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Business process management (BPM) research emphasizes three important logics – modelling (process), infrastructural alignment (infrastructure) and procedural actor (agency) logics. These logics capture the dominant ways of thinking in BPM, reflected in its assumptions, practices and values. While the three logics have proven useful in prior contexts, we argue that the applicability of these underlying assumptions in theorising BPM needs to be re-examined in the context of digital transformation. Based on an ethnographic study of BPM in a company undergoing digital transformation, we uncover tensions related to applying these prior logics that point to the need to update the underlying assumptions. Consequently, we propose new logics that we conceptualise as *light touch processes* (process), *infrastructural flexibility* (infrastructure) and *mindful actors* (agency). Our observations contribute to a rethinking of the dominant BPM logics by unpacking their dynamics in the context of digital transformation. Our study further highlight salient differences between digital transformation and IT-enabled organisational transformation contexts. We conclude by proposing new managerial approaches for BPM in digital transformation contexts.

Keywords: Digital Transformation, Business Process Management, Organisational Change, Mindfulness, Infrastructural Flexibility, Light Touch Process, IT-Enabled Organisational Transformation, Logics

INTRODUCTION

Business process management (BPM) has been broadly conceptualised as a field that consolidates knowledge on "how to best manage the (re-)design of individual business processes and how to develop a foundational BPM capability in organisations catering for a variety of purposes and contexts" (Vom Brocke & Rosemann, 2010, p. viii). Prior research provides detailed descriptions of three sound BPM logics (i.e. dominant ways of thinking about BPM – assumptions, practices and values). These are: the careful modelling of business processes (Vom Brocke et al., 2014; Van Der Aalst, 2013; Dijkman et al., 2011); the design

of IT infrastructures to support those processes (Recker, 2014; Sidorova et al., 2014); and the authorisation of employees and teams to complete tasks accordingly (Vom Brocke & Rosemann, 2014; Hung, 2006). By relying on these logics, BPM enables process owners, employees and other BPM stakeholders to design and renew business processes.

Despite calls for studies to further explore the role of BPM in these transformation contexts (Muller et al., 2017; Recker, 2015; Rosemann, 2014; Vom Brocke et al., 2016), scholars are yet to empirically unpack the dynamics of BPM in digital transformation. However, questions remain about the suitability of prior BPM logics for practical recommendations and for theorising about BPM in a digital transformation context. This is because the underlying premise of these prior logics is grounded on the assumptions and values of improving efficiency and quality of organizational processes in a relatively stable context (Recker et al., 2009; Rosemann et al., 2008; Vom Brocke et al., 2014). While these assumptions have been appropriate and valuable for regular business contexts, digital transformation introduces a context that questions the extent to which these assumptions hold true. For example, scholars of digital transformation have described it as a context characterised by uncertainty and a constant flux of change (Utesheva et al., 2016; Wessel et al., 2019).

Specifically, digital transformation presents a unique context for BPM in two ways. First, it draws on the properties and the affordances of the digital domain with inherent generative properties (Yoo et al. 2010). Digital transformation involves the need to grapple with the generativity of emerging digital technologies (Legner et al., 2017; Yoo et al., 2010) in attempts to re-conceptualise business models and the business processes around them that are often based on trials and experiments as much as on meticulous engineering efforts. Second, digital transformation as a context for BPM results from the deep structure changes that accompany it (Besson & Rowe, 2012; Gersick, 1991; Wessel et al., 2019). Prior studies have observed that deep structure changes, such as radical re-engineering efforts, failed as BPM logics were

not able to take into account the dynamics of change and the implications of a broader organisational transmutation (Land, 1996; Besson & Rowe, 2012; Muller et al., 2017).

We thus argue that digital transformation provides us with a unique opportunity to sharpen existing BPM logics and extend them beyond their theoretical limits. Therefore, the purpose of our paper is to unpack the implications of digital transformation for traditional BPM logics. Specifically, our research question is this: *How does business processes management unfold in the context of digital transformation?* Our study draws on a longitudinal study of a case company in the process of digital transformation. The study was conducted over a period of two years during which we observed the organisation's attempt to manage their business process during a continual wave of changes. This provided us with the possibility to observe how the traditional BPM logics were upended in the midst of deep structure transformation.

Building on our empirical base, we consider how digital transformation alters the traditional logics of BPM – the process, the infrastructure and the agential logic. We theorise three logics that extend these prior logics of BPM in the context of digital transformation: a) *light touch processes* – processes that are structured to be modifiable rather than rigidly fixed; b) *infrastructural flexibility* – infrastructures that allows for flexible flow and configurability of process data flow; and c) *mindful actors* – giving the actors enacting a business process the agency to evaluate a business process and their corresponding actions based on the prevailing circumstances of the context. Additionally, our study presents a step towards a conceptual delineation of digital transformation from IT transformation at an organisational level.

BACKGROUND

Prior Knowledge on BPM

The origins of BPM date back to the early 1990s when organisations began to recognise that value from IT investments was gained through complementary changes in business processes and work practices, enabling, in turn, improvements in quality, product offering and customer

service (Van der Aalst et al., 2016). The introduction of large-scale information systems such as ERP appeared to be sufficient for the top-down coordination of cross-functional business processes (Hammer & Stanton, 1999). The origins of BPM research lie in the subsequent organisational reengineering that drew lessons learned from cases where new business processes were imposed on organisations (Melao & Pidd, 2000).

Davenport and Short (1990, p. 1) define business process reengineering as the "analysis and design of work flows and processes within an organisation." While this definition can encompass a large variety of organisational changes, the early proponents of this approach, Hammer and Champy (1993, p. 11), popularised it as a "fundamental rethinking and radical redesign of business processes to achieve dramatic improvements in critical, contemporary measures of performance, such as cost, quality, service and speed." The radical change prescribed by reengineering was soon contrasted with incremental approaches for improving processes by creating a continuum of BPM projects (Edwards & Peppard, 1994). More recently, BPM has been additionally connected with organisational restructuring in the context of business process outsourcing decisions (Tanriverdi et al., 2007). Over the years, numerous barriers and success factors have been found for business process change (Newman & Zhao, 2008; Sarker et al., 2006). The factors investigated include organisational readiness and politics, IT infrastructure and change management (Broadbent et al., 1999; Janz et al., 1997).

The focus in BPM research has gradually moved from strategic change considerations towards the refinement of BPM modelling techniques and workflow optimisation tools (for recent summaries, see Recker, 2014; Klun & Trkman, 2018). The adoption of ERP systems has also influenced the way companies understand their business processes (Bala & Venkatesh, 2007). As ready-made process repositories proliferate, for example in ERP systems, researchers are refocusing on the character of processes and the extent to which they can be changed when circumstances change (de Albuquerque & Christ, 2015; Crick & Chew, 2017).

A Logics Perspective on BPM

The main premises of prior BPM research can be synthesised into three fundamental BPM logics: a) process logic, b) infrastructure logic, and c) agential logic (Recker et al., 2009; Rosemann et al., 2008; Van Der Aalst, 2013; Vom Brocke et al., 2014). Each logic represents the generic assumptions that underlie how BPM is considered under the perspectives of process, infrastructure and agency. Our definition of logics is as follows: logics are important theoretical constructs that capture a particular mode of reasoning in a domain, which is indicative of the taken-for-granted assumptions, value systems and related practices that predominate in the said domain. Essentially, logics capture the dominant way of thinking, which is reflected in terms of the *assumptions*, *practices* and *values* underlying the conception and associated actions in a specific context (Prahalad & Bettis, 1986; Reay & Hinings, 2009; Sambamurthy & Zmud, 2000; Thornton & Ocasio, 2008).

This is consistent with the use of logics in prior management studies, such as organising logic (Sambamurthy & Zmud, 2000; Yoo et al., 2010), institutional logics (Thornton & Ocasio 2008; Reay & Hinings, 2009) and dominant logic (Prahalad & Bettis, 1986; Vargo & Lusch, 2004). It is worth emphasising that the dominant logic in a domain emerges because it serves a useful purpose and is helpful in achieving some desired value/benefit (Prahalad & Bettis, 1986). These accruable value/benefits become the underlying drivers that lead to further reinforcement of the logic. However, like cement, these accepted logics are malleable at the beginning but difficult to adapt to changing contexts when they become dominant.

Besides the associated values or benefits, which are the underlying drivers of dominant logics, logics also emerge from past experiences that subsequently form the basis of the assumptions that come to characterise that domain (Vargo & Lusch, 2004). Although this is sensible, as logics become dominant because they have been proven to be effective in attaining some success measure, the coalescence of these assumptions into a fixed mindset and a repertoire

of preferred practices implies that these logics may result in tensions when faced with new contexts that require a shift in these dominant logics. Prahalad and Bettis (1986) suggest that assumptions and practices that constitute a dominant logic are likely to be inappropriate when confronted by a different context that requires different measures of value. Based on the foregoing considerations, we outline three components of a logic: values/underlying drivers, assumptions and practices. In general, BPM contains particular assumptions about its operationalisation in organisations that are implicit or recommended practices if the approach is to be faithfully utilised. We unpack the dominant view of each logic and highlight their underlying assumptions, values and practices in the subsequent sections.

We selected the three logics as representative of recurring themes in different BPM studies that are considered essential regardless of the strand of BPM that one subscribes to (Curtis, Marc, & Over 1992; Melao & Pidd, 2000; Vom Brocke & Roseman 2010, 2014). The logics emerged from an abductive interaction between our data and the prior BPM literature. The idea is not to claim that the three aforementioned logics are an exhaustive list of logics that characterise BPM. Therefore, rather than taking a single view based on an individual source, we synthesise these prior views into these three that hold salience across different BPM perspectives. As Melao and Pidd (2000, p. 112) note: "Even one person's views [of BPM] can be multifaceted!" The consolidation of these prior conceptions of BPM into these three logics provide a useful approach to organising the plethora of views and allows to extract the fundamental principles and assumptions underlying BPM studies.

The Three Logics of BPM

Process logic

Business processes are seen as sequences of activities that can be perfectly understood and *modelled* as well as remodelled when necessary (e.g. Van Der Aalst, 2013; Recker et al., 2009). The modelling work in BPM, where existing organisational processes are analysed and

new processes replacing them are drawn, has received attention throughout the history of BPM (Bandara et al., 2005). Early interest focused on techniques to discover processes (Datta, 1998) and on tools to ease the work of modelling (Dijkman et al., 2011; Lee et al., 2008).

According to this logic, it is desirable that as much as possible of the work done in the organisation is represented as explicit knowledge so that work flow diagrams and flowcharts can be created and inefficient paths identified (Recker, 2014; Melao & Pidd, 2000). For example, Davenport and Short (1990) recommend that, if not all, at least some critical processes should be redesigned and that existing processes should be understood and measured accurately. Should some portion of the work be tacit knowledge, which is not codified but all the same exists as part of the organisational routine, that part of the work should be rigorously modelled so that it, too, will be subjected to analysis in the BPM effort. It is typically not acceptable in BPM that the work activity could not be modelled or that it should not be modelled; every crucial activity – to the level at which meaningful performance improvements can be realised – is assumed to be understood and possible to model (Recker, 2014). Consequently, the dominant view in process logic is *modelling*.

Infrastructure logic

In this view, the required infrastructure for effective BPM is typically *reengineered to align* with the objectives of the modelled business process it facilitates (Takeoka-Chatfield & Bjorn-Andersen, 1997; Hammer, 1990). The traditional BPM as advocated by Michael Hammer (1990), often termed business process reengineering (BPR), underlines that processes should be automated using technology to attain defined business goal (Sidorova et al., 2014), but they should also be redesigned so that unnecessary work and information flows are eliminated and replaced by flows that reflect a new understanding of work in that business process (Dumas et al., 2005). The new possibilities of modelled work come about by increased and more comprehensive use of technology; thus, BPR efforts are assumed to lead to larger and more

integrated systems that span departments and business units and connect the organisation to other stakeholders (Karimi et al., 2007; Takeoka-Chatfield & Bjorn-Andersen, 1997).

Such expansive systems facilitate a closer alignment with the business process goals by enabling a freer transfer of information among units that might have been more isolated and silo-like before the reengineering (Broadbent et al., 1999). In general, the processing of information is more efficient when information is collected from various parts of the organisation in line with the business process vision, reducing redundancy and increasing efficiency. This, of course, rests on the assumption that business process capabilities can be attained by taking advantage of information processing and that appropriate infrastructures are structured to realise the flow and handling of information in the new work structure. Hence, the dominant view in this logic is the *infrastructural alignment* of infrastructures to be in sync with the business process objectives.

Agential logic

In this logic, the key assumption is that actors within a business process setting are *procedural* and are consequently expected to follow the processes as documented. This is an assumption about agency in business processes that draws from the early days of industrialisation and factory automation: work steps follow one another sequentially (e.g. Datta, 1998) like the procedure on a factory's assembly line. This assumption might originate from the type of industries that BPM projects were often supposed to improve – the ones involving a great amount of routinized labour with clearly defined dependencies between the steps, as if planned on a Gantt diagram. Having this assumption, however, makes it easier for project members to create models that are understandable due to the relatively straightforward dependencies among the business processes (Vom Brocke & Rosemann, 2014). It also makes it easier for the management to "buy in" to the core claim made by BPR – that efficiency improvements will result from redesigning (Hung, 2006) – because the new process model will inevitably be

a more or less procedural representation of the work done. Such procedural models can be subjected to efficiency calculations and thereby "proven" to outperform old process models.

Table 1. Logics of Business Process Management in a Regular Business Context

Dominant BPM logic	**Underlying assumptions**	**Some practices**	**Some values/ drivers**	**Some References**
Process logic: *Modelling*	Processes in a BPM should be rigorously modelled; it is not acceptable that an activity cannot be/is not modelled.	Creation of BPM models and careful mapping of actual business process flow plus attention to the sequence of activities and associated actors within a business process.	Stability Efficiency Quality	• Vom Brocke et al., 2014. • Van Der Aalst, 2013. • Dijkman et al., 2011. • Recker et al., 2009. • Melao & Pidd, 2000. • Davenport & Short, 1990. • Recker, 2014.
Infrastructure logic: *Infrastructural alignment*	Infrastructures should be reengineered to align with the business process goals.	Close coupling of process needs with infrastructural design and influencing information infrastructure choices based on mapping of business process in tandem with information flow requirements.		• Sidorova et al., 2014. • Dumas et al., 2005. • Hammer, 1990. • Broadbent et al., 1999. • Karimi et al., 2007.
Agential logic: *Procedural*	Actors in a BPM scenario are expected to be procedural and follow the modelled process.	Provision of detailed guidelines and instructions for executing business process rules.		• Vom Brocke & Rosemann, 2014. • Hung, 2006. • Datta, 1998.

The assumptions on which these BPM logics rest draw parallels with the "deterministic machine" view of business processes presented by Melao and Pidd (2000). This view may be illustrated by the three components of organisational work: (1) the activities to be conducted, referring to the business process; (2) the agent of the activities, that is the worker performing the process; and (3) the infrastructure that is used to conduct the activities. When companies implement BPM in a traditional way as reflected in the above logics, they at the same time increase formal managerial control over their processes.

As indicated in Table 1, it is, however, premature to dismiss the value of these managerial BPM logics as they are built on solid foundations and have underlying drivers built on rational

motives. Some illustrative drivers are *stability*, *efficiency* and *quality*. Although we acknowledge the relevance and essential contribution of these views and assumptions, this study brings the three BPM logics under scrutiny in the context of an organisation undergoing digital transformation.

Conceptualising Digital Transformation

The current wave of digital innovations has already been reported to lead to the transformation and disruption of established business strategies and models (Loebbecke & Picot, 2017; Nambisan et al., 2017). In digital transformation, innovation is expected to come in the form of affordance of new digital products and services, and improvisation emerges at both the managerial and the operational level. By enabling new product/service offerings (Nambisan et al., 2017), an innovating firm may adopt operational and product attributes akin to a born-digital company (Bossert, 2016). Such changes can also lead a company to converging markets with new competitors from other (digital/IT-related) industries. In general, digital transformation captures the metamorphosis of a company towards creating and delivering digital value propositions and simultaneously leveraging digital technologies in operational processes (Legner et al., 2017; Vial, 2019; Weill & Woerner, 2018).

Our study considers digital transformation primarily on the organisational level, which enables us to draw from Besson and Rowe's (2012) distinction between *deep structure change* and convergent change in transformations. Deep structure embodies the fundamental choices/rationale underlying the way an organisation has been built that, consequently, defines the real-world manifestation of the organisation (Gersick, 1991; Silva & Hirscheim, 2007). It is a representation of the foundational tenets on which the organisation's reality is modelled (Burton-Jones et al., 2017; Wand & Weber, 1995). In explaining deep structures, Silva and Hirscheim (2007) draw upon the metaphor of a house in which the foundation of the house refers to an organisation's deep structure, which cannot be changed without a significant

transformation of the organisation. According to this view, deep structure differs from convergent change, whereby an organisation "improves its efficiency and effectiveness without rethinking its business model or key processes" (Besson & Rowe, 2012). Convergent change is a process that does not alter an organisation's relatively stable structure. In contrast, deep structure change is generally understood as a process that engenders a qualitatively different organisation: "it exists when the deep structure of the organisation is transformed" (Besson & Rowe 2012, p. 104, 105). El Sawy et al. (2010, p. 835) capture this succinctly as "the simultaneous increase in environmental turbulence, the requisite speed of organisational change and the intensified ubiquity of digital technologies that are spawning a phenomenon that is messy, complex, and chaotic".

Digital transformation is also different because of the inherent generative properties of digital innovations that changes the traditional conception and process of adopting or creating non-digital innovations (Jarvenpaa & Standaert, 2018; Yoo et al., 2010). The attention to the generativity of digital innovations in a digital transformation context comes from its pivotal position in reshaping the value propositions that define the organization as well as the operational process of creating, capturing and delivering digital value (Bharadwaj et al., 2013; Henfridsson & Bygstad, 2013; Wessel, et al. 2019). The opportunities to create new (digital) value in processes, products and services typically require drawing from the affordances of several digital technologies at the same time, which is opposed to the received knowledge of a single sophisticated technology (e.g. ERP systems) driving transformation (Legner et al., 2017; Singh & Hess, 2017; Wessel, et al. 2019). This observation suggests a fundamental distinction between digital transformation and IT-enabled organisational transformation that requires conceptual clarification.

In this regard, there remains room for studies that further sharpen our understanding of these concepts. In our conception, digital transformation engenders a qualitatively different

organisation whereby the transformation is not only internal but also reflects 'digital' being an intrinsic part of a company's value proposition, offerings and identity, which explains the need to reconfigure the organisational mind-set to grapple with the concerns of generativity and deep structure change (Legner et al., 2017; Vial, 2019; Wessel et al., 2019). This simultaneous attention to the generativity and deep structure change that characterise digital transformation, is akin to "changing the wheel on a moving vehicle".

BPM Tensions in Digital Transformation Contexts

To refine the view of the BPM challenges in a digital transformation context, we build upon the three logics of BPM. The insights presented in this section draw from both our empirical observations as well as from the emerging literature on the topic. We present these insights before rather than after the empirical section as is typical for most interpretive studies. Such an approach enable us to provide and clarify the conceptual inclination and perspective taken by the study. In consistence with prior work on theory building (see Berente & Yoo, 2012), we adopt this format in order to familiarise the reader with our theoretical premises and to outline the observed gaps as well as the contribution target of our study.

Tensions in process logic (modelling) refer to the difficulty for process owners, employees and consultants to maintain the tradition of updating business process models for all business processes during the rapid and continuous flux of changes and modifications that characterise digital transformation. Digital transformation by its nature induces changes in various business processes (Gust et al., 2017; Vial, 2019), which, in turn, may lead to more changes in interconnected business processes than is typical (Sarker et al., 2006). The ability to adapt to change swiftly and repeatedly has been proposed as an essential property of a digital transformation context (Demirkan et al., 2016). In addition, in exploring new digital business opportunities, organisations often need to sustain business process models for their existing business while also crafting new variations of such models for digital offerings as in the

exposition of the case of Volvo by Svahn, Mathiassen, and Lindgren (2017). Dealing with a large number of process model update requests is made difficult by the fact that in a transformation context, political, socio-technical and economic dimensions become determining (Besson & Rowe, 2012; Muller, 2017). As research related to radical business process re-engineering of the 1990s demonstrated, initiatives for implementing substantial changes to cross-functional business processes are typically handled with reluctance by the management. “It is a highly political situation in which the inbuilt structural conflicts of multiple-interest parties need to be resolved” (Coghlan, 1998, p. 143). Hence, we propose that digital transformation challenges adhering to the modelling logic as follow:

> *Process logic tension*: The volume of changes required and the perpetual need to modify or redevelop business process models makes it challenging to follow the modelling logic of BPM.

Tensions in infrastructure logic (infrastructural alignment) results from the emergent and generative nature of new digital technologies as opposed to the prior view of pre-planned alignment of information infrastructures with business process models. Generativity refers to an “overall capacity to produce unprompted change driven by large, varied, and uncoordinated audiences” (Zittrain, 2006, as cited in Yoo, 2012, p. 228). Experimentation spurred by generativity is one driver that influences the shift from the re-engineered infrastructure logics (Jarvenpaa & Standaert, 2018). For example, Sebastian and Ross (2016) presented an account of how Schindler’s business process had to undergo constant changes as the company tried to leverage the affordance of a new internet of things (IoT) platform (Sebastian et al., 2017). Generativity calls for leaving users a possibility to try out different approaches and consequently translates to a situation where the operational process as well as the objectives are under constant reconstruction and recalibration (Wang et al., 2012). It has also been contrasted with modularity in arranging work in cross-functional processes (Henfridsson & Bygstad, 2013), deployed for example in ERP systems (Besson & Rowe, 2012). Therefore,

following such predictions, we propose that the generative attribute of digital transformation challenges BPM in general and its infrastructure logics in particular.

> *Infrastructure logic tension*: The generative nature of digital innovations challenge the adherence to the alignment view of BPM infrastructure logic.

Tensions in agential logic (procedural) result from the diverse implications of digital transformation on organisational restructuring that often affects individual and team roles and even identities (Utesheva et al., 2016; Loebbecke & Picot, 2017). For example, as Utersheva et al. (2016) argue, due to the changing roles of different actors, an ongoing strategic renegotiation of the roles, identities and tasks of all the actors involved is required for an organisation's survival (Utersheva et al., 2016). In addition to dealing with changes for existing employees, and turnover in personnel composition, organisations often recruit new employees or contract with external parties (Svahn et al., 2017) to seek capabilities for innovating novel uses for digital technologies. Such situations are accentuated in a context where this is occurring at a pace and frequency that challenge the capacity to keep the process models updated. In such situations where there is no up-to-date modelled documentation of business processes to guide the actors, the procedural logic is challenged in the pursuit of business goals. Hence, we propose that implications of digital transformation for individuals and teams will also reflect on BPM as follows:

> *Agential logic tension*: The lack of reliable business process models/instructions and frequent turnover/role change in personnel composition challenges the procedural assumption in BPM agential logic

METHOD

The Case Company

The case company, LeadTech, is a leading provider of manufacturing equipment with embedded software for the manufacturing industry. LeadTech made a strategic decision that it was going to transform itself from being a manufacturing automation hardware provider to being also a digital service provider and digital consultant to other manufacturing companies

interested in navigating the era of digitalisation (e.g. leveraging IoT as well as providing predictive maintenance and data analytics.) With the formulation of a digital transformation agenda, the company set in motion a number of deep structure changes that were aimed at restructuring the organisational process to enable and support the creation of digital innovations and reorienting their value propositions with the infusion of digital offerings into their product portfolio. This transformation agenda led to the initiative to shift the company's positioning from a pure hardware-driven manufacturing company to become a software vendor, a provider of digital services and a digital consultant for the manufacturing industry.

Historically, the company has developed a very detailed and robust business process management procedure with elaborate business process models and clear roles and logical flow of activities within virtually all business processes. However, with the pace of digitalisation, it is increasingly seeing competition from unexpected angles, which is leading to operational and strategic changes that are challenging LeadTech's meticulous BPM practices. For example, LeadTech has typically considered itself to be in competition with other manufacturing companies, but recently there has been an increasing number of competitors form "software only" companies. With this background, LeadTech provides us with an appropriate contextual premise to conduct a study on BPM in digital transformation.

Data Collection and Analysis

Our study draws on an ethnographic case study of a manufacturing company, spanning a period of over 24 months. Adopting an ethnographic study enables us to observe and examine a phenomenon in its organisational context by looking at everyday interactions of the people and the process under study. It affords us a scientific approach for unpacking interactions and understanding how an organisational agenda is translated into situated actions (Myers, 1999; Van Maanen, 2011). Our data include two sets of semi-structured interviews, extensive archival data covering the period from 1986 to 2019 and participant and non-participant

observations (see Table 2). We adopt an abductive analysis approach (Mantere & Ketokivi, 2013). This was an appropriate approach as the uniqueness of the context provided us an opportunity for theory building as well as theory testing. We deductively analysed our data using the lens provided by our abstraction of the three logics of BPM from prior literature.

Table 2. Data Collection and Analysis

	Archival documents	**Interviews I**	**Interviews II**	**Observations**
Total size of the data sample	106 archival document items.	41 semi-structured interviews with management and operational employees across the organisation.	19 semi-structured interviews with management and operational employees across the organisation.	Over 100 hours of observation gathered during 29 workshops and meetings plus relevant organisational events.
Description of the data	Historical documents, strategy documents, business process models and documentations, blog posts and other relevant archival documents and intranet posts.	Recorded and fully transcribed interviews. Interview notes taken during the session and afterwards.	Recorded and fully transcribed interviews. Interview notes taken during the session and afterwards.	Notes of business process practices observed. Notes from formal strategy formulation meetings and workshops. Notes from opinions during meetings and informal discussions. Digitalisation-related announcements and appointments.
Timeline	1986–2018	2016–2017	2017–2018	2016–2018
Type of information provided	Historical motivation for digital transformation as well as the organization's perspective on BPM before and during the digital transformation.	Individuals' reflections on the digital transformation agenda and implementation. An assessment of ongoing changes based on the past and their expectations for the future direction.	Reflections on the business and the IT process and on the impact of the digital transformation context on BPM. Respondents' assessment of the ongoing changes and the underlying reasons.	Reflections on how the business processes are changing and managed during the digital transformation process as well as uncovering the rationale behind the business process choices.
Limitations of the data	Officially produced documents may not disclose tacit information existing among the members of the organisation. Intranet posts are opinions shaped by the awareness of the open nature of the content.	The possibility of post-hoc rationalization, the underlying biases of the respondents and the increased noise in the data due to the extensive focus on digital transformation not limited to the business process.	The possibility of post-hoc rationalization, the underlying biases of the respondents and the narrow focus may cloud other perspectives.	Observations that are broad in scope, although extensive, bring in a lot of unneeded materials. Not all organisational events were captured. Possible bias in informal statements.

This enabled us to see the limits of prior BPM conceptualisations and opened an avenue for inductive analysis. We then inductively analysed our data following the Gioia methodology, which draws on the principles of grounded theory method (Gioia, Corley, & Hamilton 2013; Strauss & Corbin, 1990). We began the analysis of the data in tandem with data collection to

sharpen emerging understanding by recursively iterating between the theoretical concepts and the data (Suddaby, 2012; Walsham, 2015). In general, we embarked on an iterative four-step process to analyse our data with a particular focus on deriving theoretical explanations for the emerging BPM approach in the data.

First, we drew on our understanding of prior business process literature and our synthesis of the literature into the three logics (the process, the infrastructure and the agential logic) when making sense of what was going on in the case. We iterated between theoretical abstractions related to the three logics of BPM and the emerging empirical material. It is through this process that we detected a mismatch between the empirical evidence and the prevalent assumptions of the BPM logics. Further iterative probing of the data as well as further data collection revealed preliminary explanations for why digital transformation contexts require a different theoretical lens to unpack what we were observing in our analysis.

Second, we used an open coding procedure to discover concepts and their properties and dimensions within the empirical material (Gioia et al., 2013; Strauss & Corbin, 1990). To do this, we first identified initial concepts in the data and grouped them into categories – first order codes (Strauss and Corbin, 1990) – using direct words from the data whenever possible or a simple descriptive extraction (Gioia et al., 2013). In this and subsequent steps, one author who was not familiar with the case context labelled the interview transcripts and developed a classification of codes that were then discussed with the other authors. The lead author, who had collected the data and was therefore intimately familiar with the case, in conjunction with the other participating authors, contributed theoretical knowledge and sharpened the emerging concepts relating to the logical structure of this classification.

Third, we proceeded with axial coding to derive the second order themes by examining the categories for relationships (Gioia et al., 2013). This allowed us to combine the categories and achieve an abstraction of higher- order themes. The process involved iterating between

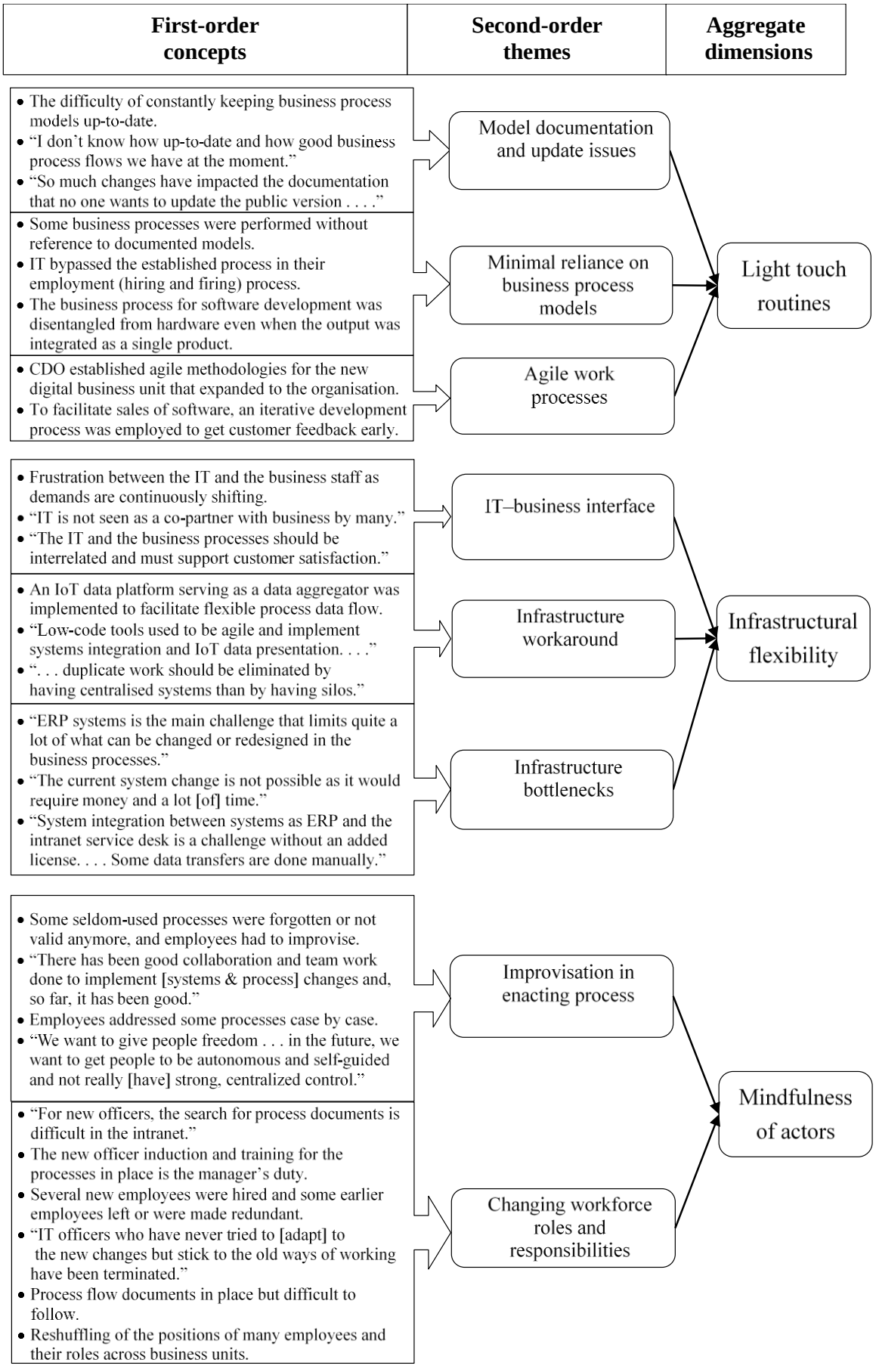

Figure 1. Conceptual themes emerging from the data.

different emerging categorisations of the data and the revision of the first order themes. We made initial categorisations which were then cross-referenced with the emergent theorising. We embarked on several iterations to reconcile the independently derived themes and align areas in the emerging dimensions where our representations varied. This followed constant comparative analysis in which the themes were compared and grouped based on theoretical similarities and differences (Strauss & Corbin, 1990).

Fourth, we assembled related themes into three aggregate themes as the foundation of our emergent theorising. We used the BPM logics as a lens for identifying patterns and deviations in the data as we proceeded with the categorisation and subsequent abstraction. This approach enabled us to toggle between the data and the need for more data as we tried to find an explanation for the anomalies in the data with regards to the logics (Klein & Myers, 1999). With further iterations between the coding and data, our theorising started to form around the nascent idea of three theoretical explanations of BPM in a digital transformation context (light touch processes, infrastructural flexibility and mindful actors; see Figure 1 for a summary). Faced with intermediate versions of the three theoretical views of BPM in the digital transformation context, we collectively engaged in retroduction, whereby we challenged our emergent understanding in view of other plausible explanations and iterated the emergent theorising until they coalesced on these three new logics.

FINDINGS

History of BPM at LeadTech

Our case company, LeadTech, has typically prided itself as a project house where the principles of BPM have been faithfully adhered to during its regular business era. During this pre-digital transformation era, the company traditionally followed a well-modelled, documented and structured business process procedure. The business process models and procedures were systematically and thoroughly developed with a high level of precision and

care, reflective of a company dominated by a systematic engineering mindset. The business processes were not only modelled but supported by annotations and links to extra information and further documentation of the roles and duties of actors within the business process. Besides these, each business process had a duly assigned business process owner responsible for its management. This approach of operating with very detailed and comprehensive business process models that capture most, if not all, of the business processes in the organisation gives an indication of the underlying prior BPM logic with which the company had operated over the years.

Digital-Innovation-Induced Digital Transformation

LeadTech has traditionally positioned itself as a company that makes and delivers manufacturing equipment, but, unlike many other competitors, it has been able to successfully integrate a unique control software alongside its hardware. The software has traditionally not been the primary offering of LeadTech, but it is considered a critical value-enhancing addition that is bundled together with their hardware products. This software, in conjunction with the data opportunities that it affords, plus the advancement of relevant digital technologies – specifically industrial internet of things (IIoT) and predictive maintenance, remote maintenance via virtual and augmented realities (VR/AR) and 3D printing – provided the company a footing for the creation of digital innovations and, therefore, further emboldened their motivation to embark on an organisational digital transformation.

Additionally, the company recognised an increasing demand for more digital capabilities by its customers, who were also seeing the potential in digital technologies and were looking for a digitally savvy manufacturing company for inspiration and guidance. Digital transformation is partly explained by the opportunities that the company sees in repositioning itself to leverage the potentials of creating digital innovations. This is evident from a key statement in the organisational strategy:

> The future potential to differentiate and grow, lies in digitalization of manufacturing. With this strategy, we have made digitalization an integral part of our doings and development of future value creation. (Archival document)

Digital transformation became an imperative for the company due to the disruptive threats of digital innovations emanating from software companies and digital start-ups. LeadTech has traditionally seen itself as a hardware manufacturer and supplier, competing with other manufacturing companies. However, after the company unexpectedly lost a high-profile client to a software company, the threat of digital disruption became a prominent strategic topic.

> A project we were bidding for was lost to a software company. So naturally the software company took the responsibility of the whole project.

The pressure was further accelerated by the speed with which the software technologies and companies were catching up and threatening the current product line and business model of LeadTech. These software companies typically offered the same value proposition as

Table 3. Examples of Key Events and Digital Transformation Initiatives at LeadTech

Sample digital transformation events and activities	**Brief overview**
Establishment of a digital business division (DBD)	The company created a new digital business unit – DBD to champion the effort in creating digital offerings. The unit was formed by tearing apart four existing business units and combining bits from the prior business units to form a new set of four business units, with DBD emerging as one of them.
New digital innovations as business offerings	In a bid to position the identity of LeadTech as a digital company and a digital partner for the manufacturing industry, several digital offerings were developed by DBD. These included innovations such as a) a standalone automation software, b) an IIoT platform and associated services, c) remote diagnostics and preventive maintenance, and d) digital consultancy, among several others.
Competition from digital companies	LeadTech increasingly found itself in competition with software companies that introduced a different business dynamic and had the advantage of not dealing with legacy systems or existing installed base like LeadTech, which was forcing LeadTech to re-evaluate its positioning in order to be competitive against such digital competition.
Deployment of IoT platform	LeadTech invested heavily in creating an IoT platform and developing associated services for its customers as well as for its internal processes. This was a strategic choice aimed at enabling the company to extract value by leveraging a network of its existing clients, systems and devices.
New digital business models	The emergence of new digital offerings necessitated new and different business models which would mark a radical departure from the typical brick and mortar model that the company was used to. For example, LeadTech now adopts variation of subscription, platform and freemium revenue models to sell its digital products. For the first time, the flagship software was sold independent of the machine hardware.

Changing composition of the workforce	In the space of about two years, the number of software developers in the company increased to about 20% of the workforce. Also, in the space of one year, 25% of the total workforce were new employees.

LeadTech, with an emphasis on their software. They then acquire the cheapest hardware from other hardware vendors to perform the mechanical aspect of the manufacturing process. Thus, they shift the locus of competition from the hardware to the software that manages the manufacturing process. They do this by leveraging the fact that most of the hardware in the industry has attained such a level of standardisation that the difference between hardware manufacturers can be marginal and that the key desire of the customers is to gain a better overview of their manufacturing process while still achieving the minimal mechanical requirements. According to one of the managers, the threat is pertinent considering the infrastructural legacy that characterises LeadTech versus the competition from a software company that "does not need to worry about all the hardware" requirements to promise a client the same value. Introduction of digital services was, however, a major change. New digital business differed considerably from company traditions. The old processes, deeply rooted in the company culture and identity, were not necessarily applicable in establishing new digital services:

> I think it's important here to understand that LeadTech is a project house, by default. It's deeply rooted in the company culture that most of the organisation is focused only on delivering projects to customers. And that's a challenge related to creating something new. Because the product development has happened within rigid delivery business processes.

One major deep structure change was the decision to restructure the organisation and its business units, leading to the establishment of a digital business division (DBD) as a profit centre and a champion of the new digital business area. The strategy resulted in an organisational renewal with a flurry of new arrivals and an exodus of old employees. One way this unfolded as a deep structure change was that rather than simply adding the DBD as just one more business unit, LeadTech carried out a general overhaul of the organisational structure (see Table 3 and Figure 2 for an overview). This led to a restructuring of four prior

existing business divisions into a completely different set of four new business divisions, with DBD being one of them.

The process of doing this involved a concurrent reshuffling, recombination, separation and merger of resources, employees, goals and leadership structures of the four prior existing divisions. This had direct implications for the internal processes of the organisation as existing departments were dissolved or were absorbed into the new units; new roles were created, and former roles were made redundant. These reshufflings heralded a flurry of changes in many

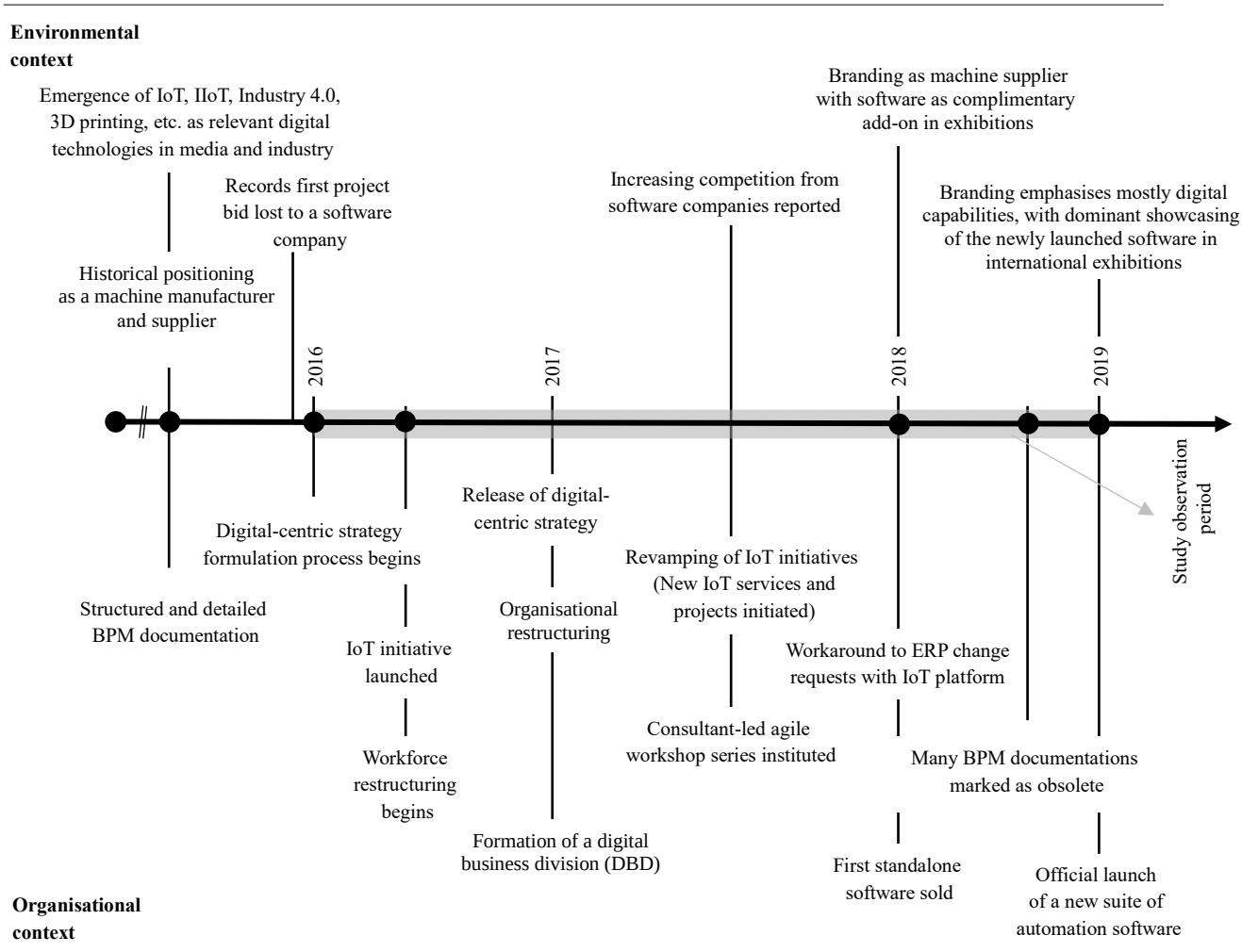

Figure 2. Timeline of key events in LeadTech's digital transformation journey.

led to changes in digital offerings and competition, changes in the business model, organisation structures and personnel and also had implications for corporate culture and

identity (see Table 3 for an overview). Observations of how these transformation events or activities impacted the BPM approach of the case company forms the basis for our theorising.

Juxtaposing BPM in Digital Transformation – Shift in Logics

As the digital transformation process unfolded in LeadTech, we observed how the BPM logics that have functioned well gradually became insufficient to navigate the multiple demands of digital transformation. In what follows, we elaborate the emerging conceptual themes from the analysis of our empirical data, as presented in Figure 1 above.

Process Logic: From Modelling to Light Touch Processes

One of the first things that became obvious in the case was the disparity in the modelled version of several business processes and how the business processes were actually enacted in practice. A key explanation for this can be traced to the burst of changes that were instituted in the organisation due to the deep structure transformation going on – particularly the role changes and the establishment of the DBD as well as the rapid change in the composition of the workforce. The DBD was established to be a business unit tasked with creating digital innovations that could be offered to clients while also facilitating the extraction and infusion of digital value in the other business units.

Model documentation and update issues. With all the changes being instituted across the organisation, it became difficult to adhere to the modelled business process. The models now referenced roles or teams that no longer existed; particularly in the DBD, many business processes remained unspecified. Although it was acknowledged that the changes necessitated updating the models, the organisation remained in a state of flux that made the attempts to update some models redundant within a short period.

> If you really want to do that exercise documenting everything, people need to have time for that as well, or then you need to have some extra resources. . . . The last work that I know that has been done on this level on the business process has been done on that level by [a colleague]. I think they did some kind of process auditing, and he also gathered as

> part of that activity a list of obsolete and still current processes that we have. But I think he has also changed his role, so I don't really know who is really responsible anymore.

The DBD naturally inherited already-existing processes in the company, and, at the same time, it had to define new processes for achieving the digital vision entrusted to them. These new processes that became necessary for pursuing the digital transformation agenda were not yet clearly defined or articulated in the form of a documented process but were implicitly acknowledged as processes that needed to be done. Similarly, the newly established business units had to reformulate their processes to reflect the current direction that the organisation was taking. While the other divisions could draw largely on prior business processes, the DBD had to tweak, renew and create different business processes, albeit with a degree of adaptiveness and flexibility in the specification of its business processes. For example, the DBD had to tweak the business process for the development and delivery of client projects such that the business process for the software accompanying the delivery of the machine hardware would be decoupled from the whole process. This meant that, rather than developing the client's project as an ensemble moving in sync, they were now able to adopt agile principles in the development and delivery of the software while the hardware development largely followed the prior process.

Minimal reliance on business process models. Despite the multiple changes going on in the organisation, it still remained functional by drawing on light touch processes to get things done. Indeed, the emergent new DBD processes were not documented nor visually modelled. The execution of most processes, particularly the new ones, relied on the experience and commonsensical judgments of the people involved.

> It's more like learning by doing. So, when you do know it, then. . . . And if you ask someone, you [may] get the answers. So, everyone is doing it a bit [in their] own way. Because there are no certain [business process] rules that I need to follow.

Some business processes were started and later forgotten or evolved into new directions. For example, one of the digital innovation initiatives by DBD was to create an IoT platform. The

IoT team were instituted to create IoT solutions by drawing on the growing access that the company had to various customer data. An ad-hoc business process was put in place for this. However, with priorities shifting and due to the limitations of the technology, the utility of this business process waned with time. Although the platform spinoff from the resulting initiatives found relevant use as a data aggregator, the ad-hoc business process was phased out as a new business process was conceived for leveraging customer data.

Agile work processes. Another illustration of the light touch processes can be seen in the choice of the DBD to initiate attempts to experiment with an agile methodology rather than the linear documented business process approach for client product development. The argument of the manager leading the DBD was that the mindset of digital innovations is amenable to changes and can be improved with input and feedback loops, which is different from the linear process of hardware-driven product innovations. Hence, he encouraged his unit to embrace iterative thinking and the likelihood for deviations from a linear business process. To ingrain this mindset, a four-month agile training of the whole DBD team was mandated for members of the unit.

> Because in the previous organisation we used to have a model where even small processes like a small software task required a process owner, which doesn't make any sense. So, for example, in the software production we are going to have so-called quick response scrum team, which is taking care of smaller software tasks, customer projects, basically independently, for us to be able to act quickly.

From an organisational viewpoint, there was a need for the company to adopt a new way of doing business. Particularly in the case of the newly created digital business division, there was a constant process of trying to be adaptive to relevant advances in digital innovations (e.g. IoT, blockchain and 3D printing and virtual/augmented reality [VR/AR]). This involves changing the processes to take on new ways of working, such as agile development, VR/AR-facilitated service maintenance, VR/AR inclusion in the sales bidding process and digital consultancy, among others. On individual level, the decision to restructure the organisation

led to some initial questions about who owns what process in lieu of the changing roles and positioning in the organisation.

Infrastructural Logic: From Infrastructural Alignment to Infrastructural Flexibility

IT-business interface. The general idea in LeadTech has been that the IT infrastructure and the business objectives are aligned. This means that IT is seen as an enabler and facilitator of making a business process functional. Prior to embarking on the digital transformation, the company's IT infrastructure was tightly aligned with the modelled business processes. The ERP, which formed the central backbone of the organisation's infrastructure, was highly customised and aligned with the business process of Leadtech. This level of customisation evolved over a long period of time and due to a strong relationship with their ERP vendor. The relationship of LeadTech and the ERP vendor is such that both companies have grown and evolved together in a symbiotic manner over several decades. This is because in the early years of their relationship, the ERP vendor was growing its ERP features based on the requests of LeadTech while, at the same time, LeadTech was able to achieve a highly business-specific and customised ERP system.

Both companies have grown significantly over the years. The ERP vendor has come of age and now serves a larger pool of companies. Therefore, the ERP vendor places specific requirements on how change processes are done and has additional bureaucracies surrounding such requests. This has resulted in a detailed change management process within LeadTech on how to handle change requests as well as how to adopt new functionalities of the ERP and ensure that such changes are aligned and non-disruptive to the existing business models. This is because the IT department had meticulously aligned the infrastructure to the organisation's business process during the previous BPR initiative, but it was becoming apparent that this was now due for an update with the ongoing transformation.

> Those are probably not up-to-date because we did this exercise like two years ago when we documented the application systems, that is, what kind of data flows between each [business process]. (IT staff)

Infrastructure bottleneck. As the DBD was tasked with developing digital innovations, they required rapid changes and new requests from the company's information systems than the IT infrastructure could deliver without extensive modifications. For example, the company explored the digital possibilities that can be extracted from their control software, which is one of their core digital assets. The generative potential of the software was explored with digital innovation ideas such as the following: shifting it from being embedded software to standalone automation software; repurposing it from being pre-packaged software to a platform that customers can build on; using it as the nucleus of data collection from customers and machine interactions; an enabler of IoT solutions; a facilitator for preventive maintenance and an analytic base for digital consultancy services, among several other digital innovation initiatives. The team realised that many of the generative potentials of the software can only be leveraged by being able to poll different data from multiple sources, including their ERP.

> . . . data, of course, will come [from] wherever. It might be coming from our own systems or other systems. In the future, more and more, I think from other systems from the production domain or even outside the domain. And we are ourselves able to create data sources without any involvement of other people [e.g. ERP vendor] in the future.

Among other digital innovation initiatives, DBD was trying to create an IoT platform that could integrate different client and product data with machine-generated data from the client location. However, achieving these required triggering a modification request to the ERP vendor and rewiring some of the business processes. Such changes, however, could not be fulfilled at the pace that would have been in sync with the plethora of changes that the company was experiencing. The situation was analogous to an infrastructure made of cement – malleable while wet but over time rigid and hard to reshape. Replacing or modifying the

ERP was particularly difficult because the ERP was deeply integrated into LeadTech's processes over the years.

> . . . our ERPs . . . having changes there probably always affects also somebody else, which makes it very difficult to make changes there. . . . I would say the ERP system is the main challenge that limits quite a lot what we can do when we are changing or redesigning our processes. (IT solution manager)

This dependency and the highly customised nature of the ERP systems meant that changing the ERP system was difficult for LeadTech. In fact, during an interview the CIO exclaimed:

> …at the moment, for example, there's no chance in hell that we could change our ERP vendor for example, fast and agile. It would not happen. It would take two to three years and a [expletive] load of money!

Infrastructure workaround. With ongoing digital transformation and the associated business process changes, there was a pressing need to come up with a way to be able to get and use data to facilitate the emerging process that could not have been readily achieved with the infrastructure setting at the time. Realising that the dependency of having to wait for the ERP vendor was a bottleneck and that the difficulties posed by the changes affecting other business processes was not desirable, the DBD repurposed the IoT project to create a data integrator that could poll different forms of data that could then be combined, processed and analysed to generate digital business insights and opportunities. According to the CIO,

> . . . we have this IoT platform which is actually an excellent integration platform which makes development faster because this has its own databases and from here you have already different ready-made connectors.

The platform is positioned to serve as a form of data aggregator from different data sources, including the ERP, which can then be recombined and repurposed to more flexibly meet the different emerging needs of the digital innovations and the business process.

> . . . somebody said that I have an idea, but I don't know if it can be done because . . . the ERP is like so limiting then and everything is so awful to use, and we're like hey, [in the IoT platform] everything is possible. We can do everything! (IoT innovation lead)

This enabled many managers of different business units (e.g. the lifecycle service and maintenance business unit) to start rethinking several of their business processes in relation to the possibilities of recombining data and mapping business processes with the new possible data flow. A member of the lifecycle service team described the flexibility gains as follows: "Now that we have the [IoT] software . . . there we have a benefit [to] define how we want to work and then the tool will be modified according[ly]." While the infrastructure still supported the transformation and business processes, the building frustration and the need to develop an IoT platform for leveraging data for innovation purpose suggest a need as well as the motivation for a flexible infrastructure that could accommodate generative changes.

Agential Logic: From Procedural Actors to Mindful Actors

While operating in a regular business context that was not characterised by the volatility of digital transformation, the actors in LeadTech had clear instructions and well-modelled business process diagrams that outlined what they needed to do as well as the sequence of activities within a business process. Although deviations did happen during this period, the business process models accommodated such issues with escalation mechanisms. As this was a period not characterised by transformation, the models were not too difficult to update when new exceptions or deviations occurred as the volume and the pace of changes were not too overwhelming. The underlying assumption of this work is that actors are procedural and are expected to follow the business process models in fulfilling their obligations. The transformation period challenged these premises and required the mindfulness of the actors, particularly in situations where there were either no documented business processes or where the business process model was obsolete.

Changing workforce roles and responsibilities. One of the visible aspects of change in the organisation has been the rapid change in the composition of the workforce. First, prior to the transformation, the company was primarily a manufacturing company dominated by engineers.

With the transformation to creating and delivering digital offerings, the company revealed in a recent announcement that software developers make up almost 20% of its workforce. This composition is atypical for a manufacturing company. Second, the CEO revealed in an annual event of the company that "25% of all the company's workforce have never been to the annual event because they were hired within the past 12 months." This is indicative of the scale of change the company had undergone since it embarked on the digital transformation journey as well as the pace at which the organisational change is happening.

LeadTech has traditionally operated in a stable and conventional business setting, which implies that the organisation has not needed to employ as many people (onboarding) as it had to during its digital transformation process. Besides the influx of new employees, there was also the dynamic of a large number of existing employees leaving the company. Some of these employees were laid off in a sweeping redundancy episode (offboarding) that affected about 20% of the workforce. This lay-off episode happened just before the announcement of the digital transformation strategy. Yet other employees considered that the new direction of the company did not favour their expertise or did not align with their vision and thus decided to leave during the transformation process. The high number of new employees being hired as well as employees leaving the company introduced new BPM challenges. The new hires are not familiar with the business processes in the company, so they do not have much experience to rely on. Also, several business processes have not been modelled yet. The fresh hires, therefore, must rely on training and frequent checks with others to ascertain the process to follow. The exodus of certain veteran employees also left a void of knowledge regarding existing approaches. Although this created a gap, it was also seen as an opportunity for business process renewal as the new employees brought expertise and best practice suggestions as input in shaping the organisation towards its transformation goals.

To provide an example, the company has developed a very robust process for its onboarding and offboarding process which is properly modelled and well-documented to the most minute details. However, this process has been very seldomly evoked, which means that many managers have never had to follow the process. With the implementation of the digital transformation initiative, many managers (some newly appointed) were predefined actors required to play an active part in the onboarding/offboarding process (in addition to their already-expanding or changing regular work responsibilities).

One of the aspects of the business process involves accessing and populating a software application that has been designed specifically for handling the IT registration and security access privileges for new or quitting employees. By filling out this application, a member of the IT team receives a notification of an incoming or an outgoing employee at a stipulated time. Based on this information, the IT team then starts the process of acquiring the necessary IT equipment for an incoming employee or preparing to receive equipment from a departing one. This notice also triggers the creation/deletion of a work profile as well as the provisioning or revoking of the rights and privileges of the employee. Despite this well-defined process, many managers do not remember nor are aware of the need to fill out the application. Hence, all the relevant IT processes that should be started remain inactive until the new employee arrives or leaves.

> [Over] breakfast I heard that oh, that guy has left, and I was like who? . . . Then I contact HR – is this person working here? Because he has all [user] accounts open, and emails, and so on . . . he can actually access all information . . . and then we finally figured out that okay, he's gone [since] a couple [of] months ago. (IT support manager)

Improvisation in enacting business processes. Following the onboarding/offboarding challenges, the IT staff have been continuously under pressure to react on short notice when new employees arrived and needed a laptop/PC with all the software installed and ready to use. This led to frustration on the part of the IT team, to an awkward surprise for the managers

about and to an uncomfortable start for the new employee. For the managers who were aware of or who remembered the existence of such an onboarding/offboarding process, the situation was different but still deviated from the documented process. These managers have typically preferred to send an email to the IT team to notify them of the onboarding and offboarding of an employee. This usually set in motion a back and forth series of emails to guide the managers in using the system or to collect the essential information needed to continue the onboarding or the offboarding process. Reasons given for this approach range from not knowing or remembering how to use the system, to complaints that it requires a lot of effort and some passwords have changed. Such approaches still leave the IT team and the managers frustrated.

Given the increasing frequency of this occurrence and the headaches it causes particularly for the IT team, a key member of the IT team leading this arm of the business process embarked on an initiative to improve the situation. She decided to create a light process that would encourage and make it easy for the managers to provide the required information as quickly as possible. The team also considered making it a process that could be used as a rapid and standard response to emails of onboarding and offboarding from the managers. The IT team decided on a simple yet robust excel sheet that required only the essential details.

> We are trying to make it work with these small changes that they can now forget about the HR system. HR will take care of it, and they just have to fill the [excel] form. Actually, I have filled some forms for them because I know I get it faster . . . . (IT support manager)

The IT unit's actions in this scenario show mindfulness in how the actors enact their initiatives in carrying out the required activities. Similarly, a sense of deploying light processes can also be seen in play in contrast to attempting to enforce rigidly defined business processes. As one manager describes it: "People need to basically know what needs to be done and keep documentation [only] where necessary for reference."

Additionally, since many of the conventional business processes are obsolete, this brings to the fore different approaches and practices adopted for achieving the desired objectives

without recourse to the documented process. For instance, many workers relied on oral transmission of knowledge instead of checking process documentations. One manager captures this in his reflection:

> . . . there's a plan, and there's a process existing, [however] the documented version is not so easily available [or up-to-date]. I know well what I'm supposed to do because I have discussed with my foremen, and they have told me that this is how this goes.

And another manager presented his approach to enacting his role within a business process as follows:

> . . . of course, when it is again how much you want to document [business processes] . . . it doesn't matter [if] we have them or not. The important thing is that people know how they are working, how their work is impacting other persons' work.

DISCUSSION

We observed that the process of digital transformation set in motion a series of continuous changes that required a rethink in our case company's approach to BPM. Rather than relying on traditional logics of BPM, LeadTech had to adopt new kinds of logics to sustain and adapt business processes in the midst of continuous business and organisational changes (Table 4). Instead of relying on detailed modelling (Vom Brocke et al., 2014, Van Der Aalst 2013; Dijkman et al., 2011), they adopted new logic based on *light touch processes* that they deemed as sufficient and easily configurable. In designing infrastructure, rather than engineering detailed process rules for information systems (Recker, 2014; Sidorova et al., 2014), the new approach aimed at increasing *infrastructural flexibility* in the form of a new IoT platform. Concordant with changes in these two other logics, agential logic also changed: rather than expecting employees to follow procedures (Vom Brocke & Rosemann, 2014; Hung, 2006), managers changed their agency related to employees and began treating them as *mindful actors*, whose judgement would be critical in choosing appropriate actions, particularly in situations where appropriate models or guidelines were not available. See Table 4.

Table 4. Overview of BPM Logics in Regular versus Digital Transformation Contexts

Dominant BPM logic	Digital transformation BPM logic	Underlying values/ drivers	Assumptions	Practices
Process logic		Adaptiveness Experimentation Ambidexterity	The number of changes required and the perpetual need to modify or redevelop the business process requires easy-to-adapt processes.	The focus is on making processes adaptive and easily configurable so they could evolve swiftly rather than being rigidly defined or controlled structures.
Modelling	*Light touch processes*			
Infrastructural logic			When infrastructures are malleable and responsive to emergent business process needs, they can accommodate the generative nature of digital innovations.	The emphasis is on an infrastructure's capability to morph to accommodate continuous change requests rather than as a pre-mapped infrastructure that is tethered and engineered to align with business processes.
Infrastructural alignment	*Infrastructural flexibility*			
Agential logic			Actors can effectively decide on the appropriate actions when there are no reliable business process models and instructions to follow.	Actors effectively equipped to make decisions in ambiguous situations, plus the emphasis is on swift reaction and response in engaging with instances of threats or opportunities.
Procedural actors	*Mindful actors*			

Rather than proving that the new logics adopted during the digital transformation process are generalised formulas for success, our case indicates that following the prior logics leads to tensions triggered by the digital transformation context. Consequently, there is a need for BPM scholarship to rethink prior logics and advance new ones for digital transformation contexts. This forms the basis of theorising the three logics that we advance.

Peculiarities of the Digital Transformation Context

Juxtaposing received knowledge about IT-enabled organisational transformation from prior literature with the observations of digital transformation in our case suggests that there are differences between digital and IT enabled transformations. As conceptualised in prior literature, in the case of an IT-enabled organisational transformation an organisation leverages a particular digital technology (e.g. ERP systems) to enable it transform its processes (Besson & Rowe, 2012; Crowston & Myers, 2004; Orlikowski, 1996). Typically, such IT-enabled organisational transformations align with the transformation of operational processes in order

to facilitate the attainment of certain business and organisational goals (Crowston & Myers, 2004; Wessel et al., 2019). Such transformations help an organisation to be more efficient, effective and reliable in the different facets of its operational process and value offerings (Barrett & Walsham, 1999; Berente et al., 2016; Orlikowski, 1996; Wessel et al., 2019).

As observed in our study, digital transformation captures the metamorphosis of a company towards developing traits that are characteristic of a company that creates and delivers digital value propositions as part of its offerings as well as leverages digital technologies in its operational processes (Legner et al., 2017; Wessel et al., 2019; Weill & Woerner, 2018). This is indicative of changes that reflect the positioning of aspects of the organisation's identity as having attributes of *going digital*. Going digital in this sense would imply that the company is leveraging digital technologies in repositioning itself towards operational and product attributes that have elements which are akin to a born-digital company (Bossert, 2016; Weill & Woerner, 2013), regardless of their industry or traditional business domain (Bharadwaj et al., 2013, Westerman et al., 2014). As an analogy, while IT-enabled organisational transformation (such as implementing an ERP) can be likened to "a cub transforming into a lion" – that is into a faster and more efficient version – digital transformation, on the other hand, can be likened to "the metamorphosis of a larva into a butterfly".

Our findings emphasise and are consistent with prior research, such as Nambisan et al. (2017), Svahn et al. (2017), Wessel et al. (2019) and Vial (2019), that suggests that theorising about digital transformation begs a rethinking of the assumptions regarding applicable management frameworks. The three new logics that we have advanced draw from two fundamental attributes of digital transformation: deep structure change and generativity of digital innovations (Besson & Rowe, 2012; Yoo et al., 2010). Generativity is a potent argument for the need for less rigid and less–tightly controlled management approaches. It engenders change and emergence, which makes it an attribute that cannot always be pre-planned or

totally modelled due to the degree of emergence and uncertainty that accompanies its actualisation (Henfridsson & Bygstad, 2013; Yoo et al., 2012).

These two attributes (generativity and deep structure change) together lead LeadTech to assume a posture in their managerial and leadership approaches that leverages rather than conflicts with the two attributes. With traditional BPM logics, tensions were inevitable, thus limiting LeadTech's possibilities for attaining the digital transformation objectives. The alternative BPM logics adopted during digital transformation allowed them to better take advantage of the opportunities afforded by generativity as well as to engage with the tensions that arise due to deep structure changes.

Advancing BPM Logics for Digital Transformation Contexts

Light Touch Processes

We have established that although the modelling logic enables BPM to provide sequences of activities that guides an organisation's business processes (Recker et al., 2009; Vom Brocke et al., 2014; Van Der Aalst, 2013), the modelling logic is challenged by the volume of changes and perpetual need to modify or redevelop business process models in digital transformation (the process logic challenge). We propose that *light touch processes* provide a new process logic for BPM in a digital transformation context. Light touch as a term reflects a situation where processes are not controlled strictly or with rigidly modelled instructions. As a theoretical concept, it captures the value of having easily modifiable processes in the process logic of an organisation's BPM. This light touch view reflects the capacity for processes to be structured in a way that allows for easy reconfiguration and adaptability to changing situations (Harmon, 2010; Pentland & Feldman, 2008; Feldman & Pentland, 2003).

In the case this is exemplified by the cumbersome business process and the HR system surrounding the onboarding and offboarding of employees, which was replaced by an easily reconfigurable excel sheet that was delivered through direct email communications. The

desire to implement simple processes and tools in LeadTech is similar to the descriptions given by Eisenhardt and Martin (2000), whereby such processes provide enough structure so that people can focus their attention and are able to act in uncertain and volatile situations. With this discussion in mind, it is plausible to understand business processes as routines that are constantly changing and adapting to internal and external conditions (Beverungen, 2014) or striving towards the achievement of a dynamic fit between the environment, the processes and the technology (Trkman, 2010).

In contrast to a well-modelled business process, which facilitates stability (Sidorova et al., 2014; Recker, 2014), light touch process provide value with its dynamic nature in a context that is characterised by constant changes (Lyytinen & Rose, 2006). As illustrated in the case, the digital transformation context required a series of experiments with different processes and ways of achieving the organisation's goals. This is accentuated by the ambidextrous exploitation and experimentation going on in the company with regards to leveraging digital innovations. Coupled with the changing employee base whereby new employees are coming in with their own ideas of how to do things, a light touch process provides the adaptability that is required to cope with such situations. Light-touch processes contrast with rigidly fixed processes that place hurdles and are hard to adapt (Crick & Chew, 2017; Wang et al., 2012).

Infrastructural Flexibility

While the prevalent infrastructure logic has typically viewed the essence of infrastructure as tools that need to be aligned to enable the fulfilment of a business process (Dumas et al., 2005; Hammer, 1990; Sidorova et al., 2014), our study demonstrates that this infrastructural alignment logic is challenged by the generative nature of digital innovations in digital transformation contexts (the infrastructure logic challenge). Therefore, based on our findings, we propose *infrastructural flexibility* as a theoretical lens that captures the infrastructural logic of BPM in digital transformation. Infrastructural flexibility refers to the capacity to swiftly

orchestrate the IT infrastructures in a way that makes them amenable to different situations and purposes.

We identify this view from the approach that the case company took to rethink parts of its infrastructure in order to make progress with its digital transformation agenda. Infrastructural flexibility as opposed to an alignment view of infrastructure suggests that the capacity of an organisation to nimbly reconfigure its infrastructure in accordance with the shifting demands of the business process is an important element in a context characterised by constant experimentations, change and ambidexterity. This is particularly so due to the generative property of digital innovations required in such contexts (Yoo et al., 2010). For example, as data is a key component of a business process, the lack of flexibility to accommodate continuously changing digital innovation demands in the setup of the infrastructure can mar rather than enable the flow and utility of data along the business process towards creating digital innovations (de Albuquerque, 2015; Recker et al., 2009).

While the infrastructural alignment view positions infrastructure as a component of the business process that needs to be carefully structured based on a well-crafted plan (Vom Brocke et al., 2014; Sidorova et al., 2014), the flexibility view considers infrastructure as something that is malleable and possible to reshape to account for changes and deviations from the plan (Pentland & Feldman, 2008; Rosemann et al., 2008). As illustrated by the case, this can be a very difficult endeavour, particularly when the reengineered infrastructure is burdened by legacy and inertia. While LeadTech's ERP system provided the functionality for the IT to perform most of its activities, it remained a huge bottleneck considering the time and effort plus cost required each time there was a need to make changes to the system to accommodate emerging demands for creating digital innovations. This led to the introduction of the IoT platform as an infrastructural investment that not only provided value as a data aggregator for multiple systems but also as the hub for exploiting and exploring business

opportunities from the data collected from customers. In essence, a flexible infrastructure would better support an organisation's digital transformation efforts by its capacity to evolve and support the continuous redesign of the business and related processes (Kim et al., 2011).

Mindful Actors

In agential logic, the underlying assumption is that actors are procedural and follow defined guidelines (Datta, 1998; Hung, 2006; Vom Brocke & Rosemann, 2014). However, as shown by our study, this logic is challenged in situations characterised by a lack of reliable business process models/instructions for the actors to adhere to procedurally (the agential logic challenge). Hence, we propose *mindfulness of actors* as an agential logic for BPM in digital transformation. Mindfulness of actors refers to the agency of employees to draw from their experience and evaluation of the circumstance of the context at hand to decide on appropriate business process actions. This shifts the agential logic in BPM from a procedural view (Datta, 1998; Hung, 2006) to a mindfulness view (Dernbecher & Beck, 2017; Janz et al., 1997).

According to this view, actors can effectively decide on the actions to take in the absence of a well-modelled or documented business process. This is particularly relevant in situations where the organisation's business process is in a continuous flux of change. The case highlights how some managers were able to carry out their tasks without relying on documented model. Similarly, new executives were given training that showcased the objectives their tasks were aimed at without a modelled procedure to follow. This enabled the actors to depend on applying a mindful consideration of the prevailing circumstances in enacting some activities within a business processes as dictated by the dynamics of their digital transformation journey.

Mindfulness as an agential view of the business process suggests that individual actors in the organisation should have the capacity to make conscious decisions towards the attainment of

an objective or the transformation goals without conforming to a dogmatic application of predefined processes (Recker, 2014). Employees should demonstrate sensitivity to the general direction of the organisation and take intuitively calibrated choices that align with this direction (Butler & Gray, 2006). This is apparent in the case of a deviation from a rigid followership of the detailed business process document. This is particularly so in the cases where the old business process may not reflect the changes in other dependencies along the execution of the process or in the cases where applying the old process may even impede the objectives for which they were initially intended.

Implications for Theory and Practice

The purpose of the BPM field is to develop BPM capability in organisations "catering for a variety of purposes and contexts" (Vom Brocke & Rosemann, 2010; Vom Brocke et al., 2016). While prior theorising on BPM remains important and valuable, our study suggests that it is essential, if not critical, that we consider the peculiarity of the context (regular or digital transformation) to determine the extent to which each view of the BPM logic would be more appropriate. We posit that a dogmatic application of the same logic to every context will likely face hurdles and can stifle an organisation from attaining its objectives (Rosemann et al., 2008; Muller et al., 2017).

Perhaps more importantly, we propose three alternative BPM logics that hold the potential to form the core of future investigations of BPM in transformation contexts. Although the context of our study is digital transformation, the advanced BPM logics may find relevance in other deep structure transformation contexts (Besson & Rowe, 2012) in which the distinction would lie in the level of organisational change, generativity and the digital quotient involved in the transformation (Vial, 2019; Wessel et al., 2019). Based on adaptive and emergent nature of the advanced logics, we suggest that they can facilitate an integration between BPM research and the socio-technical views of the transformation of work.

For proponents of the traditional approach to BPM logics (modelling, infrastructural alignment and procedural agency), it may appear unnerving to accept theoretical positions that seem to advocate less-structured and less-formalised procedures. We acknowledge that there is still much value in prior logics, particularly in a regular business context (Vom Brocke et al., 2016). However, our study demonstrates that processes are drifting, rendering top-down managerial control difficult and the achievement of alignment among organisational components a very delicate and uncertain task, and requiring a rethink of rigid models (Beverungen, 2014; Ciborra & Hanseth, 1995). Our proposition is that navigating BPM amidst such a maelstrom as digital transformation calls for new BPM logics, three of which we have presented in our study: light touch processes, infrastructural flexibility and mindful actors.

Additionally, our research has implications for digital transformation research, by focusing on one important area in such transformation - management of changes in business processes. It underlines that, to be successful, digital transformation involves a relaxation of control in an organisational leadership approach which is inconsistent with traditional BPM logics. In this respect we add to Vial's (2019) identification of the structural changes variable in the digital transformation process. If managers continue to operate with assumptions stemming from traditional BPM logics, the digital transformation effort may be limited to performance enhancement rather than digital innovation. Prior digital transformation research may thus far have largely skirted the notion uncomfortable to many firms, which is that careful top-down control and coordination is not always consistent with innovation.

The study has also implications for practice. Not all organisations face a business context characterised by digital transformation. But if they do, this research should serve as a reminder that, in the midst of all the changes, to achieve their digital transformation goals they may also need to reconsider their prevalent BPM logics. Managers in such organisations can use this paper to examine their BPM logics in three essential areas: modelling, infrastructure and

agency. They can compare their existing BPM logics to see if the ones that they rely on resemble more the traditional logics (Hung, 2006; Hammer, 1990) or the logics adopted in the case organisation. In situations of digital transformation and related deep structure transformation, the advanced logics of light touch processes, infrastructural flexibility and mindful actors may be better suited to navigate BPM.

Our study is limited by the focus on a single case. However, we contend that the longitudinal nature of our ethnography study and the rich empirical data that we draw on has enabled us to unpack more of the inner operations of an organisation's BPM in a digital transformation context than can be revealed by a generalisable quantitative model (Klein & Myers, 1999). These limitations provide an opportunity for future research to explore the generalisability of the study's key findings in multiple contexts. Although the context of our study is a case of digital transformation, the BPM logics advanced may find relevance in other deep structure transformation context (Besson & Rowe, 2012).

CONCLUSIONS

Many experienced BPM scholars and practitioners may find the results of this study rather surprising. The received knowledge of BPM is, and has been, of benefit to both researchers and practitioners, with its guidance towards stable, efficient and well-organised business processes. However, the context of digital transformation necessitates a rethinking of the dominant assumptions that have characterised how we think of BPM. Particularly because digital transformation context is the epitome of management at the edge of chaos (El Sawy et al., 2010), it unfolds as a rattling call that challenges the precision and finely modelled control structures that BPM logics have advocated. The counterintuitive logics advanced in this paper for a digital transformation context – light touch processes, infrastructural flexibility and mindfulness of actors – should stimulate the imaginations of BPM scholars and practitioners alike.

The new logics advanced here are also of value to practitioners for evaluating their BPM assumptions when faced by a digital transformation context. For example, they can assess the efficacy and appropriateness of the existing BPM logics in their own organisations. Knowledge of BPM in a digital transformation scenario is thus an important target for research and an important challenge for practitioners. Much is known about it, but much more remains to be learned. The three logics proposed by our study can serve as an impetus for researchers and practitioners to understand and practice BPM better.

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