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The Socio-Technical Dimension of Inertia in Digital Transformations

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Abstract

When organizations undertake large transformation initiatives enabled by information technology, these efforts are often hampered by inertia. The literature suggests that inertia plays a dual role in organizations: it is both required for organizational efficiency and an antecedent of resistance to change. While traditionally inertia is believed to reside in human actors, we suggest that inertia is rooted in multiple facets – in routines, resources such as social agents, and also technology – and plays on multiple levels – at individual, group, and organizational ones. In this essay, we propose a new conceptualization of inertia that encompasses and integrates these elements. Our model suggests that inertia occurs as path-dependent rigidity in organizational behavior through the coalescence of social entities with technology artifacts. We illustrate our new understanding of inertia by revisiting two case vignettes of inertia and impeded digital transformations.

1 Introduction

Organizations continuously exist in the tension between the need for strategic agility to address environmental changes, and the coherence of structures and practices [2, 52]. The interactions between social entities and information technology aggravate this tension. On one side, information technology is meant to serve the competitiveness and agility of organizations. On the other side, design, implementation, and use of such artifacts rigidify organizational practices and resource allocations through their inherent logic, in turn decreasing strategic adaptability [32, 54]. This rigidity can be viewed as inertia, the persistence of form and function, regardless of their efficiency or effectiveness [48].

Because of the dual role of information technology, inertia is central to digital transformation. The latter denotes the use of emerging information technologies to enable major organizational improvements [18]. As Aldrich and Ruef [1, p. 136] formulate it: "Transformation, as currently conceptualized, only takes on meaning if we assume that relative inertia constitutes the normal state of organizational life". Due to inertia, organizations struggle to keep up with and adopt to the fast paced changes in their competitive environment [18].

The case of a Swedish engineering company (anonymized as SEC) illustrates these challenges well [38]. The information technology platform of SEC was integrated and relatively standardized. The legacy artifact for the organization's logistics, however, over years became too rigid and data management could not keep up with newly added functionalities. Thus, SEC decided to transform its logistics processes by implementing a new artifact.

The strategic intent of the project at SEC was to improve its competitive position through efficiency gains. The implementation was driven by business requirements and completed smoothly. The new artifact enhanced the flexibility of communication and coordination between head office and sales units. Simultaneously, however, the artifact also reinforced existing administrative organizational structures, fostered centralization of power, constrained flexibility in decision making, and rigidified routines. Accordingly, the strategic transformation of its logistics simultaneously increased efficiency and decreased the competitive responsiveness of SEC through accruement of inertia.

In the literature on digital transformations, the relevance of inertia is acknowledged and, to a limited extent, also examined [6]. However, we show that while it is a popular theme in the literature, by and large it remains under-developed and under-operationalized; most notably in the interpretation of inertia as merely a synonym for resistance to change, and as a concept rooted in human agents. We challenge this view. Our main assertion is that inertia is neither a synonym for resistance to change nor an exclusively agent- or resource-centric concept.

If inertia is meant to be more than a synonym for resistance to change, then we need a theoretical framework helping to understand its nature as well as its antecedents and consequences. We make this move and offer a new model that describes the *socio-technical dimension of inertia*. The model suggests that inertia in

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socio-technical systems is rigidity from emergent interactions of human actors with information technology [6, 37].

In developing our new model for this research-in-progress report, we undertake three steps: 1) we review the literature on organizational inertia in the information systems research community for existing conceptualizations and the role of information technology therein, 2) we derive explanatory gaps in the understanding, and 3) we propose an extension of existing conceptualizations for the incorporation of information technology in organizational inertia. With our model, we contribute by theorizing the role of information technology in inertia and thus indirectly to the understanding of transformational changes enabled by information technology. Furthermore, the model offers a foundation for research on the phenomenon of inertia by proposing a conceptualization of a socio-technical dimension and potential implications thereof.

2 Current conceptualizations

We are not the first to examine inertia in information systems research. To review current conceptualizations and the role of information technology therein, we performed a structured literature search [57] and review. We kept a broad scope, aiming to cover a selected sample of literature on inertia in the context of information technology. We centered the search on information systems research and related publications in organizational science.

2.1 Literature search setup

We searched the AIS Electronic Library without any restrictions on any particular outlets or conferences. Conferences indexed therein included the International Conference on Information Systems, European Conference on Information Systems, Americas Conference on Information Systems, and Hawaii International Conference on System Sciences, among others. To assure the inclusion of the top journals of the discipline, we used additional databases to search through the AIS Senior Scholars' Basket of Journals [51]. We searched for the term "inertia" in abstract, title, or keywords. From 41 search hits, we excluded literature on forms of inertia that do not correspond with the purpose of our study such as studies on consumer/brand choice or network inertia [e.g., 21, 34]. Furthermore, we excluded workshop summaries and tutorials. From the remaining 15 publications, we conducted a backward search to include seminal sources. We considered referenced sources to be seminal if they served as foundation for the conceptualization of inertia in multiple publications from the initial result sample. The final review sample for analysis included 28 publications. For the purposes of this conference paper, we omit the detailed search results; however, the material is available for inspection online at https://goo.gl/p0O8DP.

For each publication, we extracted the notion of inertia as described in the text. Furthermore, we searched for conceptualizations of information technology and any explicit or implicit agential role of it in the emersion of inertia. For that purpose, we collected specific direct quotations that were synthesized in short descriptions. Those aggregated descriptions included the definition and conceptualization of inertia from each source as well as the representation of information technology and its attributed agency. The detailed coding results are also available online at https://goo.gl/p0O8DP.

We summarize our interpretation of the literature as follows: Although the reviewed literature treats inertia as a core concept, the term often remains undefined and its description vague. More than 40% of the publications we inspected (12/28 in total) do not provide a precise outline of their understanding of the concept. Some of them superficially describe the term or refer to established definitions, without any explanation of the extent to which they draw from existing work for their conceptualization [56, 61].

2.2 Level of analysis

The literature can be differentiated roughly in three categories according their level of analysis [26]: *micro-level* (5 publications), *meso-level* (6), and *macro-level* (17). Micro-level studies are concerned with the likeliness of individuals to continue using existing information systems over newly introduced alternatives [e.g., 29, 46]. Macro-level studies investigate the (dis-) ability of organizational systems to adapt to changes in the external environment for efficiency and effectiveness [e.g., 20, 48]. Meso-level studies combine or integrate a micro- and a macro-level perspective [e.g., 6, 56]. Few of those studies go beyond mere consideration of micro- and macro-level dynamics in parallel and relate dynamics on either level to the other and investigate their interrelationships. An example therefore the choice of users to use technology to retain existing habits, resulting in reinforcement and preservation of structures and work practices [42].

Depending on their level of analysis, studies tend to implicitly emphasize different aspects of inertia. For the conceptual foundation they mostly draw from three core sources:

- Hannan and Freeman [22, p. 151] posit organizational size, age, and complexity to co-determine (structural) inertia and describe it to be present when the "*… speed of reorganization*

is much lower than the rate at which environmental conditions change".

- Besson and Rowe [6, p. 105] define inertia as "*… the degree of stickiness of the organization*" (p. 105), as which it may lead to a misalignment of the organization with its environment and thus determines "*… the effort required to propel information system-enabled organizational transformation*".
- Polites and Karahanna [46, p. 24] define inertia in an information systems context "*… as user attachment to, and persistence in, using an incumbent system (i.e., the status quo), even if there are better alternatives or incentives to change*".

All micro-level studies (5) rely for their conceptualization of inertia exclusively on Polites and Karahanna [46]. In comparison, seven studies (from 17) on macro-level inertia explicitly draw from Hannan and Freeman [22], while half of all studies on a meso-level (6) base their conceptualization of inertia on the work by Besson and Rowe [6].

The commonality of the three perspectives, from the level of analysis as well as the core publications cited is the understanding of inertia as *rigidity*, seen in relation to an external reference such as the environmental context or changes in the technology base.

Rumelt [48, p. 103] trenchantly summarizes the meaning of this rigidity:

> *"The centerpiece … is the deduction of the … responsiveness … to changes in … technology, … etc. […] I shall call this lack of plasticity inertia. Inertia is the strong persistence of existing form and function. If the form is efficient, inertia is costless and arguably beneficial. However, if … form or practices are inefficient, inertia is a problem. Indeed, the most direct evidence of inertia is the persistence of inefficient forms and practices".*

According to this definition, inertia is rigidity in structures, social and material, and their interrelationships.

2.3 Social and material entities and their agency

While all studies consider some form of social entities, individuals, groups, or organizations, also material entities play an important role in the reviewed sample of studies. Information technology as a material artifact is explicitly referred to by nearly 80% of the studies (22/28), not surprisingly of course given the focus of our review on IS research articles. In inspecting the view of this artefact more closely, however, we find that most dominantly information technology is represented as a *tool*, a material artifact that can be used by social actors (64%; 18/28 of the publications). Fewer studies (10) can be classified to represent information technology beyond a tool view as *embedded systems* [43]. We consider both the tool and the systems view to represent structures. Thus, besides social structures also material ones are widely present throughout the literature on inertia.

A difference can be found in the attribution of agency, the capacity of agents to act on their own [33], to those social and material entities. The matter of agency is particularly relevant to the conceptualization of the relationship between different entities [3, 44]. None of the studies we reviewed questions the agential role of social entities. However, half of the studies (15) do not attribute any material agency to information technology. The other studies in the sample (13) imply some form of agency or a potential for it to be inherent in their representation of information technology.

In particular, all individual-level studies omit an agential role of information technology in the emergence of inertia. They emphasize the social realm and consider social entities to take purposeful decisions upon passive material entities. Individual choices or social relationships stand in the foreground (e.g., through psychological factors such as cognition, behavior, affection, and social norms or structures). Micro-level studies thus show a bias towards inertia as a relational concept, expressed in the unidirectional relationship of social actors with information technology, or as Doherty et a. [14, p. 569] put it: "*… recent contributions … have tended to be rather one-sided, focusing almost solely upon the role of the human agent in shaping the technical artefact, and in so doing either downplaying or ignoring the artefact's shaping potential*".

This bias is less extreme in studies of inertia on a meso- or a macro-level. However, we therein find a considerably stronger emphasis of structural features of inertia [e.g., 20, 22]. Those structural features are for example the age, size, and complexity of structures in the social as well as the material realm. In particular, macro-level studies show that bias towards structural features. Current meso-level analyses of inertia, with two exceptions [i.e., 42, 56], reflect a combination of both biases: the micro-level tendency towards a focus on relational properties as well as the macro-level bias towards emphasis of structural features of inertia.

2.4 Key challenges

From our review, we synthesize three major challenges. First, we identified a seemingly widespread assumption that inertia lays in either structures or relationships. Second, a large part of the literature ignores the potential agential role of information technology in the emergence of inertia. Third, although implicitly present in a large part of the literature on inertia, the space of interaction between social actors and information technology in the formation of inertia lacks a theoretical foundation.

We thus propose a new perspective on inertia that suggests it to emerge from both, structures and relationships from a social and a material realm. Our perspective stresses the proposition that information technology, through inherent agency, contributes to the emergence of inertia. For that reason, we point out the necessity for a consideration of a socio-technical dimension of inertia in which the social and the material entities enact their agency upon each other.

3 A socio-technical dimension of inertia

The following section describes a novel conceptualization of inertia that encompasses both social and material elements. We do so by identifying relevant concepts of inertia in the (a) social realm, (b) the material realm, and (c) the space of interaction of these realms - the socio-technical dimension. The proposed concepts we extracted from current and established conceptualizations of inertia in the literature which we analyzed along those three spaces. Where no concepts were found, we extended the search beyond inertia into literature on each of the individual spaces for being able to draft relevant concepts each of them.

We start by defining inertia as rigidity in the form and function of socio-technical systems. The socio-technical dimension of inertia relates to the rigidity arising from path dependent interactions of human actors with information technology [6, 42]. Those interactions are constituted by three domains: the social, the material, and the emerging socio-technical dimension. The realms are interrelated and mutually co-determine each other. Thereby, they make up a meso-level construct, mutually bridging dynamics form the interaction of individual human actors with information technology artifacts to macro-level organizational effects [41, 58].

3.1 Social and material realm and their enactment of agency

The social realm encompasses human actors with their attitudes and beliefs that exhibit in conscious actions and decisions. Accordingly, the rigidity is a bias in the conscious decision-making towards the status quo [49] as a "preference to stay with the incumbent course of action even if there were better alternatives or incentives to change" [46, p. 23]. The main motives behind such a preference relate to the perceived effort to leave the status quo and change towards a new status. An example for the course of action in the context of social entities and their relationship to information technology are users using an information system differently or switching from an incumbent to a new system. Considerations of leaving a current course of action relate to the perceived *sunk costs* (see Table 1), previous resource commitments. Those commitments, although irrecoverable, can cause reluctance to leave a taken course of action, even if it is leading to suboptimal outcomes [9]. Efforts related to taking up a new course of action and adapting to a new situation are called *transition costs* [49]. Those could, for example, be resources that are necessary for users to switch to a new system. Resources come in the form of expenses and time to setup a new information system, time to learn to use it,

Table 1. Socio-technical dimension of inertia

Concept	Realm/ Dimension	Definition
Sunk Costs	S	Individual tendency to justify previous commitments to a course of action by making subsequent commitments [46].
Transition Costs	S	Time and effort required from individuals to adapt to a new situation [46].
Rigidity of Material Artifact	M	Degree of (in-)flexibility of information technology to be adapted to newly required affordances [17].
Material Complexity	M	Number and variety of components, number and strength of interactions, combined rate of change, and individuals' perceptions of difficulty in understanding the technology [60].
Habit of Artifact Use	ST	Learned response automatically triggered by stimulus cues in the environment such as thoughtless use of established (legacy) systems for obtaining specific instrumental goals [46].
Formalization of Routines enacted upon Artifact	ST	Degree of explication/articulation of written policies, descriptions, charts, strategic and operational plans, and objective-setting systems to govern [5].
S = social; M = material; ST = socio-technical		

or compromises in the functionality compared to the old system. Polites and Karahanna [46] in their study on decision-rigidity of information systems users show that the two factors, sunk costs and transitions costs, account for a large part of potential attachment to and persistence in incumbent courses of action.

The material realm relates to the properties of information technology artifacts that determine their flexibility or rigidity. *Rigidity of material artifacts* has been researched primarily with a perspective on its inverse quality, which is flexibility. Flexibility is the ability of a resource to serve multiple purposes and thus, as opposed to rigidity, is seen as a desirable quality in information technology [17]. Thereby, flexibility as a design feature expresses in the relative range of potential affordances as well as the dynamic adaptability or modularity to serve newly required affordances [14, 33]. Rigidity, in turn, is a relative lack of such properties. Furthermore, rigidity in the material realm is also determined by the *technological complexity*, the number of components, their variety, and dynamics of interaction [60]. An increase of complexity can negatively affect flexibility and thus increase rigidity of an information system [36]. Complexity decreases the response time of systems "… not because they are any slower than simpler systems in detecting environmental […] [changes] but because the process of adjustment takes longer" [22, p. 162]. The material realm accordingly is constituted by the structural properties of information technology artifacts that define their architecture on a physical, a deep, and a surface level [59].

The enactment of the agency of social and material entities upon each other happens in the socio-technical dimension. Rigidity in that realm arises from and within that enactment of agency. Accordingly, in the socio-technical realm, *"… inertia involves drawing on and not changing existing interpretive, technological, and institutional conditions, and, in this way, reproducing and reinforcing them over time*" [42, p. 422]. The reproduction and reinforcement of the conditions and patterns of actions happens across all levels of enactment. On the macro-level, the competitive landscape evolves, industry standards emerge, and backward compatibility of large information technology infrastructures determines technological trajectories. All of those dynamics rigidify organizational entanglement with information technology [12, 15]. On a micro-level, users interact (or decide not to) with information technology through graphical interfaces, touchscreens, keyboards, and computer mice [13, 30]. It is thus on this meso-level on which macro- and micro-level interact and accordingly social actors and material artifacts enact their agency upon each other in routines [33, 42].

Interactions on a meso-level happen not in isolated instances but along repetitive patterns of interdependent actions, also called organizational routines [45]. Those patterns of actions can be executed by one individual upon one material artifact, by multiple individuals upon multiple artifacts, or variations thereof. Rigidity in patterns of actions stems from two sources: as effect of subconscious individual actions and as side-effect of organizing. Repetitiveness in patterns of actions and the agency of material artifacts over time form *habits* as persistent, subconscious behavioral patterns [47, 48]. Habituation is closely associated with inertia because subconscious patterns of enactment emerging from repeated interactions rigidify routines by decreasing their

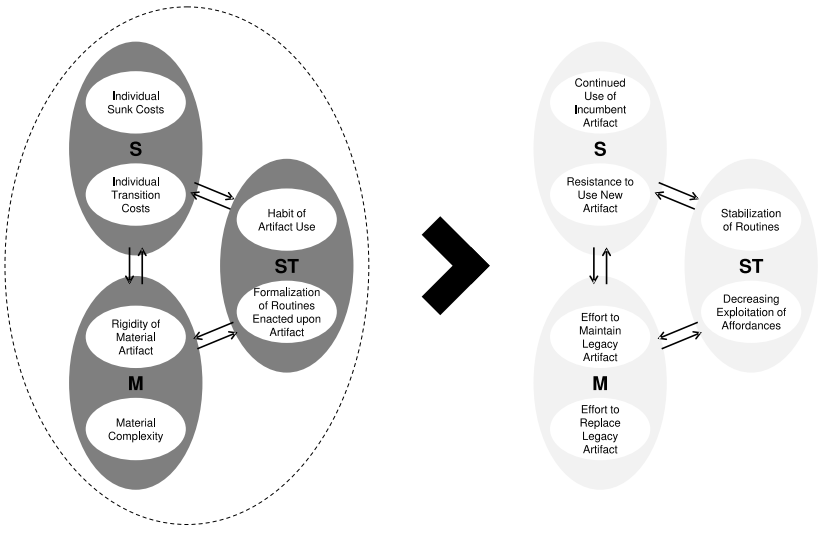

Figure 1. Socio-technical dimension of inertia and its consequences (S = social; M = material; ST = socio-technical)

variation over time [24, 46]. Part of the pattern formation happens through the agency of information technology. Material artifacts offer certain affordances to the user and thus subconsciously guide the user's actions, although being purposeful, with their own inherent logic [10]. This guidance can also be deliberate through the *formalizations of routines* [50]. Accordingly, formalization as articulation of governing policies is on one side a necessary consequence of organizing for efficiency, on the other hand a root-cause for inertia [5, 19] (see Figure 1).

3.2 Interactions between the two realms and the socio-technical dimension

The two realms as well as the emergent socio-technical dimension and their components are closely interlinked. Inertia might be present in the social and the material realm in isolation, but only in their enactment upon each other do they unfold into the socio-technical dimension. Existing research also draws relationships between the individual components of the realms.

The mutual relationship between the social and the material is also determined by material agency. Complexity of information technology, for example, can directly influence the perceived transition costs, because the more complex an artifact is, the more effort it takes to learn to use it [46, 55]. Simultaneously, those transition costs translate into sunk costs once a complex system is mastered and should be replaced. As a consequence, complexity contributes to inertia not just directly but also indirectly. This relationship contributes to the overall rigidification in the socio-technical dimension of inertia. Beyond the current model, logics of the social realm also determine the design and development of material artifacts and thus, intentionally or not, their rigidity and the complexity of the design.

The social realm and the socio-technical dimension are in a close relationship as well. For example, habits and individual sunk and transition costs are in a reinforcing feedback relationship witch each other. Habits can increase the perception of both types of costs. At the same time such costs can guide conscious decisions and thereby increase subconscious habituation [35, 49]. The same accounts also for the formalization of routines. Formalization policies can be entry barriers to learn routines as well as barriers to change by hindering the transition into a new regime.

Similar to the other relationships, also the socio-technical dimension and the material realm are mutually dependent. An example therefore is the formalization of routines that interweave with the rigidity of material artifacts [25]. A high degree of formalization favors rigidity in material artifacts, in their design or adoption. Also, artifacts with their inherent (rigid) logics contribute to formalizations of behavior [7, 10]. It could also be plausible to hypothesize complexity in a system to promote formalization in use, as means of trying to keep the actualization of affordances "under control". For example, we could think of the vast body of policies to govern stakeholders that often comes with complex organizational information systems.

The emergence of inertia is closely coupled with a temporal aspect. While the material properties might be inherent to the artifact, its design includes a temporal dimension through standards with a past evolvement and backward compatibility of artifacts [23]. Furthermore, the interaction between human actors and material artifacts happens dynamically. Over time, sunk costs accumulate and habituation arises. As Kallinikos [27, p. 237] states: "*Human inventions solidify over time, as layers of technical, organizational, and social developments get superimposed one upon another to create complex systems that impose their ways of operating*".

The consequences of inertia from the interplay between the three realms unfold in the very same domains. In the social domain, a higher propensity for *continued use of an incumbent legacy system* or *resistance to use new information technology* might arise from rigidity in the path dependent interactions between human actors and material artifacts [8, 31]. In the material domain, inertia might express in higher *efforts for maintenance* of material artifacts and *higher efforts to replace* incumbent systems. A replacement requires the extraction of the purpose of a material artifact in the context of a larger work or organizational system and the coverage of the same purpose with a new artifact. On a socio-technical level, the routinization of the interaction between human actors and material artifacts can lead to an *endogenous stabilization* as it tends to remain stable also when facing change in external conditions [24, 50]. In terms of a path dependency it could thus be hypothesized that, over time, the exploitation of potential affordances decreases as the use of an artifact becomes rather routinized and habitual than improvisational [53].

3.3 Core propositions of the model

Based on the proposed model and our objective to theorize the socio-technical dimension of inertia, we put forth the following core propositions that relate to the preceding explanations.

First, our work bases on a definition that suggests inertia to encompass both, form and function, respectively structures and relationships:

i. Inertia exists in structures, social and material, as well as in the interrelationships of those realms.

We argue that rigidity in structures and relationships apply to all realms, regardless of their ontological nature. Relationships between the two realms are considered to be coequal, regardless of which ontological entity enacts its agency upon another:

ii. The agential role of information technology contributes to the emergence of inertia.

The enactment of agency of different ontological realms happens in an emergent dimension, within which inertia arises from the path-dependent coalescence of different entities:

iii. Inertia in the relationship between social and material entities takes meaning only in consideration of a socio-technical dimension, in which the two realms enact their agency upon each other.

Finally, our model posits the emergence of inertia as a change over time. Only through time can actors unfold their agency and rigidity arise. Furthermore, inertia has manifold consequences that range from individual resistance to use newly introduced artifacts to increased required resources to replace incument artifacts and introduce new ones.

4 Illustrating the socio-technical dimension

We now present two vignettes. Those are meant to exemplify the grounding of our propositions. The vignettes illustrate, based on real examples, how the socio-technical dimension of inertia arises from the emergent interaction of the material and the social realm.

4.1 Vignette 1: QWERTY-Keyboard

Dating back to the early history of information technology, the persistence of the QWERTY keyboard layout is an illustrative example of socio-technical inertia. The external environment changed significantly since the late 19th century, when the layout emerged in typewriting. Nevertheless, QWERTY is still the dominant layout. The story of the keyboard has been told from different perspectives such as economics of technology standards, competition among manufacturers, and path-dependency [e.g., 4, 11]. Those perspectives emphasize the resource aspects in the emergence of the keyboard layout and tend to neglect the role of technology in structuring the habituation of patterns of actions [3, 44]. The structuring of the habituation, implying a certain agency in material entities, brings on inertia. Inertia in that case might also contribute to the explanation of why decades of innovations in human-computer interaction, including ten years into the launch of smartphone touchscreens that today are prevalent everywhere, did not change anything in the dominant keyboard layout.

This example shows how rigidity in surface structure, through routinization and habituation in the socio-technical realm, can establish rigid social and material norms.

4.2 Vignette 2: Banking and Insurance core information systems

An illustrative example of inertia can also be found in organizations of the finance and insurance industry throughout western countries. Due to the nature of their business, those organizations were among the early adopters of information technology in the second half of the last century. Organizations in those industries heavily rely on information and thus technologized their core business as fast as possible. This served their purposes well and contributed to their successful positioning as an important part of the global economy [28]. Those days, however, the accrued inertia in particular in the socio-technical dimension surfaces when those organizations try to keep up with the fast paced mega-trends in digital innovation.

Many banks and insurances face increasing pressure to modernize their core platform infrastructure, while the efforts to achieve that and to maintain the systems are constantly growing. Not seldom are those information systems in place since more than 40 years [39]. Accordingly, the physical infrastructure relies on mainframes as known from the 1980s and software is programmed in old languages such as COBOL. This rigidity in the material realm is related to the formalization of work routines on the business side, and rigidity in the social realm, particularly in the knowledge and capabilities of the staff responsible for development. Younger developers are not familiar with the languages and the current knowledge holder grow constantly older [40].

Those circumstances cause significant challenges for those organizations, when they try to apply new digital techniques like big data analytics or mobile data provision. The required artifacts are incompatible with the old infrastructure. Accordingly, making the operational data available to work with the new techniques without separating it from the old systems can become very expensive, if not even impracticable [40, 16].

This example describes how inertia impedes organizations from innovating their information technology

core. Rigidity in the material realm thereby combines with rigidity in the social realm. Consequently, the organizations are caught up in socio-technical rigidity which seriously endangers their competitive position, threatened by young, agile organizations or concepts (PayPal, Transferwise, Bitcoin, Peer-to-Peer-Lending, Crowdfunding, etc.).

5 Interim conclusion

From our integrative review, we derived three main challenges for the conceptualization of inertia in socio-technical systems: a) there is a widespread assumption in the literature that inertia lays in *either* structures *or* relationships, b) the potential agential role of information technology in the emergence of inertia is often ignored, and c) the socio-technical dimension of inertia lacks a theoretical foundation.

We provide a theoretical account to address those challenges and suggest a novel model of the socio-technical dimension of inertia. Thereby, we integrate established conceptualizations on a meso-level and aspire to connect decisions and actions of individuals, and characteristics of technology as material artefacts with organizational dynamics from repeated patterns of (inter-)actions.

The model we describe has three underlying core assumptions. First, the social and the material realm exist independently of each other. Second, in socio-technical systems, the two realms mutually depend on each other. Third, through the interaction of the two realms emerges a third dimension in which the properties of the two realms unfold their agency upon the other realm.

While offering first propositions to address the outline challenges, our model is far from complete. The components to describe each realm and the socio-technical dimension are neither comprehensively nor exhaustively portrayed. Because an endeavor to make them exhaustive would be boundless, we had to choose a manageable size and thereby focus on established components and properties. Those are expected to provide a first account for our research-in-progress rather than a final theory.

We will pursue our research on the proposed account in multiple ways. Conceptually, we will further develop and refine the model to align it with existing research and theory. This includes the inclusion of further concepts to describe inertia. Empirically, we aspire to explore our propositions. Because of our focus on the socio-technical emergence of inertia, we suggest to use an interpretive case study methodology to explore inertia-in-practice.

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