cyclic process.

D'Adderio (2011) argues that uncovering the reciprocal interactions between both aspects is key to understanding how routines and an IT system coevolve with each other in IT-enabled OT. The interactions between ostensive aspects of routines and an IT system are critical for an investigation to understand how working logics and abstract patterns of actions are inscribed into an IT system (Pentland and Feldman, 2005) and how the IT system shapes the ostensive and the performative aspects of an organizational routine. Studying the interactions between the performative aspects of routines and an IT system is critical to understanding how actors use the IT system when performing organizational routines and how an IT system shapes the performances of such routines (Pentland and Feldman, 2005).

A cyclic coevolution process of organizational routine and an IT system is triggered when a new IT system is deployed in an organization (Boudreau and Robey, 2005). When actors start to execute their work routines [3] with a new IT system, they share their experiences with their co-workers about the affordances and constraints of the IT system (Fulk *et al.*, 1995). During adoption, the actors are exposed to the attitudes and behaviors of their co-workers, which shape their individual perceptions about the features and functions of the newly implemented IT system (Fulk *et al.*, 1987). The perception of affordances and constraints leads actors to either change organizational routines or request modifications of the IT system. Research suggests that often it is the organizational routines that are changed because additional resources and efforts are required to modify, test and deploy changes to the new IT system (Leonardi, 2011).

Following this logic, organizational actors further employ interpretation, appropriation and enactment to modify their routines when they use and employ a new IT system in their work

(Leonardi and Barley, 2010). Through interpretation, the actors make sense of how to use a new IT system in their work routines (Orlikowski and Gash, 1994). They draw on past technological frames to understand and use the new IT system in ambiguous situations (Leonardi and Barley, 2010). Understanding the interpretation of a new IT system is important because it affects the ways through which a new IT system is appropriated and enacted in the routines.

During appropriation of a new IT system, the actors appropriate its features and functions through exercising human agency in various ways that are sometimes consistent and sometimes inconsistent with the intentions of the designers (Leonardi and Barley, 2010), and they may choose not to use the IT system or use it in ways that undermine its intended objectives. It is thus important to investigate why actors deviate from the original features and functions of an IT system and why they use it in an unanticipated manner in their routines. This is uncovered by the application of the enactment perspective.

In enactment, the actors employ an IT system in the process of accomplishing their work in the organization. The actors embed a new IT system in their work routines through planned as well as unplanned actions (Orlikowski, 1996). The actors execute planned actions with the help of a new IT system. Unexpected and emergent situations appear during the execution of planned actions, which are resolved through unplanned actions and situated improvisations. The appropriation and enactment of a new IT system occasion changes in the work routines, which, in turn, lead to (mis) alignments of the patterns of interactions among members of role sets in the organization (Barley, 1990). The new patterns of actions challenge the existing roles and relationships in the organization, and at this point, the social order and structure of the organization is at risk of change (Leonardi and Barley, 2010).

Figure 1 incorporates the five social constructivist perspectives and depicts our conceptual framework for understanding IT-enabled OT as a coevolution process of organizational routines and a new IT system that occurs over several coevolution cycles.

3. Research methodology

3.1 Case setting

We conducted an interpretive case study to investigate the implementation of an IT system, the Campus Management Solution (CMS), in a public sector university in Pakistan. The university consists of different schools for various academic disciplines, which are centrally managed through a Main Office (MO). Every school has its own head, called the Dean of the School. In every school, there are different academic departments. Each department has its own head, called the Head of the Department (HOD). The MO sets policies and regulations for all schools and ensures their implementation through coordination with the Deans of the schools. The MO consists of various administrative units including an Administration Section, a Finance Section, a Postgraduate (PG) Section, an Undergraduate (UG) Section, an Academic Section, a Registrar Office and an Information and Communication Technology (ICT) Section. Each Section is headed by a Director, with the Vice Chancellor as the head of the university. The project was initiated in 2012, and the CMS was deployed across all schools of the university in 2015. The implementation provided a valuable opportunity for examining IT-enabled OT over a five-year period from 2015 to 2020. The study was primarily conducted in one of the academic schools of the university, including its Program Office (PO), its Academics Departments of Finance, International Business & Marketing and HR & Management, and the school's Exam Section (ES).

The case study captures the implementation of a large-scale enterprise system in an organization characterized by multiple organizational units, interdependent working routines, legacy systems and centralized governance. It is also situated within the broader institutional context of Pakistan, which represents a distinctive and analytically valuable setting where traditional cultural values, bureaucratic administrative structures, high power distance, collectivist tendencies and rapidly evolving digitalization initiatives coexist and interact.

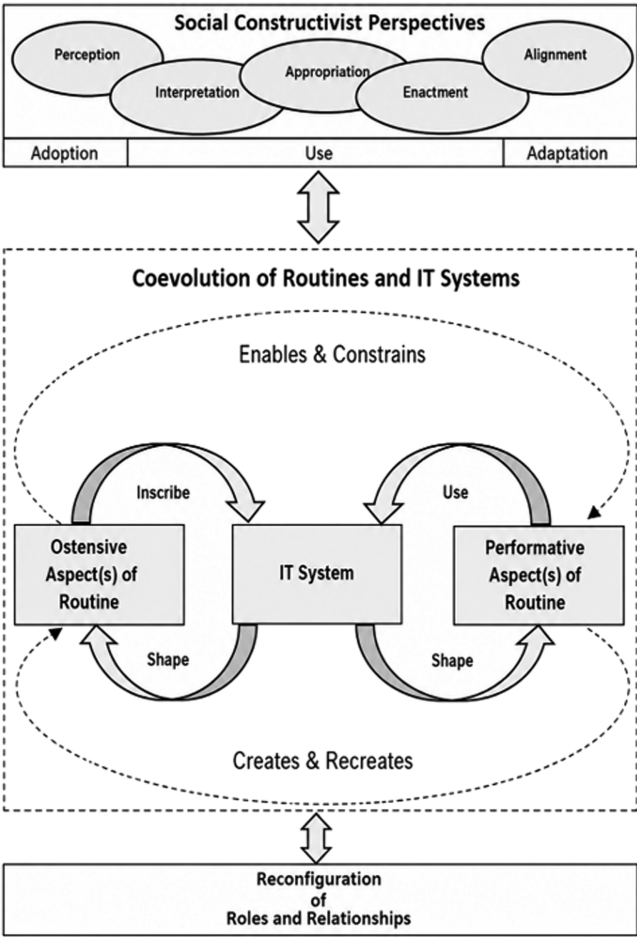


Figure 1. Framework for IT-enabled OT. Source: Authors' own work

These conditions shape organizational coordination, authority structures, knowledge sharing and employee behavior with a growing focus on leveraging and adaptation to emerging digital innovations, making the context particularly relevant for investigating the phenomenon of IT-enabled OT.

The case is not only contextually rich but also analytically interesting because the CMS was introduced to replace fragmented systems with an integrated Enterprise Resource Planning (ERP) based student information system covering the full student lifecycle. However, its implementation unfolded within important organizational and technological constraints, including limited end-user involvement, unresolved system issues, continued dependence on Excel and other legacy systems, restricted system access rights and centralized control of key functions of the new IT system. Rather than producing a smooth transition to standardized processes, the implementation generated ongoing tensions between centralized governance and local operational needs, requiring actors to engage in workarounds, repeated coordination practices, manual interventions and renegotiated alignments across organizational boundaries. This made the case further valuable for observing how actors perceived, interpreted, appropriated, enacted and aligned the new IT system within everyday organizational routines,

and how these situated interactions recursively reshaped routines, roles, responsibilities and interdepartmental relationships over time. The research led to the findings that are highly relevant to the implementation of enterprise systems, particularly those introduced into organizations characterized by established routines, centralized authority structures and complex cross-unit dependencies.

3.2 Data collection

Data collection was performed through participant observations, interviews and archival documents. Twenty-two participants were selected for observations and interviews from the school, and two participants were selected for interviews from the MO. [Appendix A](#) contains a list of participants who were involved in the data collection process. Approximately 100 h of participant observations were carried out, which provided a rich understanding of the issues and problems during the implementation of the CMS in the organization. Participant observations were carried out in two rounds: the first, a short round during the Summer Semester from July 11, 2019, to August 31, 2019; and the second, a comprehensive round covering the entire Fall Semester from September 1, 2019, to January 31, 2020. During this second round, the organizational routines of the PO, the academic departments and the ES were observed in detail. A further 16 interviews were conducted with participants from different organizational units to uncover their experiences with the IT system under investigation. The standard interview protocol is presented in [Appendix B](#), which was adjusted according to the role and the work routines of the interviewees ([Myers and Newman, 2007](#)). Approximately 110 sets of IT system artifacts and documents of 1,038 pages were collected to triangulate and validate the participant observations and interviews.

3.3 Data analysis

For data analysis and interpretation, we adopted a pluralist approach, which leverages the power of a multiperspective inquiry to confirm an existing theory or develop a new theory from data ([Müller et al., 2017, 2020](#)). Adopting a pluralist approach enabled us to apply the five social constructivist perspectives within the same empirical account for uncovering the coevolution of organizational routines and the CMS in the case organization ([Tashakkori and Teddlie, 1998](#)). Our pluralist methodology consisted of the following six steps: (1) development of a multiperspective conceptual framework, (2) preparation and coding of data, (3) creation of single perspective accounts, (4) creation of multiperspective accounts, (5) creation of theory fragments and (6) synthesis of a pluralist theory.

The conceptual framework (see [Figure 1](#)) guided both data collection and analysis. During data collection, the framework helped us to adjust the interview protocol and acted as a guide in conducting interviews. The framework was also helpful in participant observations and enabled us to identify and focus on relevant aspects of the organizational routines to investigate how actors were accomplishing work with the new IT system. The conceptual framework also played a significant role in guiding the data coding process. The initial coding scheme was derived from the conceptual framework to analyze and code data according to five social constructivist perspectives.

During data preparation, the collected data was transcribed and grouped into three categories: one for the PO; the second for the academic departments; and the third for the school's ES. NVivo 12 software was chosen as a data management tool to support the overall analysis process ([Bergin, 2011](#)). Then, the data were coded in an iterative process with four coding cycles as per an initial coding scheme as listed in [Appendix C](#), which had been derived from the initial conceptual framework. In the first cycle, data were coded to capture the ostensive and performative aspects of organizational routines in the school. In the second coding cycle, the five social constructivist perspectives were applied to code data according to the individual perspectives. For instance, the attitudes, beliefs and values of the actors about the CMS were coded as perception. In the third cycle, the data were coded with the individual

attributes of the social constructivist perspectives. During the execution of this cycle, new concepts and attributes appeared in the data, which led to the revision of the initial coding scheme. As a result of this coding process, in the fourth cycle, further concepts and attributes were included in the coding process. An example of the four data coding cycles is presented in [Appendix D](#).

Through analysis of the coded data, we identified six organizational routines. In the next section, as an exemplar, we focus on one of them, the Course Registration (CR) routine. We identified the CR routine by analyzing the data of the PO as we coded the (a) ostensive aspects and (b) performative aspects of organizational routines. In the process, we uncovered a number of actions that were executed by the Program Coordinator to register students in the courses for the forthcoming semester. These actions were repetitive, and there was a recognizable pattern of interdependent actions ([Feldman and Pentland, 2003](#)), which constitutes the CR routine (see [Appendix E](#)).

Once we identified the routines, the next step was to create five single-perspective empirical accounts for each routine based on the same data but analyzed through different theoretical perspectives ([Lee and Baskerville, 2003](#)). [Appendix F](#) presents the five single-perspective empirical accounts for the CR routine. We positioned the creation of the single-perspective accounts at the routine level to be able to examine the reciprocal interactions of organizational routines and the newly implemented IT system through the five perspectives.

Next, we created multiperspective empirical accounts for identified routines that synthesized their respective single-perspective accounts ([Lee and Baskerville, 2003](#)). On this basis, we developed one narrative for the coevolution of each identified organizational routine and the newly implemented IT system as a multiperspective account to explain our findings ([Langley, 1999](#)).

4. Analysis and findings

To support and illustrate our reconceptualization of IT-enabled OT during the implementation of an IT system, we now present our analysis and findings of the coevolution of the CR routine and the CMS.

The staff in the PO executed the CR routine to register students in the courses for the forthcoming semester. The coevolution of the routine and the CMS happened in five coevolution cycles. These coevolution cycles are graphically depicted in [Figure 2](#) where we have marked the concepts of the framework at play in those cycles in red. The analysis of the multiperspective narrative organized according to the coevolution cycles is presented below.

4.1 First cycle

In this cycle, the routine and the CMS coevolved during the adoption of the CMS. The CMS had a self-enrolment function, which enabled students to register in the courses for the forthcoming semester by themselves. PO staff perceived that the students were not responsible enough to correctly apply self-enrolment. They also perceived that the self-enrolment function was not aligned with an existing school class policy as they interpreted it. Prior to the CMS, the PO and the ES had manually implemented a policy in their work routine. As per the interpretation of the policy, ES staff equally distributed academically competent and weak students into different sections of a class. They provided lists of different class sections to PO staff, who then manually executed the enrolments. Based on past experience and knowledge, the actors interpreted the organizational policy and the situation to overcome the constraint and keep the new IT system aligned with the policy of the school. This led PO staff to create a new ostensive aspect for the routine where the actors set aside the inscribed self-enrolment CMS function and appropriated the new IT system in an unintended manner, with the Program Coordinator manually registering every student in the CMS. Enacting the CMS in this way (re) shaped the performance and execution of the routine, adding extra manual actions to the work

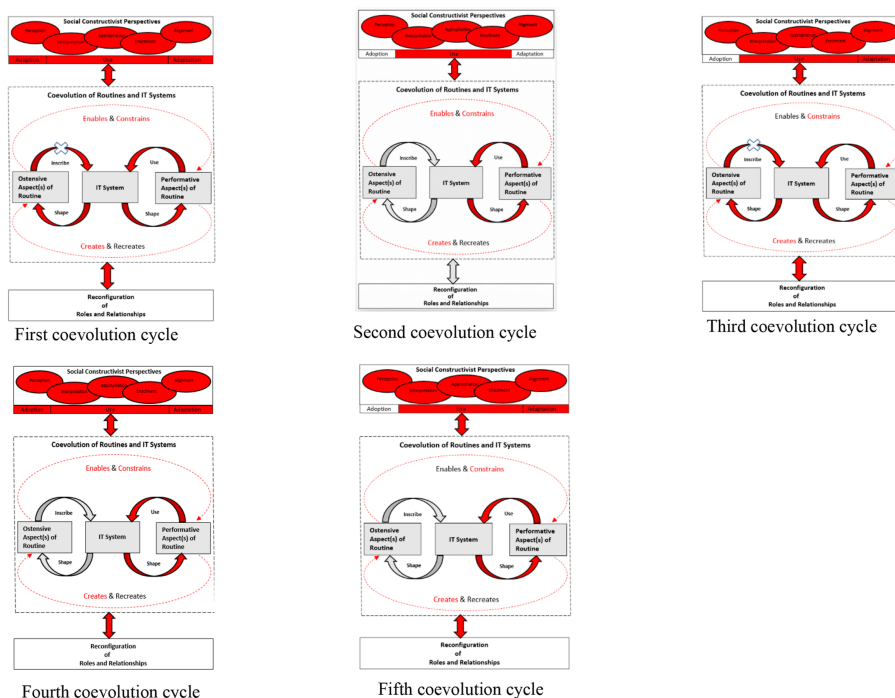


Figure 2. Coevolution of the CR routine and the CMS. Source: Authors' own work

of the actors in the PO. The adoption decision led to an alignment that (re)configured the actors' roles by shifting the CR workload back from the students to the PO.

4.2 Second cycle

In this cycle, the routine and the CMS coevolved during the use of the IT system when the prerequisite function was interpreted and appropriated in different ways for different academic programs, and when two program coordinators in the PO interacted differently with the CMS during routine execution. One trusted the CMS's prerequisite functionality and appropriated the CMS in the intended manner. The perception of the prerequisite function as an enabler (re) shaped the performance of the routine, relieving this coordinator from manual work. The other did not trust the CMS function and preferred manual checking. He interpreted the situation based on his past course enrolment experience and created a new ostensive aspect of the routine. Following the revised ostensive aspect, he appropriated the routine and the CMS in an unintended manner. He manually checked the prerequisite conditions against a study plan when enrolling a student rather than configuring and using the prerequisite CMS function. When enacting the routine, he maintained the course enrolment records in an Excel sheet alongside the CMS, aligning them with his work routine. The difference in perceptions and interpretations led these actors to appropriate and enact the new IT system in different ways, (re)shaping the performance and execution of the routine.

4.3 Third cycle

In this cycle, PO staff perceived that sufficient CMS rights had not been granted to them, which hindered the performance of the routine. Based on their past experience, the actors interpreted

the situation and considered the CMS rights' distribution as constraining. Insufficient system rights led PO staff to approach different MO sections to resolve issues that appeared during routine execution. Appropriating the CMS in this way created new action patterns, which included postponing course enrolment, email exchanges with the MO and sending reminders. This led PO staff to request more CMS rights to smoothly enact the new IT system in their work. However, the requested rights were not inscribed in the system because MO staff interpreted the existing CMS rights' distribution as appropriate and necessary to control the PO operations. This led PO staff to adapt the use of the CMS to the existing CMS rights' distribution between the PO and the MO. As an alignment, the coevolution of the routine and the CMS created new relationships between the PO and the MO, where staff in the PO were required to coordinate with the staff in the MO when accomplishing their work with the CMS.

4.4 Fourth cycle

In this cycle, during use, a CMS issue was revealed where a student course enrolment was skipped due to an active semester deferment tag on that student's system record. MO staff did not update deferment tags in the CMS in a timely manner, which misaligned the routine with the IT system. According to the routine's ostensive aspects, it was MO responsibility to deactivate the deferment tags before semester start. Analyzing the routine's performative aspects uncovers that such tags were still active in the system. PO, ES and MO staff had perceived and subsequently interpreted the situation differently. MO staff preferred to apply and remove deferment tags manually in the CMS, while the PO and ES advised that an automatic CMS function was to be used for such tasks. MO staff did not agree with the other offices and continued to apply the manual mechanism for (de)activating CMS deferment tags. Due to the difference in interpretations, MO staff appropriated the CMS in a manner that created problems during the routine execution for the other offices, which had to coordinate with each other to investigate and resolve such problems. Enacting the CMS in this way added additional manual actions to the routine. It (re)shaped routine performance and, as an alignment, established a new relationship between the PO and the ES.

4.5 Fifth cycle

In this cycle, a HOD perceived that some course names were not according to the approved nomenclature and advised the PO to correct this before enrolling students. PO staff were unable to edit course names in the CMS due to unavailable CMS rights. Based on their past experience, PO staff interpreted the situation and created a new ostensive aspect of the routine to cope with the CMS rights constraints. Following the revised ostensive aspect, the Program Coordinator postponed student enrolments until a course name was corrected by the MO's Academic Section. She sent an email to the Section with a request to edit and change the name. Sometimes she had to send repeated requests and reminders to the Section to handle such situations. Academic Section staff did not update course data on time and were not aware that the way they appropriated the CMS impacted its appropriation and subsequent enactment in use in the PO. The Program Coordinator executed the routine once the AS had edited the course name in question in the CMS. Enacting the routine and the CMS in this way (re)shaped the performance of the routine, involving additional manual actions to the actors' work in the PO. As an alignment, the coevolution of the routine and the CMS created a new relationship between the PO and the Academic Section, where PO staff coordinated with Academic Section staff to update data on existing courses in the CMS.

4.6 Summary of the findings

Across the five empirical cycles, the findings demonstrate that IT-enabled OT unfolds through recursive and situated coevolutionary interactions between the organizational routine and the new IT system mediated by perception, interpretation, appropriation, enactment and

alignment, rather than through sequential implementation phases. A summary of our findings is presented in [Table 2](#).

4.7 Propositions derived from the study

Our analysis of the empirical data and findings based on the application of the proposed framework challenges the assumptions underlying the original framework and leads us to a number of propositions with regard to the application of the five social constructivist perspectives to understand IT-enabled OT. They are summarized in [Table 3](#) and will be discussed in the next section.

5. Discussion and contributions

In the following, we discuss our findings, including the mechanisms that trigger IT-enabled OT (see [Figure 2](#)) and the propositions regarding the mechanisms, which we derived from the study. Furthermore, we will examine our contributions in particular with regard to the original distinction of the IT implementation and IT-enabled OT processes in three phases. This will include our reflections on their differing treatment regarding the application of the five social constructivist perspectives and their restriction to certain phases.

5.1 Untangling the coevolution process of organizational routines and a new IT system through the application of five social constructivist perspectives

Our research answers the call of [Pentland and Feldman \(2005, 2008\)](#) and [D'adderio \(2008, 2011\)](#) to untangle the interactions between different aspects of organizational routines and a new IT system to understand how routines and the new IT system coevolve and how change unfolds in the implementing organization. Our interpretive case study reveals the reciprocal interactions between ostensive aspects of routines, performative aspects of routines and the new IT system through the application of the five social constructivist perspectives that result in IT-enabled OT.

The perception perspective uncovers actors' perceptions when they start executing their work routines with a new IT system. Following [Leonardi \(2011\)](#), we show that these perceptions create a space of opportunity or frustration in which people (re)create ostensive aspects of their routines and that the perception of affordances leads actors to modify and adjust the performative aspects of routines to fully exploit a new IT system's features and functions in their work. The perception of constraints may lead actors to request modifications of the IT system by inscribing revised features and functions into the system. However, the requested features and functions are not always inscribed into the IT system, which leads actors to (re)create new ostensive aspects of their routines (see Cycle three). Following the revised ostensive aspects, actors may resolve the constraints through the performance of additional manual actions. In some situations, actors do not use the constraining function of the new IT system and manage part of the routine in a shadow IT system (see Cycle two), which impacts both the ostensive and performative aspects of the routines and ultimately may increase the workload in the organization ([Berente and Yoo, 2012](#)). Perceptions trigger the coevolution process, which is further mediated by the way the new IT system is interpreted in the work routines.

The interpretation perspective uncovers the transfer of knowledge and/or modification of previously held frames when people make sense of and execute their routines with a new IT system ([Hsiao et al., 2008](#)). Due to incongruent technological frames, an IT system's features and functions may be interpreted differently by different occupational groups and organizational units. Our study provides evidence (see Cycles two and four) of how this impacts the ostensive and performative aspects of routines and leads actors to use the new IT system in different ways, which may add additional manual actions to their routines. Actors' situated perceptions and interpretations drive diverse appropriations of an IT system, which in

Table 2. Coevolutionary cycles of organizational routines and the new IT system mediated through five social constructivist perspectives

Empirical cycle	Triggering event	Coevolutionary outcome	Coevolutionary dynamics mediated through five social constructivist perspectives
First cycle	Actors perceived the self-enrolment functionality of the CMS as misaligned with existing organizational policies and interpreted its use as conflicting with established administrative responsibilities	Initial role reconfiguration and negotiated alignment between organizational routines and the new IT system	Actors' situated <i>perceptions</i> and subsequent <i>interpretations</i> of the new IT system led to unintended <i>appropriations</i> that bypassed the inscribed self-enrolment functionality. Through <i>enactment</i> , these <i>appropriations</i> recursively (re) shaped both the ostensive and performative aspects of the routine, reconfigured organizational roles and relationships and produced negotiated <i>alignments</i> between the organizational routines and the new IT system
Second cycle	Actors perceived the CMS prerequisite functionality differently and interpreted prior routine experiences in conflicting ways during routine execution	Emergence of parallel work practices and localized alignments between the organizational routine and the new IT system	Difference in <i>perceptions</i> and <i>interpretations</i> of a CMS functionality produced competing <i>appropriations</i> during routine execution. Through <i>enactment</i> , these <i>appropriations</i> recursively reshaped the ostensive and performative aspects of the routine by generating parallel work practices (using shadow systems like Excel), localized adjustments and <i>alignments</i> between the organizational routines and the new IT system
Third cycle	Actors interpreted the CMS's access rights and existing control structures incoherently across different organizational roles	Negotiated coordination practices and new relational patterns through adaptive appropriation	Incongruent <i>interpretations</i> of control and operational flexibility across different organizational roles triggered adaptive <i>appropriations</i> of the new IT system. Through <i>enactment</i> , these <i>appropriations</i> recursively reshaped both the ostensive and performative aspects of the routine by producing negotiated coordination practices, new relational patterns and provisional <i>alignments</i> between the routines and the new IT system

(continued)

Table 2. Continued

Empirical cycle	Triggering event	Coevolutionary outcome	Coevolutionary dynamics mediated through five social constructivist perspectives
Fourth cycle	Differing perceptions and interpretations of a CMS functionality across organizational contexts generated coordination breakdowns and cross-context misalignments during routine execution	Cross-context misalignment and renegotiated interdepartmental coordination	Difference in <i>perceptions</i> and <i>interpretations</i> of the semester tag functionality led to divergent <i>appropriations</i> across different organizational contexts. During <i>enactment</i> , these <i>appropriations</i> dynamically transformed routine execution through additional manual actions, coordination practices and evolving interdepartmental relationships. The resulting (mis) <i>alignments</i> triggered further recursive adjustments between the organizational routines and the new IT system
Fifth cycle	The way CMS was appropriated in one organizational context recursively (re)shaped its social constructions (perception, interpretation, appropriation, enactment and alignment) in other contexts	Emergence of recursive cross-unit dependencies and renegotiated interdepartmental coordination between organizational routines and the new IT system	Delayed updating of course data by the MO constrained the execution of routines in the PO. The way CMS was <i>appropriated</i> in one organizational unit recursively (re)shaped its <i>appropriation</i> and subsequent <i>enactment</i> in other units. This led to postponements, repeated coordination requests, manual interventions and evolving interdepartmental relationships. These recursive dependencies and emerging patterns of actions (re)shaped routine execution and produced negotiated <i>alignments</i> between organizational routines and the new IT system

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turn reshape routine performance and reconfigure roles and relationships in the implementing organization. Our findings demonstrate how two program coordinators interpreted the CMS's prerequisite functionality differently: one trusted and used it as intended, while the other, based on prior experience, manually checked prerequisites and maintained parallel records (see Cycle two). The differing interpretations and subsequent appropriations led to distinct enactments, demonstrating how individual agency and technological frames drive divergent change paths in the coevolutionary process. These variations create recursive feedback loops between actors' interpretations, IT system use and routine performance.

In appropriation, the actors repurpose the features and functions of a new IT system, whereas in enactment, they embed the new IT system in their work routines through planned as well as unplanned actions (Orlikowski, 1996). Our study demonstrates that appropriation and

Table 3. Original framework and propositions derived from the study

Perspectives	Assumptions underlying the original framework	Propositions derived from the study
The perception perspective	• focuses on the adoption phase and investigates the convergence of attitudes, values and beliefs	• is applicable to uncover attitudes, beliefs and values <i>during the whole IT implementation and coevolution process</i>
The interpretation perspective	• focuses on the use phase and investigates the transfer or modification of schemas when actors interpret the features and functions of an IT system • uncovers the differences in interpretation between designers and users	• is applicable to uncover transfer or modification of schemas <i>during the whole IT implementation and coevolution process</i>, where <i>actors also interpret organizational policies and the authority structure of an organization</i>
The appropriation perspective	• focuses on the use phase and investigates whether the actors use the features and functions of an IT system as it was designed and intended by the designers	• is applicable to uncover patterns of deviations and conformity <i>during the whole IT implementation and coevolution process</i>, where <i>actors also appropriate organizational policies and roles</i>
The enactment perspective	• focuses on the use phase and investigates the evolution of work practices when actors actually employ an IT system in their work	• is applicable to uncover the evolution of work practices <i>during the whole IT implementation and coevolution process</i>
The alignment perspective	• focuses on the adaptation phase and investigates how the implementation of an IT system (re)configures roles and relationships in an organization	• is applicable to uncover reconfiguration of roles and relationships <i>during the whole IT implementation and coevolution process</i> • can be applied to uncover <i>the alignment of an IT system with organizational policies</i> • can also uncover <i>the alignment of an IT system with different aspects of a routine as well as across routines in different organizational units</i>
The sequence of applying the perspectives	• The framework assumes an implicit sequence (from perception to alignment) of the application of five social constructivist perspectives	• <i>The prescribed sequence of the perspectives' application is not productive</i>, as the five perspectives are of limited support when applied in a linear fashion, but they should rather be applied as <i>a roadmap</i> to gain a holistic understanding of the coevolution process

Source(s): Authors' own work

enactment are intertwined ongoing processes, with actors experimenting, improvising and adjusting the new IT system to fit local needs. The new IT system may be deficient to meet actors' requirements, or its features and functions may constrain the execution of the routines. Our study (see Cycles one and two) shows that in such situations, actors (re)create new ostensive aspects of the routines and enact the new IT system in unintended manners. During enactment, breakdowns and misalignments often surface, revealing further gaps between intended and actual use of the new IT system. This triggers further interpretation and prompts additional cycles of appropriation, enactment and alignment, thus creating recursive feedback loops to drive the coevolution process. For instance, the staff in the PO were unable to edit

course names in the new IT system due to limited IT system's rights (see Cycle five). To resolve the situation, the PO staff carried out repeated coordination with the Academic Section, adding manual steps to the work routine and creating new patterns of interactions and relationships between departments.

The alignment between organizational routines and a new IT system is not a static end-state; rather, it is a continuous dynamic process of ongoing negotiation and adaptation. As actors encounter constraints like policy conflicts, structure or data mismatch, lack of IT system rights, they engage in new patterns of interactions within or across the boundaries of organizational units to keep the new IT system aligned in their work routines (see Cycles one, four and five). The new patterns of interactions redistribute workload, modify existing roles and establish new relationships between organizational units, leading to a new social order in the organization. Our findings show that during the CMS adoption, PO staff perceived the self-enrolment functionality as misaligned with an existing school's policy (see Cycle one). Drawing on past experience, they interpreted the situation and appropriated the CMS in an unintended manner by manually registering students instead of letting them use the self-enrolment function. Enacting the CMS in this way (re)shaped the routine performance and also shifted the registration workload back to the staff, thus (re)aligning roles and relationships in the PO. These findings also demonstrate that misalignments impact adoption decisions, which then affect roles and relationships in the organization.

During design time, roles and IT system's rights as ostensive aspects of routines are inscribed into a new IT system to designate who can access and execute the work routines with the new IT system (Volkoff *et al.*, 2007). As soon as a new IT system is deployed, it disrupts the existing social order and introduces new roles and relationships in an organization (Barley, 1986; Berente *et al.*, 2016). The scope of work of some actors or organizational units is widened while others are restricted (Volkoff *et al.*, 2007). Such adaptation is evident in our study (see Cycles three, four and five) where the MO was granted full control and limited user rights were granted to the PO in the investigated school. Our findings show that the deployment of the new IT system led to centralized authority in the case organization, as editing course records in the system and semester deferment tag control were shifted from the school to the MO. This limited the local agency and created further dependencies among organizational units. It also led to perceptions of constraint, increased manual work and reduced willingness to adopt or fully utilize the functionalities of a new IT system (see Cycles three, four and five). Thus, adaptation choices of a new IT system either facilitate or hinder full adoption and effective use of a new IT system.

The application of all five social constructivist perspectives together helped us to uncover the reciprocal interactions between organizational routines and a new IT system in a holistic and integrated manner. This advances the IS literature on the coevolution of organizational routines and IT systems (Volkoff *et al.*, 2007; D'Adderio, 2011; Goh *et al.*, 2011; Berente *et al.*, 2016) and explains how, through such interactions, both routines, their ostensive and performative aspects, and IT systems coevolve during the implementation process.

5.2 Challenging IT implementation as a phased and sequential process

The existing social constructivist literature on IT implementation and related IT-enabled OT assumes an implicit sequence of the application of the five social constructivist perspectives. This assumption is explicated by Leonardi and Barley (2010) as a result of their literature review on IT-enabled OT where they reveal that "the literature suggests an implicit sequences of processes, phenomena, and levels of analysis in the social construction of technology implementation," but also underline that "assessing the veracity of this latent pattern awaits study" (Leonardi and Barley, 2010, pp. 31–32).

Our study assesses the veracity of this assumption. It challenges the validity of the alleged latent pattern and, through the analysis of the identified coevolution cycles of the CR routine and the new IT systems in our case organization, empirically demonstrates that the sequence of

the application of the perspectives is not always cogent. We show that the five perspectives do not have to be applied according to a particular sequence or need to be focused on a particular phase in the implementation process and the accompanying IT-enabled OT: all five perspectives are relevant during the entire process but with various weightings and different emphases, not in a fixed or set order. This outcome of our study questions the understanding of IT implementation and IT-enabled OT strictly as a phased and sequential process.

The original framework suggests that the perception perspective focuses on adoption. Our findings suggest that the interpretation, appropriation and enactment perspectives are also applicable and equally helpful when actors adopt a new IT system in their work routines.

In the initial stage of an IT system implementation, the actors perceive the IT system and interpret different situations based on their past experience – they often share their experiences with co-workers about affordances and constraints (Fulk *et al.*, 1995) – to make sense of the new IT system in their routines. Actors are exposed to attitudes and behaviors of co-workers, which shape their individual receptions and lead them to make an adoption decision to use the new IT system in a certain way in their work. The social construction of the new IT system occurs through the convergence of attitudes, values and beliefs, leading actors to make an adoption decision for appropriating and enacting the new IT system in a certain way (Fulk *et al.*, 1987). In this process (see Cycles one and two), in our case, organization actors use and develop further understanding of the features and functions of the new IT system through in-depth interactions with the IT system, which modify existing schemas of the actors and redefine their interpretations, which consequently (re)shape their perceptions (Leonardi, 2009). This leads actors to make further adoption decisions for appropriating and enacting the new IT system in a different way. As put forward by Boudreau and Robey (2005), our study also shows that adoption and use of a new IT system occur simultaneously, when actors perceive, interpret, appropriate and enact a new IT system during the execution of their work routines and that the perception and interpretation perspectives cannot be confined to either the adoption or to the use of an IT system in its implementation process.

Our research further reveals that it is not just perception, interpretation, appropriation and enactment practices that lead actors to adopt a new IT system in a certain way. Rather, actors set aside a function and adopt a new IT system in an unintended manner when the new IT system cannot be aligned with an organizational policy as a structure of the implementing organization (see Cycle one). Other misalignments, such as the handling of the deferment tag in the case organization (see Cycle four), may emerge when actors use the IT system in their work routines and eventually impact the coevolution process and thus any resulting IT-enabled OT.

We also find that the implicit sequencing of phenomena from perception to interpretation does not always take place, and that the social construction processes are not confined to specific phases. This is in line with Lau and Woodman (1995), who argue that actors form a specific attitude toward a change based on a cognitive understanding guided by their modified schema. In our study (see Cycle two), an actor, in contrast to a co-worker, replicated his past practices when applying Excel alongside the CMS. This supports Orlikowski and Yates (1994), who argue that the same employee group may use the same IT system differently at different points in time. This also demonstrates that the formation and modification of schemas may happen before the construction and convergence of attitudes, values and beliefs among potential actors. Applying the perception perspective at all times before the interpretation perspective may thus not be a productive way for understanding and explaining the coevolution process of organizational routines and the new IT system. It is important to note that the evolution of routines is not only occasioned by the appropriation and enactment of a new IT system during use but that routines may already begin to evolve when actors adopt a new IT system in their routines.

The original framework and the literature argue that the alignment perspective uncovers the social construction of a new IT system during adaptation (Tyre and Orlikowski, 1994; Sabherwal *et al.*, 2001). This perspective reveals how pre-existing, entrenched social structures shape an IT system's use, how the use of an IT system alters existing roles and

relationships in an organization (Barley, 1990), and how these changes lead actors to adapt. However, our analysis of the coevolution cycles shows that the alignment perspective can also be productively applied when actors adopt (see Cycle one, the structural reason we uncovered there led the actors to reject a function and to appropriate the new IT system in a certain way to keep it aligned with an existing policy in the organization) and use (see Cycle four) a new IT system. Conversely, the other perspectives are also helpful to uncover the reconfiguration of roles and relationships and when actors adapt a new IT system in their routines (for the latter, see in particular Cycles three, four and five). Our research suggests that all five social constructive perspectives are at play when actors adjust their roles and relationships during the execution of routines with a new IT system. Moreover, the analysis of all five coevolution cycles in the case organization suggests that the focus of each social constructivist perspective can be related to and integrated with the others. This integration is useful for understanding and explaining the coevolution of routines and an IT system.

Our study demonstrates that all five social constructivist perspectives are applicable and equally helpful when actors adopt, use and adapt a new IT system in their work routines. This extends the IS literature on IT-enabled OT and goes beyond mutual (re)shaping of routines and IT systems (Orlikowski, 1996; Leonardi, 2007; Volkoff *et al.*, 2007; D’Adderio, 2011; Goh *et al.*, 2011; Berente *et al.*, 2016) by uncovering the coevolution process in a systematic manner to explain how actors perceive, interpret, appropriate, enact and align a new IT system and organizational routines in their work, as well as how they align the new system and these routines with the social order and structures of the organization.

5.3 Revised framework for IT-enabled OT

Our study results suggest a revision of the original framework. Based on our findings, the propositions we offer and the above discussion, we thus present a revised framework in Figure 3 to reconceptualize IT-enabled OT.

This framework is still based on an integration of the five social constructivist perspectives, but the concept of implementation phases, including the explicit designation of an adoption, a use and an adaptation phase and their explicit link to certain perspectives, has been eliminated with a less restricted, wider application for explaining and understanding the coevolution of organizational routines and IT systems. The framework conceptualizes the coevolution process as a series of interaction loops between the ostensive and performative aspects of routines and the new IT system. As actors perceive and interpret the features and functionalities of a new IT system, they appropriate and enact these features in ways that may deviate from designers’ intentions. These enactments, in turn, reshape both the routines by altering their ostensive and performative aspects and the new IT system through requests for changes or workarounds. This creates new alignments or misalignments that prompt further cycles of perception, interpretation, appropriation and enactment. The dynamic emergent coevolution process is characterized by feedback loops, situated work practices and the reconfiguration of roles and relationships that lead to continuous OT.

The five perspectives serve as mediating mechanisms for investigating and comprehending the coevolution of organizational routines and the new IT system. For instance, they help to uncover how actors’ situated perceptions and interpretations of a new IT system drive diverse appropriations and enactments, which in turn reshape routines, roles and relationships in the implementing organization. Appropriation is not understood as a one-off event but as an ongoing process, with actors experimenting, improvising and adjusting the new IT system to fit local needs. Enactment is also appreciated as a continuous process, which involves the actual performance of organizational routines with the new IT system. During enactment, breakdowns and misalignments often surface, revealing further gaps between intended and actual use of the new IT system. Resolving misalignment issues triggers further interpretation and sensemaking and prompts additional cycles of enactment and alignment, creating a

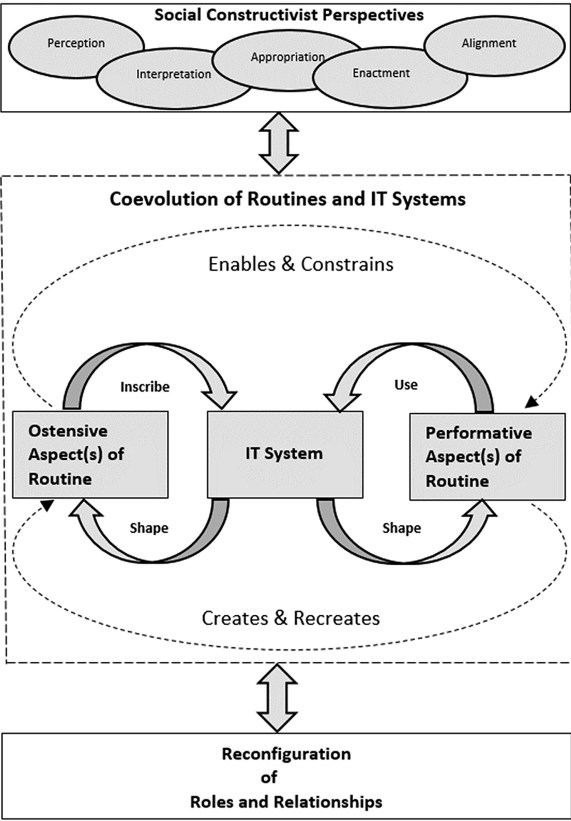


Figure 3. Framework for IT-enabled OT. Source: Authors' own work

recursive feedback loop. Alignment is not a stable endpoint, but rather a dynamic process of adjustment between organizational routines and the new IT system. It is an ongoing negotiation to align the new IT system with the social order, policies and structures of the organization. Alignment issues and challenges emerge not only during adaptation but also appear during adoption and use of a new IT system.

Our proposed framework exposes a situated practice perspective on IT implementation by providing a holistic understanding of how IT-enabled OT unfolds as a coevolution of organizational routines and a new IT system. The findings of our interpretive case study illustrate how this framework moves beyond mutual shaping of routines and an IT system by revealing recursive interactions and situated feedback loops – mediated by perception, interpretation, appropriation, enactment and alignment – that drive the ongoing transformation of both routines and IT systems in organizations. The integrated, five-perspective framework provides a rich, nuanced and holistic account of IT-enabled OT, thus moving beyond the existing understanding of IT-enabled OT as a phased and sequential process. To this end, [Table 4](#) provides a brief comparison between our coevolutionary framework and [Leonardi and Barley's \(2010\)](#) phase model on the application of five social constructivist perspectives for understanding IT-enabled OT.

Table 4. Comparison between our proposed coevolutionary framework and [Leonardi and Barley's \(2010\)](#) phased model on IT-enabled OT

Social constructivist perspectives	Leonardi and Barley's (2010) phase model	Our proposed coevolutionary framework
Perception	is the initial trigger for change and primarily occurs during adoption of a new IT system	occurs throughout the implementation of a new IT system, including what traditionally has been distinguished as adoption, use and adaptation
Interpretation	focused during use, interpretation helps actors make sense of new systems post-adoption	occurs throughout the entire IT implementation process as actors (re) interpret the new IT system in response to new affordances and constraints
Appropriation	is linked to a use phase, where actors repurpose IT in an unpredictable manner	is an ongoing process where actors experiment with and adjust the new IT system locally through the entire IT implementation process
Enactment	is linked to a use phase where actors employ the new IT system in their work routines	is an ongoing recursive process, routines and IT coevolving throughout the entire IT implementation process; breakdowns and misalignments often surface, which trigger further cycles of sensemaking, appropriation, enactment and alignment, creating a recursive feedback loop
Alignment	is the last stage of IT implementation, primarily achieved during an adaptation phase of IT implementation	is an ongoing dynamic process to adjust the new IT system with the organizational routines, the social order and structures of the organization
The sequence of applying the perspectives	The framework assumes an implicit sequence (from perception to alignment) of the application of five social constructivist perspectives for understanding IT-enabled OT	The framework applies the five social constructivist perspectives as a roadmap to gain a holistic understanding of IT-enabled OT

Source(s): Authors' own work

6. Conclusion

In this research, we originally proposed a framework that is based on a phase model of the social construction of IT implementation ([Leonardi and Barley, 2010](#)) to understand IT-enabled OT as a cyclic process of the coevolution of organizational routines and IT systems during the implementation of a new IT system. The framework integrated five social constructivist perspectives and suggested that different social perspectives focus on different implementation phases. It also assumed an implicit sequence of the application of the perspectives. Our interpretive study, however, demonstrates that all five perspectives are at play during the entire IT implementation process. We found that the original distinction of a set of phases accompanied by different perspectives with various foci and an assumed implicit sequence of application is not productive in investigating and analyzing the coevolution of routines and IT systems during IT implementation to understand IT-enabled OT. The findings of our study show that all five social constructivist perspectives are applicable and equally helpful when actors adopt, use and adapt a new IT system in their work routines.

As a consequence, we revised the proposed framework. It continues to rely on the social constructivist perspectives, but with a less restricted, wider application of the theoretical perspectives for explaining and understanding the coevolution of organizational routines and IT systems that result in IT-enabled OT. The revised framework offers a robust, process-oriented theory of organizational change, one that captures the complexity, dynamism and recursive nature of IT-enabled OT. The coevolution of organizational routines and IT systems,

as mediated by the five social constructivist perspectives, is driven by actors' continuous perception, interpretation and appropriation of the IT system, enacted in practice and iteratively aligned with an organization's social order and its organizational structures. The dynamic coevolution process is characterized by feedback loops, situated work practices and the reconfiguration of roles and relationships that lead to continuous OT. Thus, our research answers the call of [Pentland and Feldman \(2005, 2008\)](#) and [D'adderio \(2008, 2011\)](#) to uncover the interactions between different aspects of organizational routines and a new IT system to understand how routines and the new IT system coevolve and how change unfolds in the implementing organization.

The simultaneous application of all five social constructivist perspectives helped us to uncover the reciprocal interactions between organizational routines and a new IT system in a holistic manner. This advances the IS literature on the coevolution of organizational routines and IT systems and explains how, through such interactions, both the routines and IT systems coevolve during the implementation process. This goes beyond mutual (re)shaping of routines and a new IT system ([Orlikowski, 1996](#); [Leonardi, 2007](#); [Volkoff et al., 2007](#); [D'Adderio, 2011](#); [Goh et al., 2011](#); [Berente et al., 2016](#)) by uncovering recursive coevolutionary dynamics mediated through the application of social constructivist perspectives.

Our work contributes to practice by offering practitioners a way to design and manage IT-enabled OT as an evolving socio-technical journey rather than a sequential implementation process. The framework supports managers in planning for how organizational routines and a new IT system both coevolve and develop together during adoption, use and adaptation. By decomposing IT-enabled OT into perception, interpretation, appropriation, enactment and alignment, the framework can be translated into a diagnostic tool that can guide managerial inquiry. For instance, such an inquiry would include questions regarding how actors' perceptions and interpretations of a new IT system and their organizational routines impact their diverse appropriations and enactments, and how this reshapes routines, roles and relationships in the implementing organization. Posing and answering these questions can serve as a checklist to assess the progress of IT implementation and to investigate where the bottlenecks are and what kind of managerial intervention is required. This will enable managers to establish appropriate communication and training to support OT during the implementation of a new IT system.

Naturally, our study has some limitations that offer opportunities for future research. We focused on one academic school, and data were primarily collected from its three organizational units. Future research should study and collect data from multiple sites of a case organization to further develop the framework. Furthermore, the research was conducted in a hierarchical, bureaucratic and centralized organization, where its structure had a strong influence on the coevolution process; we suggest that future research applies the framework to study less hierarchical organizational environments. Second possible limitation is that the study investigated the coevolution process first from the time when the new IT system had been organizationally implemented, neglecting any earlier development activities and their possible impact on the process. In this context, studying IT-enabled OT from the start of a development process and/or in environments beyond traditional information system development projects, where, e.g. agile development approaches blur the boundaries of development and implementation, is also relevant.

Lastly, our research examined how IT-enabled OT unfolds through recursive and situated work practices by applying the five social constructivist perspectives. Future research can extend the application of these perspectives to study how DT unfolds in practice because recent DT scholarship increasingly emphasizes the importance of examining micro-level dynamics, situated work practices and the relationality between digital technologies and organizational practices ([Ashrafi et al., 2025](#)). This can enable researchers to examine how the reconfiguration of organizational value propositions, business models, organizational boundaries, value chain and emerging organizational identities unfolds through recursive and socially situated interactions between digital technologies, organizational routines,

structures, actors and institutional contexts across multiple organizational contexts and levels of analysis (Vial, 2019; Wessel *et al.*, 2025).

Notes

1. In this research, we deliberately use the concept of IT system to emphasize the technological aspects of information systems but concur otherwise with Land's (1985, p. 215) definition and statement that "An information system is a social system, which has embedded in it information technology. The extent to which information technology plays a part is increasing rapidly. But this does not prevent the overall system from being a social system, and it is not possible to design a robust, effective information system, incorporating significant amounts of the technology without treating it as a social system."
2. Vial (2019) also states that DT and IT-enabled OT overlap in their shared emphasis on using digital technologies to reshape organizational processes, routines, coordination practices and organizational structures. However, due to our focus on the coevolution of organizational routines and an IT system as a source for changes during (an) IT implementation process(es) and less on what defines and qualifies as DT – further definitions cited by Markus and Rowe (2023) include the concepts of fundamental and/or disruptive implications of digital technologies – we do not deepen and include this line of thinking in our manuscript.
3. Goh *et al.* (2011) refer to organizational routines as work routines because the actors execute these routines to accomplish tasks in the organization. Following these authors, we also refer to organizational routines as work routines or routines.

Supplementary material

The supplementary material for this article can be found online.

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