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Recommended Citation

Eshraghi, Ali; Johnston, Robert B.; and Riemer, Kai, "Technology Introduction as Social Interpretation by End-Users: Key Articulations in the Literature" (2019). *ACIS 2019 Proceedings*. 77.

<https://aisel.aisnet.org/acis2019/77>

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Technology Introduction as Social Interpretation by End-Users: Key Articulations in the Literature

Full Paper

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Abstract

What happens after new technologies have been rolled out in organisations? Current literature studying technology introduction often explicitly or implicitly focusses more on the adaptation of technologies than on the role of social interpretation of technology by end-users. Focusing specifically on how end-users, collectively and over time, respond to new technologies in organisational settings, we performed an extensive review of literature employing elements of structured and hermeneutical approaches. We identify 5 key dimensions employed by authors to conceptualise technology introduction and distinguish 3 major streams of literature using the particular positions that each paper takes along these dimensions. The streams are mainly distinguished by how they conceive the social aspects of the process and how they understand the effects of technology. This finding has implications for appropriate management of the process under each conception.

Keywords: Technology Introduction Process, Literature Review, Mixed Methods Review, End-user Technology Interpretation, Social Processes

1 INTRODUCTION

What happens after new technologies have been rolled out in organisations? This issue has assumed increasing importance in light of the recent proliferation of new malleable technologies (Richter & Riemer, 2013) and flexible work arrangements (Barley et al. 2017), which additionally raise the issue of how to manage the more emergent up-take of such technologies. In the last three decades, many IS scholars have acknowledged that dominant decision-oriented approaches (e.g. Davis, 1985; Goodhue and Thompson, 1995) are unsatisfactory to explain the processes by which organisational actors respond to these technologies over extended periods.

There is growing recognition that the organisational roll-out of new technology is a time-extended, social process (Leonardi and Barley, 2010; Orlikowski and Gash, 1994). However, the current literature presents diverging, and sometimes contrasting, accounts on this process, often explicitly or implicitly focussing more on the adaptation of technologies than on the role of social interpretation of technology by end-users. While there have been a number of attempts to order this literature through critical review studies (Fidock and Carroll, 2012; Jasperson et al. 2005; Leonardi and Barley, 2010), as yet no review has focussed specifically on the time-extended social interpretation of technology by end-users in the period after its roll out, which in this paper we term the Technology Introduction process (TIP). Hence, our research question is: In what key ways is the TIP conceptualised in existing literature?

To answer this question, we performed an extensive review of literature on the TIP that focuses on how end-users, collectively and over time, respond to new technologies in organisational settings. The reviewing process employed elements of structured and hermeneutical methods. This allowed us to identify five key dimensions employed by authors to conceptualise TIP, and to discern three major streams in the literature on the basis of the particular positions that each paper took along these dimensions. The contribution of the paper is an empirically grounded classification of how the TIP has been conceptualised in the literature. We will build on this in future work to examine what approaches to management are consistent with each conceptualisation of technology introduction, particularly as the process becomes more emergent and less amenable to traditional top-down project management.

2 MOTIVATION FOR A NEW REVIEW

A few reviews exist that have implications for our review. The study by Jasperson et al. (2005) on post-adoptive IT use concludes that most post-adoption studies are conducted on the basis of pre-adoption logic. While their work highlights the political dynamics that shape post-adoptive behaviours of end-users, this review remains relatively *individualistic*, and decision-oriented, focusing on the activities of the end-users. Fidock and Carroll (2012) surveyed different theories that have been advanced to study the trajectory of technology use and found that the majority of technology studies only partially consider the full life cycle of technology use. They advocate that a fuller perspective on technology appropriation should see technology use as co-extensive with technological design. While their model helps understand the purposeful aspects of the technology life cycle, it overemphasises the *intentionality* of the end-users in this process. Leonardi and Barley (2010) posit that the scholarly knowledge on the technology implementation process tends to be constructivist in nature as it has been historically generated in response to the difficulties of technological determinism. Hence, they offer a typology of social constructivist perspectives on different phases of the technology implementation process. We agree that such a phase view of implementation processes is epistemologically valuable. However, such a middle ground view on technology implementation tends to become too *intuitionalist* as the actual heterogenous practices of end-users are obscured by the effects of many social actors such as vendors and consultants.

These prior reviews provide valuable insights into the political, purposeful and epistemological aspects of the TIP. However, they take a dismissive view on the significance of the end-users. These reviews do not give adequate conceptual priority to end-users and their activities and interpretation. That is, the TIP is hardly reviewed from the perspective of the end-users. Reinforcing this conceptual challenge, one might argue that given the rise of consumer devices and applications such as Dropbox and iPads in workplaces (Gregory et al. 2018), users and organisations do not encounter developers, vendors, and even project managers so visibly and frequently. Hence, in this review, we take up this issue and provide a review of the literature by specifically focussing on the collective, time-extended engagement of end-users with technology that has already been completely designed and deployed in the organisation. Here, we recognise that managerial and technological factors may also be in play, but our particular concern is on the role and social interpretation of end-users in the TIP.

3 METHOD: HYBRID LITERATURE REVIEW

As this research aims to identify critical conceptualisations of, and assumptions about, the TIP in the existing literature, a hybrid literature method was designed to analyse the most influential papers in the research terrain. While we primarily developed a structured method to source the most appropriate studies (Webster and Watson, 2011), our overall approach to interpreting the conceptualisation of TI across these studies was ‘hermeneutic’ in nature (Boell, 2014). Using insights from Grounded Theory Literature Method (Wolfswinkel, Furmueller, and Wilderom, 2013), we alternated between the tasks of gathering and analysing the papers. This twofold process assured controlled coverage and consistent understanding of the accumulating materials via iterative refinement.

Identifying Relevant Literature: Addressing our research gap, we sought to obtain an overview of how the TIP, defined as the ways by which users respond collectively and over time to the introduction of new technologies in organisations, is understood in current literature. Thus, the target literature was papers that provide theoretical or empirical insights into this TIP, so defined. In order to operationalise this conceptual target, four key criteria were identified for selecting the most relevant papers. In line with our hermeneutic framework, we generated and applied these selection criteria iteratively, in a cycle of refining the selection of papers and the emerging interpretations. These selection criteria are: a focus on end-users; a focus on new technology introduction; an organisational focus on IT projects; and a detailed focus on the collective, time-extended introduction process (see Table 1 for details).

Focus	Inclusions	Exclusions
End-User	Papers that deal with how end-users collectively interpret, and work toward, the introduction of new technologies.	Studies mainly of boundary spanners between (technical) production or development of technology and its (organisational) use.
New Technology Introduction	Papers that focus on the introduction of new, unfamiliar technologies and their disruptive agency in changing or creating work practices.	Studies of technologies already in use and their role in current organisational routines.
Organisational IT Project	Papers that explore how users within a specific organisational setting respond collectively to the introduction of new technologies.	Studies of the appropriation of new technology only at either the individual or institutional levels.
Collective, Time-extended Process	Papers that provide a detailed, social analysis of how end-users interpret and work with new technology over time.	Studies analysing post-implementation as selected snapshots or stand-alone decision moments.

Table 1: Selection Criteria Elaborated

In the following, we report key activities undertaken iteratively to search and retrieve the relevant literature. For clarity, this iterative process is linearised. We began using Google Scholar to search by keywords derived from the conceptual definition. We chose this platform at this stage because it allowed us to navigate how keywords were used and contextualised. Initially, we used terms such as *appropriation*, *post-implementation*, *domestication*, *localisation*, *incorporation*, *integration*, *assimilation*, *implementation*, *adoption*, *post-adoption*, *technology*, and our keywords list became more detailed as our conceptual definition was refined.

At the level of keyword search, non-relevant results were eliminated if, on reading the abstract, it was unambiguously clear that the paper was outside the scope. However, the remaining papers were selected for further analysis based on their abstract and sections containing theoretical discussions. We chained backward via the references in these papers to identify further relevant works. This initial citation analysis allowed us to identify five seminal papers that have been very influential in TIP studies in the fields of Information Systems and Management and Organisation Studies.

Next, responding to our specific motivation to review the existing conceptualisations rather than the TIP-related papers per se, it was not feasible to use a pre-defined list of potentially relevant journals. Instead, we identified 19 top journals that published most TIP studies by using Web of Science to track the trajectory of ‘prestigious and peer-reviewed’ papers citing these seminal papers (Schroeder, 2007). We utilised a combination of paper retrieval techniques such as keywords search, backward and forward citation analysis, contextual analysis of the citations to the core papers, and selective reading, to arrive at 89 relevant papers.

Finally, we determined that 23 of these 89 relevant papers would suffice as a ‘research cohort’ for detailed analysis. The principle of this reduction was to arrive at a workable number of papers while maintaining conceptual saturation and high relevance to the conceptual target. To achieve this, we carefully read the sections on theory and contribution of the 89 papers and then dropped those with the most marginal fit to the selection criteria. Furthermore, papers that were duplications of the broad approach to the TIP across projects or by the same author team were eliminated. In this way, we arrived as a representative, typical sample of those papers with a strong and clear focus on our research topic, in particular, the role of end-users in the TIP.

Analysis of Selected Literature: The papers in the research cohort were read, and the overall conceptual approach to the TIP in each was evaluated. As mentioned, we relied heavily on a hermeneutical comprehension as supported by the Grounded Theory Literature Method (Wolfswinkel et al., 2013). First, all papers were read and coded to iteratively identify key classificatory dimensions. Over time, as they were improved, it became evident that a small number of dimensions could define the key contrasting perspectives to the TIP.

By paying particular attention to the theoretical assumptions concealed in the papers, we compared the position each paper took on these core dimensions. We found that there were two strongly opposing positions on each dimension present. Most papers took one extreme position or the other; some took some less extreme position; and some did not address the dimension significantly. For instance, for the initial dimension ‘human interpretation’ some papers viewed ‘human interpretation’ as a ‘mental activity’ while others viewed it as ‘practical reflection’. For each paper, we coded the positions P1, P2, Other or N/A, respectively. Coding the research cohort in this way resulted in a 13-by-23 matrix in which all these 23 papers were assigned relevant positions for each of the 13 initial dimensions.

Using this matrix, we searched for possible groupings of the papers based on common or near common positions assigned across dimensions. This required many iterations between re-coding extracts from the papers and the assigned positions, to make sure that these positions and assignments were accurate and consistent across the research cohort. As part of this iterative coding, we surveyed other studies cited in the selected papers on many occasions to reveal any hidden assumptions underpinning the papers. We were able to revise the classificatory dimensions as similar concepts collapsed into one and a few non-definitive concepts were eliminated. In this way, we reduced the dimension from 13 to 5 and verified that these five were robust enough to group the selected papers into three major conceptual streams articulating key approaches to the TIP.

Validity and Reliability of Assignments: Regarding validity, we continued refining the dimensions and codes until the major streams identified were mutually exclusive and complete, that is, until all papers could be assigned to one and only one stream. As an additional check, we applied the assignment to some of the 89 relevant papers that were not among the coding cohort, to verify the scheme was also mutually exclusive and complete more generally. In addition to these manipulative checks, we also employed the principles of hermeneutical review throughout to ensure that a balanced understanding between the whole body of knowledge and individual papers was maintained (Boell, 2014). Regarding reliability, we employed and extensively documented a systematic approach to coding that drew on published recommendation from a range of sources on literature search. While the process was highly iterative, careful attention was paid to establishing convergence to a robust result, as described above.

4 FINDINGS: FIVE KEY DIMENSIONS OF THE TIP

As a result of the process described above, we identified five broad dimensions distinguishing different conceptualisations of the TIP present in the selected papers. In broad terms, the difference between the papers is captured by the position they take on each of these five dimensions, with two extreme positions on each dimension accounting for most of the variation. Table 2 names each dimension, defines its relevance to the conceptualisation of the TIP, and presents in summary the two most extreme positions that occurred across the selected papers.

The Social Aspect of the TIP refers to the non-individual dynamics and collective nature of this process. It highlights those interactions with new technology that take place beyond the boundaries of individual minds and actions. Here, those aspects of the TIP involving coordination among people are considered. While there is a consensus in the cohort that TIP is fundamentally a social process, we found two extreme positions conceptualising the social aspect.

First, the *sum view* conceptualises the social as the sum of the action of individuals. Here, the social can be considered at different levels of interaction. For instance, Gasser (1986, p. 206) asserts that “by studying the individual and small-group-level interactions that drive computing in specific

organizations”, we might better explain the process by which new technologies are integrated into workplaces. In a similar vein, DeSanctis and Poole (1994, p. 143) argue that structural changes are better captured by studying “interpersonal interaction, at the micro, global and institutional level”. In such a reading of the social, people construct dynamic, multiple, social levels based upon basic individual actions.

Dimension	Question Relevant to the TIP	Position #1	Position #2
Social Aspect	How is the non-individual aspect of the TIP understood?	Sum View as a sum of actions of individuals	Context View as a context for individual actions
Effects of Technology	How are the effects of technology related to the introduced technology itself?	Separable View the technology is objective and distinguishable from its effects	Inseparable View the technology is manifested in its practical effects
Work Structures	How is the work on the TIP coordinated?	Exterior View the coordination is exterior to the TI work	Interior View the coordination is the result of the TI work itself
Teleological Orientation	How do the people achieve future orientation in the TIP?	Goal View people consciously attempt to achieve TIP-specific goals in the future	Purpose View people constantly build and commit to a shared idea of a ‘right’ direction for the TIP
Process Evolution	How does the process of technology introduction evolve over time?	Re-plan View the TIP evolves by re-planning and controlling the sequence of the actions	Repair View the TIP evolves by engaging with and repairing the flow of the work

Table 2: Key Dimensions of Conceptualisation of TIP

A second view understands the social as the *context* for individual actions. Here, unlike the sum view, the social cannot be divided into levels as it is not constituted by identifiable actions and actors. Rather, it is a collective historical base on which actions are carried out by individual people who are immersed in that social base. For instance, Robey and Sahay suggest that the organisational actions carried out to implement new technology are ‘surrounded’ by social processes (Robey and Sahay, 1996). Also, by highlighting collective learning in the TIP, we are cautioned that “group learning is more than simply the multiplication of individual learning processes” (Bondarouk, 2006, p. 50). In the context view, the interactions occur on an always-present base of the social.

The Effects of Technology on social actions and human behaviour have been a foundational issue in many information systems studies (Markus and Silver, 2018). We found that the relation between these effects and the newly introduced technology is a significant dimension for conceptualising the TIP. While there is agreement among our selected papers that in order to follow the changes in IT-related organisational actions we must focus on the effects of new technology rather than its mere technical characteristics, we found some discrepancies in the accounts of the nature of this relationship.

At one extreme, the *separable* view assumes technology is an objective entity that can be distinguished from its effects. Here, by softening the deterministic agency of new technologies, scholars still advocate seeking the effects as local outcomes of such technologies. For instance, Barley argues that “[t]echnologies do influence organizational structures in orderly ways, but their influence depends on the specific historical process in which they are embedded”, and hence scholars should seek new methodologies to predict “a technology’s ramifications for an organization’s structure” (Barley, 1986: 107). Likewise, by distinguishing the spirit of technology from its materialised utilisation, Majchrzak and colleagues state that “[a]lthough the spirit of the technology was to adopt the existing hierarchical structure, the most central feature of the technology... resulted in everyone on the team asking many more questions about each others’ ideas, drawings, and analysis” (Majchrzak et al. 2000: 588). In the separable view, the features of the introduced technology are not deterministic but nevertheless critical in explaining its organisational effects.

At the other extreme, some scholars assert that technology can only be understood through the active interpretation of its practical effects. Here, the *inseparable* view conceptualises the technology as constituted manifested in organisational effects. For example, Quattrone and Hopper challenge the idea that new technology is out there and waiting to be implemented. Rather, they argue that “[t]here was no direct implementation of the SAP package because there was nothing to implement ..., rather SAP’s identity was constructed through praxis” (Quattrone and Hopper, 2001: 426). Similarly, only when a

new technology “is used in a particular setting, for example, can we know what it is and what its effects are. Its properties remain indeterminate until they are enacted in practice” (Jones, 2017: 916). In the inseparable view, the new technology appears, and organisations are reconstructed by it, as people become acquainted with changes in their practices.

The Work Structures are the means by which collective work is coordinated in the TIP. While the literature advocates that the introduction of new technologies requires some ‘coordinative’ effort in addition to daily, task-based organisational activities, the nature of this coordination is a matter of dispute.

On the *exterior* view, some scholars presume that this coordination is independent of, and it is external to the TIP itself. Here, it is assumed that the TI work can be structured in a way that is observable, and one can identify these structures by looking at coordinative mechanisms beyond the normal TI-related organisational activities. For instance, Edmondson et al. (2001, p. 688) emphasise that “those in positions of authority, such as project and team leaders, may influence the technology learning process by coordinating the activities in an implementation project”. For Hussenot, this leadership team provides guidance through activities such as defining “essential procedures”, going “with users for training” or allowing “individual use” (Hussenot, 2008: 343). In the exterior view, the coordinated implementation of new technologies necessitates resources, in the form of resources and people, that are not themselves part of the TIP.

Other scholars argue this coordination is the result of TI work itself. On this view, *interior* coordination mechanism are not real entities that can be identified in a particular time and space during the TIP. Rather, while such coordinative acts do not retain pre-defined, independent characteristics, they appear as people respond to new technologies. For example, Orlikowski explains how the ‘mechanisms of work’ gradually transformed over two years as members of a customer support department interacted with the new call-tracking system (Orlikowski, 1996). Stressing the emergent nature of the TIP, Vaast and Walsham (2005, p. 85) similarly explain that “[u]nintended consequences emerge from actions that agents spontaneously and sometimes mechanically engage in, and which tend to bear unintentional and unexpected results. ... Their actions thus gradually turned into a social practice”. In the interior view, the main source of coordination is people’s engagement with new technology introduction itself.

The Teleological Orientation of the TIP refers to how future-orientation occurs within the introduction process. While the selected TIP studies all assert the importance of collective human orientation toward a future with the new technology, they significantly differ in terms of their understanding of its genesis.

For some, people consciously engage with the new technology in order to achieve some goals that will be attained by the TIP. Under this *goal* view, the assumption is that TIP-specific goals are established in advance, and members are motivated by a set of instructions and guidelines to reach such goals. For instance, Wagner and colleagues explain that as organisational members act and talk about new technology a special ‘assemblage’ is shaped, but that its successful performance “depends in part on the intentions and adaptive abilities of the people involved” to seek a working solution (Wagner, Newell, and Piccoli, 2010: 279). Rodon and collaborators declare that managerial interventions are the result of users’ resistance to official vision and goals for new technologies. Such goals are technologically oriented and they can also be seen as “institutional features embed the intended new social structure that managers expect users will enact in the use of” new technologies (Rodon, Sese, and Christiaanse, 2011: 227). In sum, the goal view posits that the source of collective orientation to technology futures is the ability of the people to direct or adjust their actions according to an articulated path to a pre-defined future organisational state.

Unlike goal-oriented stories of human motivation, supporters of the *purpose* view argue against the logic and importance of pre-defined objectives. Rather, they assert that human motivation is formed as people continually build and commit to a shared idea of the right direction for the IT process. For example, based on Ciborra’s Hospitality Metaphor, Saccol and Reinhard assert that the “successful hosting of the new technology by an organization depends on actors reaching an understanding of this technology” (Saccol and Reinhard, 2006: 158) and requires them to “rethink, strengthen or even change our identities. Identity is especially related to one’s reputation, which is recognized as important to a person’s life, being constantly reinterpreted according to our commitments” (p. 156). In their study of Yammer’s implementation in an international consultancy company, Riemer and Johnston found that this new technology “becomes an integral part of the practice ... as users share explicit stories about what Yammer has become ..., how it performs its role ... as part of fulfilling the practice ... and how it has become a normal part of being a member of the practice” (Riemer and Johnston, 2012: 14). Under the

purpose view, future orientation emerges as people get involved with new technologies in light of their ongoing (work) life.

The Process Evolution dimension seeks to understand how the TIP unfolds over time, and how its related organisational change is accomplished. Almost all scholars in the cohort acknowledge that the TIP is an emergent phenomenon. However, there is little consensus on what actually gives rise to such emergence. We identified two extreme positions on how TIP is evolved.

First, the *re-plan* view assumes that the TIP evolves as people continually re-plan and control the sequence of the actions. Here, the source of emergence is the accidental problems and structural rigidities encountered by the TIP, and the ability of the participants to examine these issues and develop alternative sequences of actions (new plans). For instance, in their well-cited study of a new group decision support system, DeSanctis and Poole (1994, p. 129) find that “people actively select how technology structures are used, and adoption practices vary. Groups actively choose structural features from among a large set of potentials”. By appropriating structural features, people can make diverse *appropriation moves* to use the new technologies in a way different from the initial plan. They claim that “[new] sources of structure emerge as the technology, task, and environmental structures are applied during the course of social interaction” (p. 128). Furthermore, Hussenot argues that the TIP evolves as “actions, modalities and structural properties are modified” (Hussenot, 2008: 339). He calls for identifying *appropriation paths* in different ‘periods’ of implementing new technology. In each path, actors build a coherent framework of problem-solving “in which the tool, actions, and structure have a recursive and reflexive relation” (p. 336). In this re-plan view, the TIP evolves as people deliberate upon how to reduce and control the complexity of the process.

By contrast, on the *repair* view, some scholars argue that the TIP evolves as people are engaged in situated repair to the flow of the work. Here, the source of emergence is attentive human experimentation with the new technology. That is, people who are immersed in social practices discover the usefulness of the new technology only on the basis of a continuous flow of their practices. For instance, Quattrone and Hopper argue for the serendipitous nature of the TIP. Their data showed that new technologies evolved and changed in the absence of any linear path or ideal model. Rather, the main driver “was experimentation through mediated compromises” (Quattrone and Hopper, 2001: 418). In their study of a new electronic system, Yeow and Faraj found similar evidence. They illustrate that when a new technology is implemented, people may attempt to deal smoothly with the issues that arise. For instance, “management and users admitted that some issues were distracting but expressed a need to compromise for the sake of how other parts of the [new technology] assemblages were working” (Yeow and Faraj, 2014: 58). Here, under the repair view, people are engaged in the TIP with particular care for its flow.

5 DISCUSSION: MAJOR STREAMS OF THE SELECTED LITERATURE ON THE TIP

Of these five dimensions, we found that two dimensions - ‘the social aspect’ and ‘the effects of technology’ - were the most useful for distinguishing the main distinct streams in the selected literature. We found that the papers in our cohort could be divided into three groups according to the positions they took on these two dimensions. Although space does not permit a full discussion of the remaining 3 dimensions, we note here that the positions on these in nearly all cases are consistent and predictable from the first two. Thus, it appears to be three distinct conceptualisations of the TIP are present in the literature (see Table 3), which can be predominantly characterised by how the authors treat the social aspects of the process, and how they conceive the relationship between the introduced technology and its organisational effects.

The **Taming Technology** stream assumes that the social is the sum of individual actions, and that the new technology is an objective thing that can be distinguished from its effects. According to this stream, existing social configurations, understood in terms of individual actions, will be altered upon the introduction of new technology. However, while the new technology is capable of triggering such a reconfiguration process, its development and evolution are a social accomplishment. These technology-triggered processes usually involve considerable changes in organisational roles and responsibilities. But, while the TIP is understood as a temporal process, it takes place within the existing social activities, and concludes when people internalise the effects of new technology into their organisational life.

The **Technology Enablement** stream conceptualises the social as a context against which individual actions occur, and the new technology as a real object with distinguishable effects. According to this stream, the organisational effects *emerge* as people collectively interact with the new technology. Since

these authors do not treat the social as a sum of individual actions, the new technology cannot directly trigger a change by demanding a new social reconfiguration. Rather, during micro and recurrent interactions with new technology, people generate and later employ organisationally meaningful effects that involve technology, but which cannot be attributed to pre-existing features of the technology. Here, the TIP is conceptualised as part of the complex social interactions and adaptation between organisational change and a relatively unchanging technology.

Stream	Classificatory Dimension	Positions along Dimensions Characteristic of each Stream	Papers
<i>Taming Technology</i>	<i>Social Aspect</i>	Social as a sum of actions of individuals	(Gasser, 1986) (Barley, 1986) (DeSanctis & Poole, 1994) (Majchrzak et al., 2000) (Edmondson et al., 2001) (Hussenot, 2008) (Rodon et al., 2011)
	<i>Effects of Technology</i>	The technology is objective and distinguishable from its effects	
	<i>Work Structures</i>	the coordination is exterior to the TIP work	
	<i>Teleological Orientation</i>	people consciously attempt to achieve TIP-specific goals in the future	
	<i>Process Evolution</i>	the TIP evolves by re-planning and controlling the sequence of the actions	
<i>Technology Enablement</i>	<i>Social Aspect</i>	Social as a context for individual actions	(Weick, 1990) (Orlikowski, 1996) (Robey & Sahay, 1996) (Robey, Ross, & Boudreau, 2002) (Swanson & Ramiller, 2004) (Boudreau & Robey, 2005) (Bondarouk, 2006) (Wagner et al., 2010) (Yeow & Faraj, 2014) (Aanestad & Jensen, 2016)
	<i>Effects of Technology</i>	The technology is objective and distinguishable from its effects	
	<i>Work Structures</i>	the coordination is the result of the TIP work itself	
	<i>Teleological Orientation</i>	people consciously attempt to achieve TIP-specific goals in the future	
	<i>Process Evolution</i>	the TIP evolves by engaging with and repairing the flow of the work	
<i>Practical Sense-giving</i>	<i>Social Aspect</i>	Social as a context for individual actions	(Quattrone & Hopper, 2001) (Saccol & Reinhard, 2006) (Riemer & Johnston, 2012) (Kautz & Plumb, 2016) (Jones, 2017)
	<i>Effects of Technology</i>	The technology is manifested in its practical effects	
	<i>Work Structures</i>	the coordination is the result of the TIP work itself	
	<i>Teleological Orientation</i>	people constantly build and commit to a shared idea of a 'right' direction for the TIP	
	<i>Process Evolution</i>	the TIP evolves by engaging with and repairing the flow of the work	

Table 3: Major Streams of the Selected Literature on the TIP

The **Practical Sense-giving** stream posits that the social is a context for individual actions, and that the new technology only becomes manifested through the social activities involving that technology. This stream gives a distinctive ontological primacy to interpretive practices as a 'place' where both *the social* and *the new technology* are together produced. Hence, it assumes that the new technology is 'brought to life' during the TIP while the other two streams focus on how this technology as a thing finds a place in organisational life. Consistent with this conceptualisation, certain organisational effects are interpreted by end-users, and at the same time, the new technology is made manifest in their new practices. However, such interpretation is not merely mental; rather, it requires practical engagement with the new technology. Here, the TIP is conceived as collectively embracing and nurturing of the opportunities created by new technology.

6 CONCLUSION

This review sought to identify the key ways in which the time extended, social process of technology introduction is understood in the literature, with a particular focus on end-user engagement with the technology after its roll-out. By conducting a structured hermeneutical review of the relevant papers, we found that there are three major streams of the literature presenting distinct ways of conceptualising the TIP, which differ mainly on how they conceive the social aspects of the process, and how they understand the relation between the introduced technology and its effects.

This paper advances our knowledge of the process by which organisational actors respond to new technology. It differs from the limited existing reviews by focusing on the collective engagement of end-users with new technology in the period after its roll-out. Hence, this paper contributes an empirically grounded classification of how the technology introduction process is understood, based on the underlying assumptions concealed in the selected papers. In future work we will use this classification to theorise management of the technology introduction process by analysing the theoretical fit between each conception of the process identified and relevant management approaches. This will have implications for managerial interventions consistent with each underlying conception of the TIP.

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