



Talking Past Each Other

A Discursive Approach to the Formation of Societal-Level Information Pathologies in the Context of the Electronic Health Card in Germany

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Received: 26 February 2016 / Accepted: 16 October 2016 / Published online: 4 January 2017
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Abstract An explorative case study is used to investigate the formation of information pathologies on the societal level. The paper conceptualizes these particular information pathologies as ‘interaction-related information pathologies’ (Picot et al., *Information, organization and management*. Springer, Berlin, 2008) and proposes that the production of information by multiple stakeholders leads to ‘distortions’ (Cukier et al., *Inf Syst J* 19(2):175–196, 2009) on the societal level. This broad proposition is then explored by means of a qualitative case study of the media coverage surrounding the implementation of the ‘Electronic Health Card’ in Germany. Based on that study, the initial proposition is further specified by conceptualizing how a process of path constitution ‘distorts’ a debate from being about legitimacy of an ICT innovation to being about illegitimacy of stakeholders.

Keywords Human information behavior · Information pathologies · Discourse · Legitimacy · Illegitimacy · Electronic Health Card

1 Introduction

Human information behavior (HIB) is an emerging scholarly field that exists at the intersection of information science and information systems (IS) research (Hemmer and Heinzl 2011). HIB is broadly concerned with how individuals, groups and organizations relate to the information that they seek, receive, share or produce in contexts of using and implementing information and communication technology (ICT) (Fisher and Julien 2009; Hemmer and Heinzl 2011; Miranda and Saunders 2003; Savolainen 2007). This indicates a broad area of interest that is conducive to adopting different theoretical perspectives from the wider information sciences (Fisher and Julien 2009; Savolainen 2007; Talja et al. 2005) in order to explain different phenomena that are relevant for HIB within IS (Talja and McKenzie 2007). In this regard, extant work has developed important contributions to better understanding how actors psychologically process information, for example, by highlighting how cognitive capacity (Browne et al. 2007; Pitts and Browne 2004), cognitive styles (Mendelson and Pillai 1998) or mental models (Vandenbosch and Higgins 1996; Vandenbosch and Huff 1997) affect information processing. The particular strength of these approaches lies in explaining variation in the outcomes of mental information processing when ICT-related tasks are highly pre-structured so that researchers can assume that the information, which informants receive, is objective and manipulation minimal (Talja et al. 2005).

However, more recent literature within IS has highlighted situations that are diffuse or ill-structured, often implying that information can be manipulated and framed. First, literature on IT implementation within organizations has shown how management and other stakeholders rhetorically produce information about IS and how this

Accepted after three revisions by the editors of the special issue.

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Table 1 Data sources

Type of publication	Most important representatives	Number of articles (selection process, from left to right)			
		Initial search	Duplicate removal	Relevance check	Detailed analysis
Trade publications	ÄrzteZeitung, Deutsches Ärzteblatt, Computer Zeitung, VDI Nachrichten, eGovernment Computing, WirtschaftsWoche	1600	1600	1600	573
Newspapers and magazines	Frankfurter Allgemeine Zeitung, Süddeutsche Zeitung, DIE WELT, taz.die tageszeitung, Handelsblatt, Der Tagesspiegel, DIE ZEIT	4620	3085	685	324
Sums articles		6220	4685	2275	897
Sum pages		ca. 1000–1500 pages			

influences outcomes of organizational ICT implementation (Davidson 2002; Leonardi 2013; Seidel et al. 2013). Second, literature on industry-wide technology hypes has shown that firms can try to rhetorically produce public displays of ICT innovations that socially construct (Berger and Luckmann 1967) an innovation's utility instead of this being an objective property of the innovation (Swanson and Ramiller 1997; Wang and Swanson 2007). Third, research on large scale technological change processes in society has shown that actors actively use language to try to influence how certain ICT innovations are perceived by the public (Barrett et al. 2013; Constantinides and Barrett 2015; Currie 2012; Currie and Guah 2007). These examples indicate promising potentials to extend literature on HIB toward phenomena where actors produce and disseminate information.

The wider information sciences have summarized approaches such as the aforementioned ones as a 'constructionism' perspective (Talja et al. 2005). It buttresses on the assumption that reality is socially constructed (Berger and Luckmann 1967) and actors disseminate information as discourses, most often, in the form of texts (Fisher and Julien 2009; Hedemark et al. 2005; Johannisson and Sundin 2007; Olsson 2016; Savolainen 2007). This more sociological perspective on information meaningfully complements more psychological approaches because it is relatively better geared towards explaining how information becomes constructed and disseminated (Talja et al. 2005).

In this paper, we adapt a 'constructionism' perspective to the HIB context. In particular, we contribute to exploring what HIB scholars have come to call 'information pathologies' (Neben 2015; Picot et al. 2008), i.e., behaviors that result in relevant information that is distorted, manipulated, or not shared, used, or read (Neben 2015, p. 2). Consistent with the psychological focus within the overall HIB field within IS, work on information pathologies has contributed greatly to better understanding how cognitive processes affect 'pathologic' information processing of individuals (Bawden and Robinson 2009, 2013; Bronner 2003; Koltay 2011; Neben

2015). However, the psychological focus has also restricted our knowledge of information pathologies to research on the individual, group and organizational levels of analysis (Hemmer and Heinzl 2011). This is unfortunate as recent IS research has stressed the importance that larger collectives such as industry and society have for information-related phenomena (see above). Thus, we aim to extend research on information pathologies by scrutinizing their formation on the societal level and by asking this research question: *how and why are societal-level information pathologies formed?*

Seeking answers to this question, we make certain steps in order to conceptualize societal-level information pathologies and to provide an exploratory model of their formation. In particular, drawing on the general categorization of information pathologies by Picot et al. (2008), we suggest that societal-level information pathologies are best understood as 'interaction-related information pathologies.' In contrast to so-called 'knowledge-related' and 'actor-related' information pathologies, these particular information pathologies are less related to psychological phenomena as they are the result of interactions that increasingly distort information. We then identify four types of distortions mentioned in the IS literature (Cukier et al. 2009) and broadly propose that the production of information by different actors can lead to distortions on the societal level. Relying on an explorative case study of the implementation of a high security environment for data exchanges in German health care [the Electronic Health Card (EHC)], we then further specify this broad proposition in two ways. On the one hand, our empirical study focuses on "illegitimacy" (Cukier et al. 2009) as a particular distortion showing how production of information can quickly shift a public debate from being about legitimacy of an ICT innovation to being about the illegitimacy of stakeholders involved. According to our study, this shift can explain why a discussion turns away from technical questions into contention and infamy. On the other hand, we propose to interpret this dynamic by the logic of path constitution (Fuerstenau et al. 2016; Singh et al. 2015; Sydow et al. 2012), highlighting how publication of

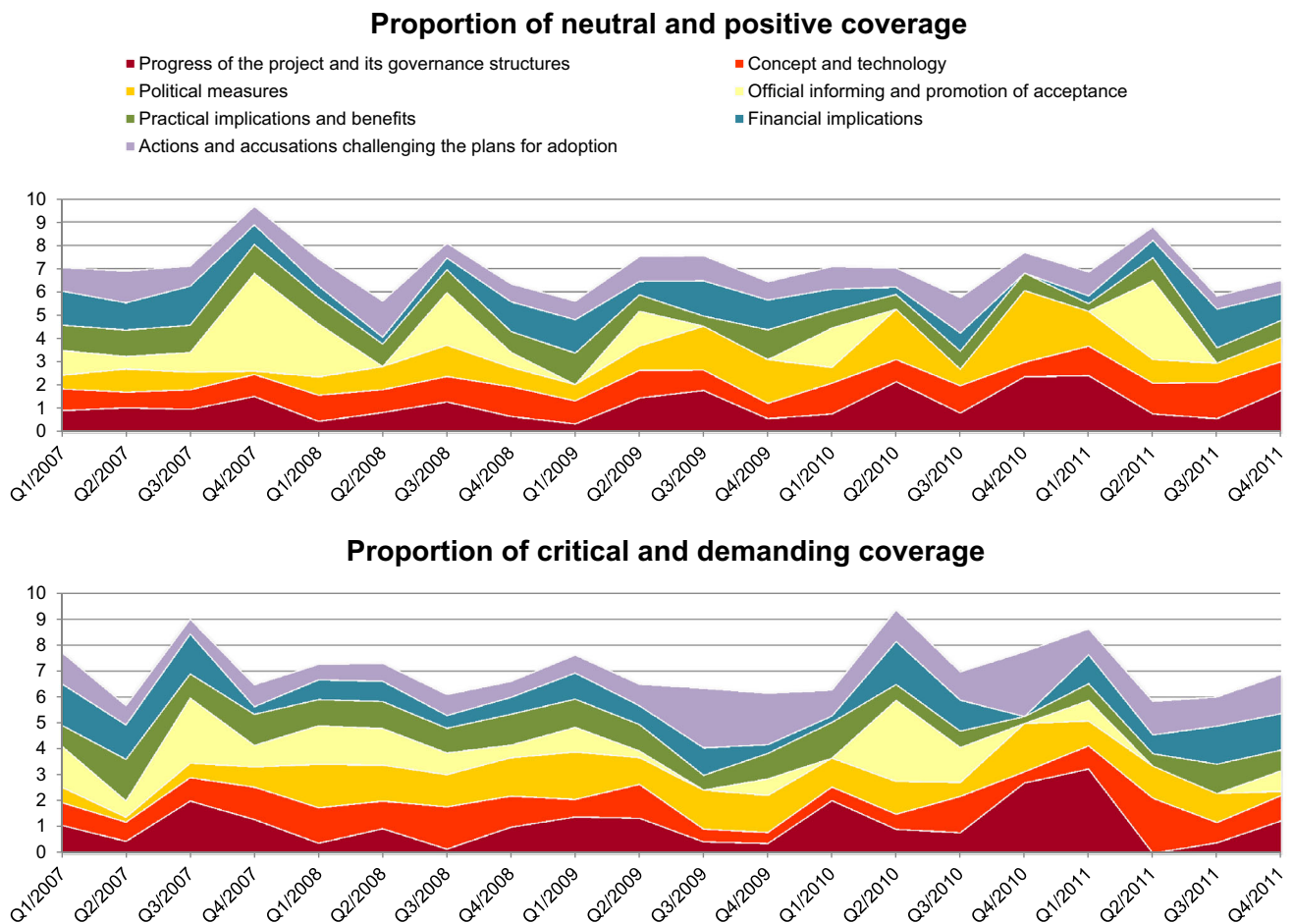


Fig. 1 Overview of the media coverage about EHC 2007-01-01 until 2011-12-31

information related to an ICT innovation cues responses from stakeholders where these increasingly accuse each other of breaching social norms. Based on this case, we seek theoretical generalization (Yin 2013) on why and how information pathologies are formed on the societal-level.

To our knowledge, this is one of the first studies focused on information pathologies on the societal level. Our contribution to HIB is thus to conceptualize this phenomenon in more depth and to offer first explanations for how it forms and for its effects on technology adoption decisions. Furthermore, this work also contributes to information science by highlighting how the practice of producing information in a focal stakeholder group changes. Last, our study also has implications for literature on the intersection of path constitution and legitimacy.

While based on an inductive methodology, we present our study in standard paper format that puts theory, methods, findings, and discussion into sequential order. Following Suddaby (2006) this approach can ensure comprehensiveness so that the remainder unfolds as follows: we begin with introducing our theoretical background

before we review our research design and methodology. Our findings are shown in two parts, a descriptive narrative is supposed to familiarize the reader with our case, and an analytical part links findings with an emerging theoretical argument in the discussion section. In this context, we also discuss our theoretical contributions, limitations and offer a conclusion.

2 Theoretical Background

In this section, we lay the conceptual groundwork for our article. First, we explicate our particular understanding of information, then we situate it within the emerging stream of work on HIB and, third, we review extant work on the particular topic of ‘information pathologies.’

2.1 Definition of Information

‘Information’ is a key term within information science and information systems (IS) research (Hemmer and Heinzl

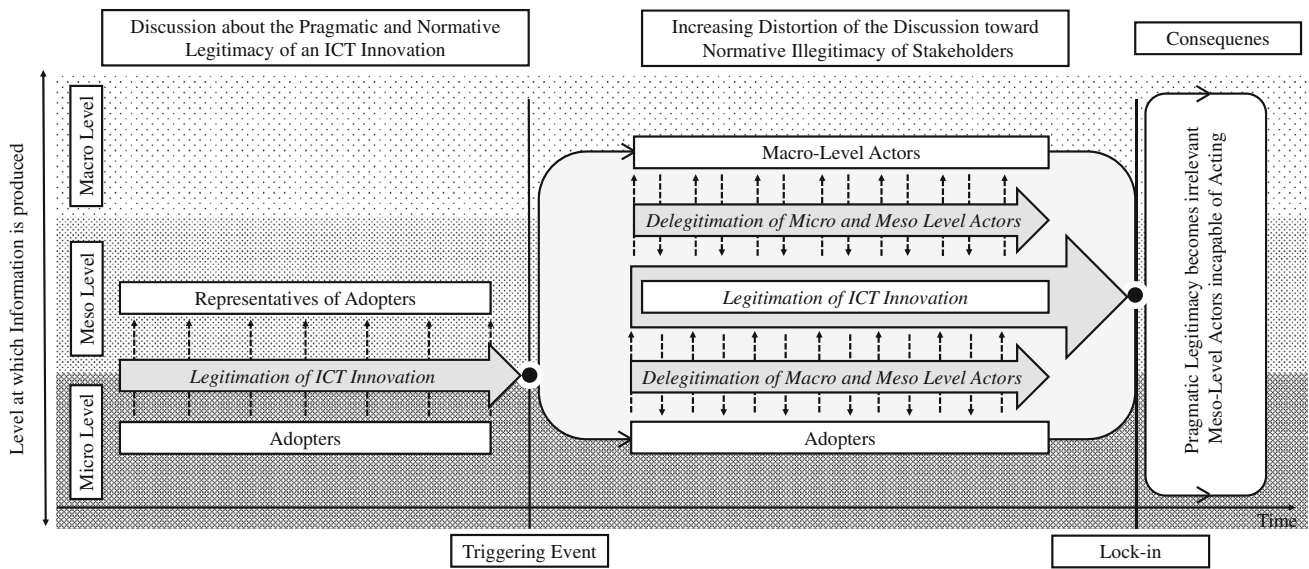


Fig. 2 Formation of societal-level information pathologies

2011). Given centrality in two disciplines, it has been challenging to find a commonly accepted definition of ‘information’ (McKinney and Yoos II 2010), and different philosophical approaches have emerged in order to study ‘information’ (Buckland 1991; Kettinger and Li 2010; Talja et al. 2005). Against this background, McKinney and Yoos II (2010) proposed a taxonomy of understandings of ‘information’ in IS. In this paper, we adopt what they called the ‘representation view’ of information. It assumes that actors receive information in the form of representations (McKinney and Yoos II 2010, p. 334), for example, Google Maps® may represent a route so that viewers are informed about where to turn left or right. Furthermore, we consider representations to include statements about ICT rather than only information received through using IT (Buckland 1991). For example, when management makes statements about the usefulness, purpose, and efficiency of ICT innovations within organizations (Davidson 2002; Miranda and Saunders 2003; Seidel et al. 2013), it provides information about ICT innovations to employees. Similarly, when actors make public statements on novel ICT innovations (Barrett et al. 2013; Constantinides and Barrett 2015; Currie and Guah 2007; Davidson et al. 2015), they provide such information to wider societal audiences.

2.2 Human Information Behavior within the Information Systems (IS) Discipline

Human information behavior (HIB) is a relatively nascent scholarly field that is located at the intersection of information science and information systems research (see, e.g., Hemmer and Heinzl 2011). One of the works that has defined the HIB domain is Hemmer and Heinzl’s (2011)

comprehensive review of the IS literature that identified six relevant themes for scholars within HIB: (1) perception of problem, (2) information need, (3) choice of information channel, (4) information request, (5) information delivery, as well as (6) information assimilation and evaluation. The identification of these areas has been particularly instructive to inform research on how the behavior of persons, groups and organizations relates to the information that they acquire via ICT (Hemmer and Heinzl 2011). A common focus of work within these themes is, thus, to explore how given information is being processed with a strong emphasis on psychological explanations of information processing. For example, cognitive styles are highlighted as triggers for individual information needs (Hemmer and Heinzl 2011, p. 228; Mendelson and Pillai 1998), mental capacities explain the amount of information that can be processed (Browne and Pitts 2004; Browne et al. 2007; Hemmer and Heinzl 2011, p. 230; Pitts and Browne 2004), and mental models guide evaluation of information (Dou et al. 2010; Hemmer and Heinzl 2011, p. 232; Vandenbosch and Higgins 1996; Vandenbosch and Huff 1997).

Psychological approaches such as the aforementioned ones are typically based on what information scientists call a ‘cognitive constructivism’ perspective (Talja et al. 2005). It is based on an objective understanding of information and the assumption that the individual mind affects the ways in which individuals process information (Talja et al. 2005). Hence, research in this vein is particularly suited for the explanation of information processing in organizational settings where tasks are highly structured and information can assumed to be objectively existing, for example, in the case of highly standardized work tasks where many

variables can be held constant but persons vary (Talja et al. 2005, p. 85).

By extension, in settings that may be diffuse or not yet standardized, information does typically not exist objectively but is largely constructed by different actors (Buckland 1991; Talja et al. 2005). Prominent examples within IS would be how managements legitimize new technologies in organizations (Davidson 2002; Heracleous and Barrett 2001) or how certain firms create technology hypes (de Vaujany et al. 2013; Swanson and Ramiller 1997; Wang and Swanson 2007). Information scientists tend to explain these more sociological phenomena by theories that fall under the label of a ‘constructionism’ perspective that assumes that information is socially constructed and represented through language (Talja et al. 2005). We assume that this thinking can be fruitfully used to extend certain areas within the burgeoning stream of work on HIB, and we focus on the area of ‘information pathologies’ to demonstrate the usefulness of that idea.

2.3 Information Pathologies in HIB

Information pathologies are an important topic for research on HIB in IS (Neben 2015; Picot et al. 2008). They broadly refer to “avoidable mistakes, in other words, producible information that is not produced, acquirable information that is not acquired, available information that is not or incorrectly transmitted and... transmitted information which is misunderstood or not put to use” (Picot et al. 2008, p. 73; cited after Scholl (1992, p. 901)). Picot et al. (2008, p. 73 f.) further conceptualized the idea of information pathologies into three types: (1) ‘knowledge-related information pathologies’ refer to individual assumptions of the world that may contradict certain characteristics of new information; (2) ‘actor-related information pathologies’ refer to cognitive processes where individuals may not be able to establish links between (1) and novel knowledge; (3) ‘interaction-related information pathologies’ can occur when individuals communicate with each other and this communication leads to information that is somehow ‘distorted’, i.e., negatively affected by how individuals express information, how information is represented in the media, or how information is manipulated.

It can be stated that extant theorizing on information pathologies in HIB has largely concentrated on types (1) and (2) without further elaborating on type (3). This asymmetry could be a result of the general focus in HIB on psychological information processing instead of on disseminating information between individuals or within society. For example, Bawden and Robinson (2009) have argued that some of the most researched information pathologies are information overload, information anxiety as well as information avoidance. The three are often

explained with reference to psychological concepts like ‘continuous partial attention’, ‘attention deficit trait’ and ‘cognitive overload’ (all used to explain information overload, see, e.g. Bawden and Robinson 2009, p. 183; Koltay 2011), perceived threats that explain anxiety (Jonas et al. 2001), or the ‘theory of motivated reasoning’ used to explain information avoidance (Kunda 1990; Neben 2015). These examples show the important contributions of psychology to better understand ‘pathological’ patterns in individual information processing.

Yet, focusing on type (3) may request the use of other lenses from the wider information sciences within the HIB context because type (3) demands explanations of different phenomena than types (1) and (2). Whereas these focus on the processing of existing information through the individual’s mind, type (3) refers to social processes of representing and disseminating information (Miranda and Saunders 2003; Picot et al. 2008). A potent way to conceptualize ‘interaction-related information pathologies’ is, thus, to draw on the social constructionist tradition within information science (Talja et al. 2005). It emphasizes how information is constructed through language and “actively engaged in by people in relation to the social contexts of which they are a part” (Johannisson and Sundin 2007, p. 200). In this context, the notion of an ‘information practice’ has been developed to capture how people act upon information including practices such as “seeking, evaluation, and use but also the production of information” (Johannisson and Sundin 2007, p. 200; see also Hedemark et al. 2005; Olsson 2016; Savolainen 2007). A key tenet of this perspective is that information disseminates via discourses as part of which individuals seek, evaluate and produce information, for example, as texts (Fisher and Julien 2009).

Discourse-oriented approaches are particularly potent to inform theorizing on ‘interaction-related information pathologies’ because these works have provided means to better conceptualize what Picot et al. (2008, p. 74) have called “distortions.” In particular, the idea of ‘distortion’ has been used to depict how statements, which were made in public, shape the public representation of certain topics in an infamous manner (Cukier et al. 2009). Cukier et al. (2009) proposed four types of distortions that may occur in public discussions, i.e., confusion indicating missing clarity in a discussion; misrepresentation indicating that what is said is not true; false assurance indicating that what is said is not sincere; as well as illegitimacy indicating that certain stakeholders claim that other stakeholders are breaching norms or that new ICT innovations are violating norms.

Drawing on the aforementioned ideas, we generally propose that micro-level information practices can lead to macro-level distortions of information. More specifically, in our study, we focus on information production as a

particular type of information practice in order to investigate how interactions between multiple actors who produce information can affect macro-level distortions.

3 Research Design and Method: Case Study on the Electronic Health Card in Germany

Given the paucity of research on interaction-related information pathologies within the HIB field, we opted for an explorative single case study research design (Edmondson and McManus 2007). In this section, we explain our methodology, dataset, and data analysis procedures in more detail.

3.1 Single Case Study Methodology and Case Context

We used a ‘theoretical sampling’ strategy (Eisenhardt 1989; Glaser and Strauss 1967) in order to identify a case that would enable us to study how interaction-related information pathologies are formed on the societal level (Picot et al. 2008). As the latter can be seen as an acknowledged, yet comparatively little researched type of information pathologies, this sampling strategy is adequate for further exploration (Eisenhardt 1989; Gioia et al. 2013; Siggelkow 2007; Yin 2013).

In more detail, we chose the implementation of the implementation of the electronic health card (EHC) in Germany as our empirical setting for several reasons that relate to the theoretical exploration of ‘interaction-related information pathologies’ on the societal level. First and foremost, the EHC was planned as a nationwide information infrastructure in German health care where patients would receive physical cards, which doctors could use to retrieve treatment-related information when patients came to doctor’s offices. Therefore, the EHC was a societal-level project aimed to reorganize information exchange in nationwide health care. Second, enabling interaction between multiple stakeholders can be seen as an important aspect of the EHC’s implementation. It was supposed to be coordinated by the „Gesellschaft für Telematikanwendungen der Gesundheitskarte mbH“(gematik). This is a consortium comprised of professional associations in medicine such as the The National Association of Statutory Health Insurance Physicians (“Kassenärztliche Bundesvereinigung”; NASHIP), the The German Medical Association (“Bundesärztekammer”; GMA) as well as the statutory sickness funds, who are represented in the consortium by the Association of Statutory Sickness Funds (“GKV-Spitzenverband”). Third, what made this case particularly interesting from the perspective of information pathologies was that technical features seemingly only played a limited role during the implementation process. We coded

arguments in our empirical material according to whether they would support or oppose EHC. The share of ‘pro’ and ‘contra’ arguments was largely constant over time even though important technical changes were made (see Fig. 1 below). To us, this was counter-intuitive as one might have expected that public statements would change upon technical changes. Fourth, the overall implementation process also seemed to have paradoxical outcomes. More precisely, the case runs counter to many intuitive insights on change management. Important stakeholders like insurances, doctor’s representatives, industry, and state formally supported the EHC. Patients, at least according to representative questionnaires that were reported in our material, also supported EHC (reference to these particular stakeholder groups follow the scheme by, e.g., Klöcker et al. 2015). So it seemed that all important stakeholders supported the project. However, a major controversy formed around the EHC; implementation was delayed, resulted in a significant budget overrun, and doctors rejected adoption in 2010 even though policy had just adapted some key requests by doctors regarding the EHC’s design. As these different stakeholders were part of the consortium, it began dawning to us that their interactions could have played a role in the aforementioned outcomes as this quote from *Handelsblatt* (2014-06-20) suggests: “The EHC has consumed billions. Sickness funds and doctors, who were supposed to implement the EHC together with hospitals, pharmacists and industry have come to be at odds with each other. Sickness funds accuse doctors of resisting online exchange of patient-related data. Doctors accuse sickness funds of failing.”

The general case context of the EHC technology is German health care, i.e., a statutory health care system with around 118¹ public insurances that insure roughly 70 million out of the entire population of 82 million inhabitants (Klöcker et al. 2015). Doctors are represented by the ‘The German Medical Association’ (GMA) which takes care of continued medical education, the ‘Associations of Statutory Health Insurance Physicians’ (ASHIPs) and, in our case, particularly the nationwide ‘National Association of Statutory Health Insurance Physicians’ (NASHIP) which regulates the allocation of doctor’s offices and reimbursement. Reimbursement is state-organized and, for doctors in their own doctor’s offices, assigned to ASHIPs. Since other important works have introduced the EHC technology in-depth (see, e.g., Dünnebeil et al. 2013; Klöcker et al. 2014, 2015; Krcmar et al. 2006; Schwarze et al. 2005), we review only key components here: the EHC is an environment aimed at facilitating administrative and value-added services. The environment draws on card readers,

¹ This number was reported by the ‘GKV-Spitzenverband’ on June 1st 2016.

internet connection, and a technical backbone (‘telematics infrastructure’) that can be installed and configured with leaving existing IT in doctor’s offices in place (see, e.g., Klöcker et al. 2015). The implementation process was coordinated by gematik and began with tests of administrative functions in certain regions in late 2006/early 2007.

3.2 Data Sources, Time Frame of the Analysis and Data Collection

We chose media coverage as our data source in order to explore how information pathologies form on the societal level. Media coverage is particularly suitable for exploring how certain stakeholders produce public information (Cukier et al. 2009; Davidson et al. 2015) and the potential distortions that occur when further stakeholders respond (Picot et al. 2008).

We set the time frame of our analysis between 2007-01-01 and 2011-12-31. This time frame is particularly insightful since it includes two important junctures. First, the German Medical Assembly (‘Deutscher Ärztetag’), which is an annual event organized by GMA, rejected the EHC in its planned form in 2007. A resolution was published bemoaning that certain issues such as data security and who would pay for the implementation in doctor’s offices had not been sufficiently resolved. Upon publication of the resolution, a major public debate ensued including industry, politicians, sickness funds, and organizations representing doctors. Many of these stakeholders quickly shifted the public discussion from technical issues, as had been addressed in the resolution, to a heated debate that often accused others (see below). Second, in 2009–2010, politics adapted demands by doctors and waived implementation of a central server. The server had been a constant worry to doctors, even though it had never been implemented. However, while one might expect that this measure would lead to an adoption decision, the German Medical Assembly 2010 voted the EHC a failure and begged government to stop implementation. Subsequently, German Medical Assemblies 2011–2013 voted either to no longer discuss the EHC as a topic or labelled the EHC a ‘failure.’

Against this background, we collected data from two sources: popular newspapers including dailies such as “Frankfurter Allgemeine Zeitung” and weeklies like “DIE ZEIT”, as well as trade publications, e.g., “Deutsches Ärzteblatt” and “Computer Zeitung”. All these data were collected using the WISO and LexisNexis data bases. Search results were cleared for duplicates and assessed for whether they met the objectives of our study. The main inclusion criteria for the articles were the following: (a) that the EHC was the central topic of the article, (b) that authors or interviewees took a stance on the EHC, and

(c) that the article *did not just* present neutral or very brief information about functional tests of the EHC. Table 1 presents our empirical material in more depth. In total, 897 articles were analyzed for this paper. These articles equal ca. 1000–1500 pages of written text. The estimate results from the fact that text formats across databases are not standardized. Some newspapers (like “Süddeutsche Zeitung”) have multiple columns on one page, and some databases print additional information on each page to which articles are retrieved. Thus, we estimated the amount of text that would be relevant for our analysis.

3.3 Data Analysis

Consistent with research on information practices, we used a discursive approach to analyze our data (Talja and McKenzie 2007).² Such an approach is widely seen as “the study of the ways that people use language to do things” (Talja and McKenzie 2007, p. 2), so that several studies on public discourses in IS (for example, Barrett et al. 2013; Davidson et al. 2015) have applied discursive approaches.

Our data analysis process can be seen as iterative between theory and data (Corbin and Strauss 2008; Gioia et al. 2013). It made sense neither to use pure deduction nor pure induction because we had doubts that either would do justice to our research question (Locke et al. 2008). Pure deduction seemed difficult since there was limited prior theory on the formation of information pathologies on the societal level and because pure deduction would have risked to betray the richness of our empirical material. Pure induction seemed also difficult since we had a certain theoretical interest in information pathologies that guided our inquiry. Thus, we chose a middle-ground between both approaches that was conscious of its theoretical interest but not as naive as to believe that it could cover all insights from the case a priori (Suddaby 2006).

Our iterations consisted of different rounds of organizing and interpreting data. We organized data in two steps that began with closed coding (Miles and Huberman 1994). To this end, we used Klöcker et al.’s (2015) study on the EHC which identified five stakeholder groups: providers, payers, insurances, industry, and government as relevant stakeholders in this context. Data were coded according to these dimensions by developing codes for each group. Moreover, we subdivided groups because each group was

² A ‘discursive approach’ is a wider term than ‘discourse analysis.’ We opted for ‘discursive approach’ because it is not as strictly linked to certain theoretical traditions as ‘discourse analysis’ is (Talja and McKenzie 2007). Our intent is to use a ‘discursive approach’ as analytical tool and less as theoretical perspective in its own right. Yet, both are generally possible in the context of discursive studies (for overviews see, e.g., Phillips and Hardy 2002; Talja and McKenzie 2007).

constituted by a variety of members. For example, we differentiated providers into doctors and organizations representing doctors (like GMA and NASHIP) since the latter take slightly different roles within the overall context. Data were coded manually using Atlas.TI[®] qualitative data analysis software. We opted for manual coding because the philosophical tenets of constructionism in information science see the production of information as a cultural process of constructing meaning that is difficult to analyze by means of automated procedures (Talja et al. 2005). The second step in the organization of the data was ‘temporal bracketing’ (Langley 1999), i.e., an approach that is generally useful to display data over time. We did this as follows: Using Microsoft OneNote[®], we created a sheet for each stakeholder group. On each sheet, we drew a timeline covering 2007–2011 into which we copied and pasted citations from our coding in sequential order. This allowed us to compare how statements between stakeholder groups developed over time.

Drawing on these steps to organize data, we began a more open, interpretive round of coding. The term ‘coding’ was no longer confined to using Atlas.TI[®] since this is an annotator that cannot interpret text to the extent necessary for our study. Instead, ‘coding’ now meant that we began marking text passages in OneNote[®] making extensive notes on how certain passages tied into the overall flow of events. First interpretations emerged, and then we constantly compared these with existing literature in order to develop the most suitable explanation for the overall pattern in our data (see below). Throughout this time and the revisions of the paper, the authors in our team met regularly to discuss data and probe different explanations. These rounds began converging into the observation that the discussions in our data increasingly shifted towards contention. This made us realize that legitimacy attribution had shifted from discussions about the legitimacy of the EHC toward the illegitimacy of stakeholders, which suggested that the central distortion in our study was illegitimacy (Cukier et al. 2009). We then probed different explanations from the literature on legitimacy dynamics in IS (Barrett et al. 2013; Constantinides and Barrett 2015) and synthesized these insights with the literature on path constitution (Singh et al. 2015) in order to theorize the aforementioned shift in legitimacy. We provide more detailed insights on these theoretical perspectives below.

We took several measures in order to increase validity and reliability of our results. First, we used an insider–outsider approach (Gioia et al. 2013). Some members of our authorship team were assigned ‘insider’ roles, i.e., they coded data and developed first interpretations. Others were assigned ‘outsider’ roles that were supposed to challenge results delivered by insiders and push insiders toward careful consideration of results. Since the ‘outsiders’ on our

team had more than a decade experience with the field, they could significantly challenge interpretations, which lead to two pivots of the overall theoretical framework. Second, once theoretical framing was agreed upon and results began emerging, we engaged with the field to discuss results with practitioners. In this context, we frequently discussed results with a former managing director of one local branch of the GMA on the phone. Moreover, we discussed findings with experienced practitioners from the field who gave guest lectures at our department in summer 2016, and we discussed results with practitioners at two industry events in June 2016. These discussions led us to rethink and re-evaluate certain details of the framing and to attend to aspects we had not taken into account before.

One paper that includes earlier results from this study was published in conference proceedings (Wessel et al. 2016). The presentation of our findings below unfolds in two steps: First, we describe our empirical findings in order to familiarize the reader with our observations. Second, we theorize these findings in the discussion section where we draw on the aforementioned literature.

4 The Public Discussion on the Electronic Health Card in Germany 2007–2011

In this section, we describe the public discussion about the EHC between 2007 and 2011. This descriptive account of our empirical material provides the basis for linking our findings with theoretical arguments in the discussion section. Such an analytical procedure is not uncommon in IS and management research as earlier studies on standardization (Garud et al. 2002) and the development of information infrastructures (Constantinides and Barrett 2015) have shown. The description of the case comprises two sub-sections: (1) a description of how doctors, who were potential adopters, interacted with GMA and NASHIP, as well as (2) a description of how other stakeholders responded to doctors after the German Medical Assembly in 2007. The separation is reasonable since the public debate changed towards contention soon after that event.

4.1 Interaction between Potential Adopters and Professional Associations

Our analysis proposed that, in early 2007, different doctors took different stances toward adopting the EHC with some having strong interests in doing so while others were less interested. This may seem logical insofar as Government planned to roll out the EHCs to all patients. Consequently, diverse doctors such as general practitioners and specialists, younger and more tenured doctors, as well as doctors

within urban or rural environments would have had to implement card readers. It is not surprising that this diversity went together with different interests as is described in an interview that Franz-Joseph Bartmann (Spokesman for Telematics of the GMA) gave the *Ärzteblatt* in November 2007:

- “For example, radiologists and cardiologists, who frequently cooperate with colleagues, have already invested into these structures (IT) and bought IT. But look at, for example, a psychotherapist who works 20 h per week. Why should he or she buy the same equipment as the aforementioned ones? These groups form ends of a continuum in between which acceptance constantly falls” (*Ärzteblatt* 2007-11-09).

In Germany all these doctors were represented by GMA and NASHIP. Both were supposed to represent doctors’ interests in the gematik consortium and towards other professional and political stakeholders. This demanded them to mediate (1) between doctors who had different interests, as well as (2) between all doctors and other professional and political stakeholders. Therefore, these associations had to take decisions that were “complex and contradictory leaving opponents and proponents [of the EHC] much room for interpretation.” (*Ärzteblatt* 2009-05-29). Or, in the words of NASHIP and GMA themselves:

- “I would like to promote [...] a more realistic approach [to the EHC] that is more requirement-driven and less centered on technical issues” (Ulrich Weigeldt, then NASHIP board member, Interview in *Ärzteblatt* 2007-04-13).
- “Doctors, who frequently use telematics, are beginning to put pressure on us [...] Other colleagues do not understand why they should use the EHC. They basically say that they need neither the ‘E-Rezept’ nor electronic communication” (Franz-Joseph Bartmann, Interview in *Ärzteblatt* 2007-04-13).

Particularly significant occasions on which GMA tried to reach consensus among doctors were the annual German Medical Assembly meetings. Delegates of doctors would gather at these events and decide how GMA should engage in certain initiatives. The implementation of the EHC was one, albeit not the sole, initiative. Even though GMA basically promoted the EHC, it had difficulties reaching out to adopters because delegates usually opposed the EHC. The assemblies held in 2007, 2008 and 2009 provide particularly instructive examples in this regard. At each of these events, delegates formulated a resolution on the EHC. Each resolution vetoed to adopt the EHC because important questions had not been answered. For example, all resolutions between 2007 and 2009 raised questions related to data security, i.e., “[unauthorized] data access and abuse by third-parties

cannot be prevented” (2007), “the more complex data transfer and storage are, the more difficult is data security, which increases risks of data abuse” (2008) and “the 112th ‘German Medical Assembly’ underscores its concerns regarding strict adherence to data protection” (2009). Other topics which were discussed across these years were the effects of the EHC on trust between doctors and patients as well as who would pay for the implementation of the EHC. News coverage of the assemblies suggested that reaching these resolutions was difficult and complex as the coverage indicated the different interests of doctors. For example, one doctor pleaded “[a]s doctors, we should be a part of this” (*Ärzteblatt* 2009-05-29), and Karl-Joseph Bartmann “*passionately*” (*Ärzte Zeitung* 2008-05-23) called on the delegates to support the EHC at the meeting in 2008.

4.2 Interaction between Potential Adopters, Professional Associations and other Stakeholders after the German Medical Assembly 2007

Through our analysis, we came to the understanding that the resolution that had been published at the German Medical Assembly in 2007 triggered responses from multiple stakeholders that grew increasingly fierce. This can be seen when comparing coverage of the EHC before and after this particular assembly. Prior to it, the public discussion appeared to be somewhat technical-rational. Adopters often asked questions related to the efficiency of EHC-based processes like the so-called ‘e-prescription’³ or entering a PIN code. This was perhaps logical insofar as there had been a field test in Flensburg that did not meet expectations:

- “A trustworthy study has shown that doctors need about two seconds for signing prescriptions. However, the ‘e-prescription’ demands 24 s, partially because doctors need to enter PIN codes” (Letter to the Editor in *Ärzteblatt* 2007-03-16).
- “Lessons learned in Schleswig–Holstein: [...] the EHC takes longer than the normal insurance card to access data. ‘This will likely affect care processes on a whole because it may delay them’” (*Ärzteblatt* 2007-03-30).
- “Cost-related questions remain unanswered. This also relates to questions about follow-up investments. [...] Keil [a doctor]: ‘We need to be able to trust that add-on costs and bureaucratic changes do not destroy the business models of our practices’” (*Ärzte Zeitung* 2007-05-10).

³ The ‘e-prescription’ was considered a core functionality of EHC. Initially, it was planned that doctors could issue a prescription by storing it on a server from where a pharmacist would be able to retrieve it. The ‘e-prescription’ was tested in EHC field tests in 2006/2007.

In contrast to these technical and economic aspects of the EHC, the resolution that was published at the German Medical Assembly in 2007 (see above) resulted in remarkable responses from politics, sickness funds and industry. The reactions of all three followed a similar pattern, i.e., they briefly commented on the resolution but they did not necessarily respond to the concerns expressed in it. Instead, at least in our public data, they provided explanations for why that resolution was passed. Industry directly claimed that the resolution was weak as was summarized by *Handelsblatt* (2007-05-16): “Industry was outraged. The EHC would by no means affect relationships between doctors and patients. The latter would not have to worry about unauthorized data access, said Jörg Menno Harms, Vice President of BITKOM.” Moreover, also in the following years, industry associations such as BITKOM repeatedly emphasized that patients would benefit from the EHC while doctors were afraid of transparency: “Patients want that [the EHC] but interest groups, especially from medicine, are against it [the EHC]. They are perhaps afraid of transparency.” (BITKOM cited in *Die Welt* 2008-03-03). Sickness funds reacted to the 2007 resolution by stating that doctors were “consciously scaring the public into fears regarding data security in the EHC context in order to protect their own economic interests.” (*Handelsblatt* 2007-05-16). Moreover, in the following years, according to our data, sickness funds began requesting patients to submit photos that could be printed on the EHCs.

Regarding politics, we found three reactions in our empirical material. Some politicians argued that monetary motives drove the 2007 resolution: “‘There are certain groups of doctors who want to avoid transparency in health care so as to protect their economic income [...],’ jeers Karl Lauterbach, health expert of the SPD” (*taz* 2008-01-25). A second reaction was insistence that GMA and NASHIP were responsible for convincing doctors to adopt the EHC. For example, in 2007, a representative of the ministry of health blamed GMA and NASHIP for doing “an unprofessional job” (cited in *Ärzteblatt* 2007-08-27) while later statements in 2008 and 2009 echoed that “From the government’s perspective, it is the task of the organizations who represent doctors to provide more information” (*Ärzteblatt* 2008-05-30). The third reaction was an announcement that no further tests would be needed to check the functionality of EHC and that a larger roll-out could begin.

Interestingly, we found that doctors responded to these statements also in a similar pattern, i.e., by accusing industry, sickness funds, and politics and thereby shifting the discussion further away from the EHC towards a debate about stakeholders. For example, a letter to the editor in *Frankfurter Allgemeine Zeitung* directly addressed

industry: “The claim that doctors want to avoid costs can be turned around: I suppose that industry, surely some large corporations, have strong interests in selling card readers and cards” (Letter to the Editor in *FAZ* 2007-05-27). Further reactions relate to the sickness funds’ announcement to collect photos for the EHC (first quote below) and to the statement that monetary interests motivated resolutions at German Medical Assembly meetings (second quote below):

- “So if some sickness funds unabashedly force patients to adopt EHC, this shows how little respect is being given to individual self-determination regarding information [‘informationelle Selbstbestimmung’]. After all, the EHC was planned to be fully implemented only after further tests” (*Ärzteblatt* 2008-06-20).
- “Budgets for paying doctors are fix. Redundant treatments do not yield more money, they only shift the allocation of money between doctors. [...] Sickness funds want the card in order to control patients” (Doctor cited in *DIE ZEIT* 2009-01-26).

A similar dynamic occurred in relation to how doctors evaluated the professional associations representing them. Although GMA and NASHIP repeatedly stressed that doctors needed to be taken seriously, doctors became increasingly aggravated with both because of them being committed to implementing the EHC. This criticism seems challenging in two ways: it increases the difficulty to convince doctors to adopt the EHC on occasions such as assembly meetings, which in turn, makes it also more difficult to represent them. GMA and NASHIP were repeatedly attacked due to their public statements in support of the EHC:

- “Mr. Bartmann, you seem to have forgotten your roots” (Letter to the Editor *Ärzteblatt* 2008-02-01).
- “It is only Franz-Joseph Bartmann, who praises the EHC” (Letter to the Editor in *FAZ* 2008-05-16).

Nonetheless, the professional associations continued to work on implementing the EHC. In 2009–2010, they eventually succeeded to convince the government to adapt the EHC to some of the doctors’ demands. By that time, a new cabinet was elected (“Kabinett Merkel II” with chancellor Dr. Angela Merkel (CDU) and secretary of health Philipp Rösler (FDP)). It promised a re-assessment of the EHC in the coalition agreement. Thus, it seemed as though the public discussion could eventually come to a halt. As Franz–Joseph Bartmann put it at assembly meetings in 2009 and 2010 (indirect quote):

- “E-prescription and emergency data management have been waived whereas the electronic letter will be implemented earlier. This was asked for by doctors,

who wanted some form of point-to-point ciphering” (Ärzteblatt 2009-05-29).

- “Franz-Joseph Bartmann [...] highlighted that GMA had been able to successfully [...] enforce demands expressed at earlier assembly meetings” (Ärzteblatt 2010-05-21).

It could have been expected that this political response would have prompted positive responses from doctors. After all, data security as an issue was closely linked to the ‘e-prescription’ since the latter was supposed to be transmitted via servers. But, paradoxically, these changes were ineffective. At the German Medical Assembly in 2010, delegates were “unimpressed by the intentions of the new government [...]. The Assembly reinforced rejection of EHC and demanded government to stop implementation” (Ärzteblatt 2010-05-21). Interestingly, arguments against EHC were largely the same as before since “As in earlier years, concerns were largely related to centralized data storage, unauthorized data access, extensive costs and missing identity checks related to photos printed on cards [...] in other words, no new arguments” (Ärzteblatt 2010-05-21). The *Ärzteblatt* documented that the discussion on the EHC at the assembly was over very fast. Subsequent assemblies in 2011–2013 declared the EHC project failed or sometimes did not even cover the topic.

As the German Medical Assembly reintroduced the EHC as a topic in 2014, contention waned in the public discussion on the EHC even though the discourse is still going on. In terms of the technical implementation process, to our knowledge, the “Basis Roll-Out” of the EHC is about to begin as we write this paper in September 2016. It is expected to enable basic administrative functions whereas value-added services like ‘e-prescription’ are planned to be added later.

4.3 Epilogue: on Patients

According to Klöcker et al. (2015), patients are the fifth important stakeholder group of the EHC. Thus, it is even more surprising that we found only limited participation of patients in our data. There was much talk *about* patients but less talk *by* patients. Several representative studies on patients, which were carried out by BITKOM and others, generally asserted that patients were supportive of the EHC.

5 Discussion

In this section, we synthesize our empirical findings with extant literature on information pathologies (Picot et al. 2008), information practices (Johannisson and Sundin

2007), and discursive distortions (Cukier et al. 2009) in order to conceptualize how information pathologies can form on the societal level of analysis. We do this in two steps: first, we link our observations to theoretical concepts, and then we conceptualize the overall formation process. Based on these steps, we subsequently discuss the theoretical contributions of our work and its limitations before providing a summary.

5.1 Linking Case Narrative to Theoretical Concepts

Drawing on Picot et al. (2008, p. 74), we propose that information pathologies on the societal level are best conceptualized as ‘interaction-related information pathologies’ because society is a collective that does not process information through an individual mind as is typical for ‘actor-related information pathologies’ and ‘knowledge-related information pathologies’ (see above). Instead, societal phenomena generally develop from interactions at a disaggregate level of analysis that may lead to societal-level ‘distortions’ of public debates (Cukier et al. 2009; Picot et al. 2008). Given that little extant research is available on societal-level information pathologies, we now draw on our findings to conceptualize how practices of producing information contribute to distorting public debates.

Our findings propose that two types of arguments were prominent in the public debate on the EHC technology. The first was largely related to *how* the EHC would be implemented, i.e., it highlighted technical factors such as data security or process improvement as well as economic questions related to who would reimburse doctors. The second was largely related to *why* certain actors made certain statements. Both these aspects can be conceptualized as a debate about legitimacy (Constantinides and Barrett 2015; Suchman 1995). Drawing on Constantinides and Barrett (2015), Barrett et al. (2013) as well as Suchman (1995), legitimacy can refer to “pragmatic legitimacy” when stakeholders state that their interests are met, “cognitive legitimacy” when technologies or practices are widely known and accepted, as well as “normative legitimacy” when stakeholders consider technologies or practices to be generally appropriate.⁴ Against this backdrop, our case narrative displayed above suggests that the key ‘distortion’ at play was illegitimacy (Cukier et al. 2009). Doctors initially questioned that EHC’s functionalities catered to their interests while all stakeholders accused each other of

⁴ Consistent with Constantinides and Barrett (2015, p. 4), we acknowledge that legitimacy is a key concept in institutional theory but we do not intend to deploy institutional theory in our own study. This is appropriate because legitimacy is also used in many other contexts (see, e.g. the review in Suchman 1995).

violating norms later on (see above). Therefore, our conceptualization focuses on how the information practice of producing information in the form of public statements led to illegitimacy of the EHC and several stakeholders that took part in the debate.

Furthermore, our study proposes a certain dynamic wherein the legitimacy at stake changed. The resolution of the German Medical Assembly in 2007 was largely concerned with pragmatic and normative legitimacy of the EHC (for example, issues such as process improvement, reimbursement, and relationships between doctors and patients were mentioned). Thus, initially, the legitimacy of the ICT innovation was challenged, not necessarily the legitimacy of other stakeholders. Responses to the resolution, however, were focused on norm violations by doctors (for example, allegedly fearing transparency or wanting to secure economic income), implying that concerns related to the illegitimacy of the ICT innovation were responded to by concerns related to the illegitimacy of stakeholders. In turn, doctors also responded with concerns related to the illegitimacy of industry, sickness funds, and politics (for example, claiming that industry wanted to generate income and that sickness funds violated the basic right of individual self-determination). So an initial discussion of normative and pragmatic legitimacy of an ICT innovation turned into a discussion about the normative illegitimacy of stakeholders. Indeed, it seems as though concerns over pragmatic legitimacy were crowded out over time because the EHC was rejected in 2010 even though politics had adapted demands by doctors in 2009–2010.

The aforementioned insights made us wonder how it would be possible to conceptualize this dynamic. Therefore, it was important for us to connect our insights with an interpretation logic that allowed to grasp how different stakeholders related to each other over time through legitimizing their claims while delegitimizing the claims of others. Literature on path creation (Garud et al. 2002; Garud and Rappa 1994) and path constitution (Fuerstenau et al. 2016; Singh et al. 2015) can be particularly helpful in this regard. In more detail, in their study on the diffusion of the Java Standard, Garud et al. (2002) theorized how Java's inception triggered a major public debate in which Microsoft substantially called into question the appropriateness of Sun's actions. A similar dynamic can be found in Garud and Rappa's (1994) study on cochlear implants. Though not focused on IS, this study showed how different scientists tried to legitimate the superiority of their particular implant over the implant of competitors until one became a standard. These insights made us confident to utilize this perspective as an interpretation lens to develop a conceptualization of how societal-level information pathologies form.

5.2 A Conceptualization of the Formation of Information Pathologies on the Societal Level

Path constitution can generally be seen as an interpretation logic and not necessarily as a theory in its own right (see, e.g., Vergne and Durand 2010). This allows to link the concept of legitimacy to path constitution (Berthod 2013; Berthod and Sydow 2013) in order to explain how micro-level processes of producing information yield illegitimacy as a distortion on the societal level. Thus, in this section, we conceptualize this process from the legitimacy perspective and suggest that the shift from discussing the legitimacy of an ICT innovation to discussing the illegitimacy of stakeholders can be conceptualized as path constitution. The latter comprises several core components (Singh et al. 2015; Sydow et al. 2009, 2012): First, it grounds on the idea that levels of analysis are inter-related, which allows to trace processes over time. Second, triggering events assume a central role because they set into motion certain dynamics, which, third, unfold in a self-reinforcing manner. Fourth, outcomes are neither entirely determined nor entirely arbitrary ('non-ergodic', David (1985, p. 332)) because such processes are affected by events which are not foreseeable *ex ante* (see below). Fifth, outcomes are seen as 'lock-in' that are increasingly difficult to reverse. In the remainder of this section, we use this particular interpretation logic to explain how production of information leads to illegitimacy on the macro-level.

As stated above, our conceptualization focuses on how the production of information by different actors contributes to distorting a public discussion from dealing with normative and pragmatic legitimacy of an ICT innovation toward being about the normative illegitimacy of stakeholders. Figure 2 draws on legitimacy and path constitution to show this process. In terms of how the process unfolds, different levels of analysis matter because information is produced by adopters on the micro-level, by actors like professional associations on the meso-level, as well as by macro-level actors such as politicians. In our case, micro and meso level actors initially called into question the legitimacy of an ICT innovation (see Sects. 4.1, 4.2 above). It was the particular task of meso-level organizations like GMA and NASHIP to find compromises between doctors as to whether and if so how the ICT innovation should be adopted. This yielded a germane process that we labelled 'legitimation of ICT innovation' (see Fig. 2) which largely related to discussing pragmatic and normative legitimacy (the latter was especially related to data security; see Sect. 4.1 above) of the ICT innovation at the German Medical Assembly meetings.

Our work further proposes that the German Medical Assembly in 2007 can be seen as triggering event that set into motion a process that increasingly distorted the nature

of the discussion from focusing on the legitimacy of the ICT innovation to being about the illegitimacy of stakeholders. Initial information about pragmatic and normative legitimacy made by adopters cued responses that called adopters into question, which cued further responses that delegitimized macro-level actors and the organizations representing adopters. This cycle shifted the nature of the discussion from being about an ICT innovation to being about stakeholders. In more detail, macro-level actors – in our case politics, sickness funds, and industry – alleged doctors of being self-interested and professional associations of acting unprofessionally. In turn, doctors responded that sickness funds violated the right for individual self-determination and wanted to control patients (see Sect. 4.2 above). Moreover, doctors also called into question the normative legitimacy of representative organizations (see Sect. 4.2 above). We captured these dynamics as ‘Delegitimation of Micro and Meso Level Actors’ and ‘Delegitimation of Macro and Meso Level Actors’ in Fig. 2. While these unfolded, resolutions made at the German Medical Assemblies 2008–2009 still tried to legitimate the ICT innovation but the distortion of the overall discussion toward illegitimacy of stakeholders seemed to overshadow these efforts.

Path constitution also builds on the notion of a ‘lock-in’, meaning “situations or outcomes” (Sydow et al. 2012, p. 159) that are particularly difficult to revise. In our case context, the shift of the discussion toward illegitimacy of stakeholders rather than legitimacy of the EHC led to a lock-in in the years following 2009. At that time, professional associations succeeded to convince politics to adapt demands expressed in the 2007 resolution, but German medical assembly meetings nonetheless rejected the EHC (see end of Sect. 4.2 above). While it is generally difficult to identify the exact date of lock-ins (Langley 1999; Sydow et al. 2009, 2012), thwarting the EHC even though it was adapted to the demands originally expressed is an indicator of a lock-in because it proposes that the debate had indeed moved away from being about legitimacy of the EHC toward being about illegitimacy of stakeholders. A second paradoxical outcome is that meso-level organizations could not do what they were supposed to for some time. This theoretical point is echoed in the German Medical Assembly meetings 2011–2013 not covering the EHC. *Qua position in gematik*, GMA was co-responsible for the implementation of the EHC. Therefore, some consent at the meetings would have been important, but the topic came to temporary halt indicating lock-in until 2013.

The last characteristic of path constitution is ‘non-ergodicity’ (Singh et al. 2015; Sydow et al. 2012). This particular term can be seen in two ways. In a strict statistical sense, it means that a process changes erratically and at inconsistent rates. However, path constitution analysis in

IS and management (Singh et al. 2015; Sydow et al. 2012) has tended to use a softer understanding referring to “simultaneous and/or sequential events that lead to an outcome which is not automatically determined from the onset but is not arbitrary, either” (Sydow et al. 2012, p. 159). In our study, publication of information happened sequentially by stakeholders with potentially varying ideologies (Barrett et al. 2013; Constantinides and Barrett 2015). While we have focused on the process of how publication of information unfolded and not on ideology, diverging ideologies help to understand that certain stakeholders valued quick implementation of the EHC while others valued clarification of practical issues. This implies that public statements were not made arbitrarily. In addition, it seems that the outcome, i.e., the rejection of the EHC, was not determined *ex ante* since the shift from legitimacy of the innovation to illegitimacy of stakeholders happened as the debate unfolded.

5.3 Boundary Conditions

We believe that our model in Fig. 2 underlies several boundary conditions. First, patients as one key stakeholder group were arguably under-represented in the discourse on the EHC. This seems critical for the formation of societal-level information pathologies in two ways. On the one hand, widespread demand for the EHC by patients could have created a ‘pull’ forcing doctors to adopt the innovation. This could have increased the doctors’ urge to discuss how the technology can be technically integrated into doctor’s offices instead of accusing other stakeholders publicly. On the other hand, a ‘pull’ by patients could have also forced industry, sickness funds, and politics to be more specific about data security and how the innovation improves relationships between patients and doctors. In other words, participation of this key stakeholder group would have likely increased chances that the public discussion kept to the legitimacy of ICT innovations instead of turning into debating the illegitimacy of stakeholders. Second, a particular structural aspect of our case is that GMA and NASHIP had to formulate compromises between (1) doctors as well as (2) between doctors and macro-level stakeholders. Yet, compromises may rarely satisfy both sides so that compromises yield inputs for other stakeholders to continue a public debate. Therefore, the involvement of representative bodies that have to strike the balance between highly heterogeneous stakeholders seems to be conducive for processes such as the one that we observed. Third, linked to the aforementioned condition, such public discussions seem likely to emerge when ideologies between the stakeholders diverge strongly, which enables each stakeholder to make polarizing allegations.

5.4 Theoretical Contributions

Our study offers contributions to the literature on information pathologies, information practices, as well as the wider literature on path constitution in IS and management. We elaborate on each of these in turn.

‘Information pathologies’ have become an important topic within the literature on HIB in IS (Neben 2015; Picot et al. 2008). Picot et al. (2008) have proposed three types of information pathologies – actor-related, knowledge-related, and interaction-related information pathologies – that all capture relevant phenomena related to HIB (see above). HIB research has so far largely focused on knowledge and actor-related information pathologies, often by using psychological theories to explore how individuals process information (Bawden and Robinson 2009, 2013; Hemmer and Heinzl 2011; Koltay 2011; Neben 2015). While invaluable to better understand these particular types of information pathologies, psychological approaches are less suited to explain interaction-related information pathologies that occur on the societal level because they demand explanation of social dynamics between actors instead of explanations of psychological processes in individuals (Picot et al. 2008). Therefore, in this paper, we aimed to explore how ‘interaction-related information pathologies’ can form on the societal level. Relying on the notion of ‘distortions’ that can occur when representations of information are disseminated by media (Cukier et al. 2009; Picot et al. 2008), we focused on how ‘illegitimacy’ as a particular type of distortion (see above) forms when a public discussion shifts from being about the legitimacy of an ICT innovation to being about the illegitimacy of the stakeholders that partake in that discussion. Based on our explorative study, we conceptualized this process as ‘path constitution’ (Singh et al. 2015; Sydow et al. 2012) highlighting that the production of information that questions legitimacy of ICT innovations can cue cyclical dynamics of responses in which stakeholders mutually call into question their legitimacy. Indeed, the legitimacy of the innovation can become less important for adoption decisions when a ‘lock-in’ occurs, which in our case was signaled by decisions to reject an innovation even though it was adapted to earlier technical demands.

To our knowledge, this is one of the first studies that has explicitly sought to provide a conceptualization of how information pathologies form on the societal level. Thus, our work goes beyond existing approaches in the area of information pathologies by (1) empirically exploring information pathologies on the societal level, (2) offering a process-based explanation of how these form over time, and (3) indicating what outcomes these may have for decisions to adopt ICT. That being said,

much remains to be done to further explore this area. A key question that remains is how a more inclusive public discourse could affect the formation of information pathologies. In our study, patients were arguably under-represented in the data material. Yet, as we sampled on leading newspapers, these reflected the societal level of analysis that we wanted to focus on. Nonetheless, this calls for more work on how a balanced representation of all stakeholders in a discourse (Barrett et al. 2013; Constantinides and Barrett 2015; Davidson et al. 2015) affects formation of information pathologies. Moreover, given our choice for scrutinizing publicly available media coverage, future work could explore in more depth how strategic choices by stakeholders, who partake in a discourse, affect a discourse. Through, for example, including interviews with stakeholders in a research design one may be able to more precisely show how manipulation of public information may affect macro-level discourses. Since we wanted to explore societal-level information pathologies in the first place, such more detailed questions lay beyond the scope of our work. However, future work focused on discursive strategies will no doubt be able to advance this domain.

If literature on information pathologies can be criticized for its focus on psychological processes, research on information practices can also be evaluated critically insofar that many works within this perspective have looked at information practices within certain stakeholder groups leaving relationships between groups largely unexplored. To begin with, the concept of information practices has acknowledged that information behavior is not exclusively mental, as suggested by extant work in HIB, but rather a social practice (Johannisson and Sundin 2007; Savolainen 2007). Most works in this domain have provided detailed characterizations of information practices within certain professions (Hertzum and Pejtersen 2000; Johannisson and Sundin 2007; Lloyd 2007; Olsson 2016; Veinot 2007), scholarly communities (Fry 2006; Olsson 2005), among students (Park 2007), migrants (Lingel 2015), or customers (Libaque-Saenz et al. 2016). This has resulted in recent criticism that literature on information practices should look at how different contexts matter for the development of information practices (Tabak 2014). Our study provides important insights in this regard. First, our conceptualization suggests certain dynamics between a focal stakeholder group (in our case, doctors) and other stakeholder groups on meso and macro levels. Thus, our study emphasizes that a focal group’s information practices are actually affected by what other groups do. In more detail, micro-level statements can shift from the legitimacy of an ICT innovation to the legitimacy of other stakeholders who engage in a debate. As this shift occurs largely in response to what these

other stakeholders say about the focal stakeholders, the shape of information practices cannot be understood without the overall context that cuts across multiple levels. This calls for more research on the co-evolution of information practices across stakeholder groups. Second, while literature on information practices is sometimes positioned as antithesis to more positivist research in HIB, our model proposes that the development of information practices is not entirely arbitrary over time. This implies that even localized practices are at least somewhat patterned by underlying structures. Future research could thus focus on the complicated relationship between agency, structure (Emirbayer and Mische 1998; Giddens 1984) and ideology (Barrett et al. 2013; Constantinides and Barrett 2015) in the context of information practices.

Last, our paper also has implications for the literature on path constitution in IS (Fuerstenau et al. 2016; Singh et al. 2015) and management (Dobusch and Schuessler 2013; Garud et al. 2002; Sydow et al. 2009, 2012). Particular insights of our study relate to the nature of self-reinforcing dynamics as well as to the level of analysis at which path constitution occurs. Self-reinforcing dynamics have been emphasized in relation to the mutual compatibility between devices and information infrastructures in IS (Hanseth and Bygstad 2015; Hanseth and Lyytinen 2010; Henfridsson and Bygstad 2013) as well as in relationship to how standards and legitimacy assessments evolve over time in management (Dobusch and Schuessler 2013; Garud et al. 2002; Garud and Rappa 1994; Lohmeyer 2017). By extension, our study shows how a discussion about legitimacy can become decoupled from an ICT innovation when a debate shifts to being about the legitimacy of stakeholders. Initial statements on the legitimacy of an ICT innovation cued responses about legitimacy of stakeholders, which cued further responses of the same type. This is a useful complement of earlier work showing that debates on legitimacy can become largely decoupled from the focal ICT innovation. Moreover, earlier works in the IS literature have largely explored path constitution within organizations (Fuerstenau et al. 2016; Singh et al. 2015) while our work would suggest that path constitution can also unfold through information-related dynamics on the societal level. This extends earlier work that suggested that macro-level lock-ins largely hinge on technical aspects (David 1985; Sydow et al. 2009) because our work underscores that ‘locked-in’ discourses may at least temporarily oppose technological change processes in meaningful ways. Future work on the intersection of path constitution (Singh et al. 2015) and legitimacy in IS (Barrett et al. 2013; Constantinides and Barrett 2015) could, thus, be very fruitful.

5.5 Limitations

Our study is not without limitations. The most obvious one is our case study methodology, which used a single case. While we aimed to make a theoretical point and it was therefore adequate to sample on the EHC in Germany, we cannot of course predict the formation of information pathologies across settings. As our argument is explorative, future studies could use our model (Fig. 2) in order to test and refine it. Interesting questions would be whether our view applies to health care in other countries, to other industries, or even to information processing within organizations. While there is good reason to expect that such dynamics are possible in other countries and settings (Barrett et al. 2013; Constantinides and Barrett 2015) as well as within organizations (Lapointe and Rivard 2005), more testing is needed to critically evaluate our ideas. A second and highly valuable line of inquiry would be to study psychological factors of individuals during the formation of societal-level information pathologies. Not only could this strengthen the links between different types of information pathologies, it would also have the potential to provide robust micro-foundations for information practices and HIB generally.

5.6 Summary and Conclusion

In this paper, we employed an exploratory case study to investigate information pathologies on the societal level. We conceptualized these as ‘interaction-related information pathologies’ and suggested that the following elements are suited to explain their formation: Distortions are infamous public representations, which we conceptualized by using the concept of legitimacy. Legitimacy-related distortions can occur when stakeholders produce and disseminate information that ‘distorts’ a public debate from being about an ICT innovation to being about the illegitimacy of stakeholders. The dynamic driving this distortion can be conceptualized as a process of path constitution.

In summary, we believe that our paper has advanced research on HIB in meaningful ways in that we looked into a particular type of information pathologies that has not been extensively studied so far. While much remains to be done, we believe that this has contributed to widening the boundaries of the HIB field toward inclusion of more ‘constructionist’ approaches from the information sciences. They provide important means for explaining collective aspects of human information behavior in the information age.

Acknowledgements We thank the special issue editors and two anonymous reviewers for their tremendous help during the review process. Leonhard Dobusch, Daniel Fuerstenau, Nora Lohmeyer,

Hannes Rothe, Hannes Schlieter, Karl-Werner Ratschko and further colleagues provided thoughtful feedback on earlier drafts. Anna Hutfils and Mona Timmermann assisted in data collection. Funding for Lauri Wessel and his research group ‘Health-IT and Business Model Innovation’ is provided by the ‘Excellence Initiative II’ and supported by the Focus Area ‘DynaAge.’

References

- Barrett M, Heracleous L, Walsham G (2013) A rhetorical approach to it diffusion: reconceptualizing the ideology-framing relationship in computerization movements. *MIS Q* 37(1):201–220
- Bawden D, Robinson L (2009) The dark side of information: overload, anxiety and other paradoxes and pathologies. *J Inf Sci* 35(2):180–191. doi:[10.1177/0165551508095781](https://doi.org/10.1177/0165551508095781)
- Bawden D, Robinson L (2013) No such thing as society? On the individuality of information behavior. *J Am Soc Inf Sci Technol* 64(12):2587–2590. doi:[10.1002/asi.22971](https://doi.org/10.1002/asi.22971)
- Berger PL, Luckmann T (1967) *The social construction of reality: a treatise in the sociology of knowledge*. Anchor, New York
- Berthod O (2013) Challenging the imperative to build: the case of a controversial bridge at a world heritage site. In: Henn R, Hoffman A (eds) *Constructing green—the social structures of sustainability*. MIT Press, Cambridge, pp 285–306
- Berthod O, Sydow J (2013) Locked in the iron cage? When institutionalization is (not) a path-dependent process. In: Schreyögg G, Sydow J (eds) *Self-reinforcing dynamics in and among organizations*. Palgrave MacMillan, London, pp 204–229
- Bronner R (2003) Pathologies of decision-making: causes, forms, and handling. *Manag Int Rev* 43(1):85–101
- Browne GJ, Pitts MG (2004) Stopping rule use during information search in design problems. *Organ Behav Hum Decis Processes* 95(2):208–224. doi:[10.1016/j.obhdp.2004.05.001](https://doi.org/10.1016/j.obhdp.2004.05.001)
- Browne GJ, Pitts MG, Wetherbe JC (2007) Cognitive stopping rules for terminating information search in online tasks. *MIS Q* 31(1):89–104
- Buckland MK (1991) Information as thing. *J Am Soc Inf Sci* 42(5):351–360
- Constantinides P, Barrett M (2015) Information infrastructure development and governance as collective action. *Inf Syst Res* 26(1):40–56. doi:[10.1287/isre.2014.0542](https://doi.org/10.1287/isre.2014.0542)
- Corbin J, Strauss A (2008) *Basics of qualitative research: techniques and procedures for developing grounded theory*. Sage, London
- Cukier W, Ngwenyama O, Bauer R, Middleton C (2009) A critical analysis of media discourse on information technology: preliminary results of a proposed method for critical discourse analysis. *Inf Syst J* 19(2):175–196. doi:[10.1111/j.1365-2575.2008.00296.x](https://doi.org/10.1111/j.1365-2575.2008.00296.x)
- Currie WL (2012) Institutional isomorphism and change: the national programme for it—10 years on. *J Inf Technol* 27(3):236–248
- Currie WL, Guah MW (2007) Conflicting institutional logics: a national programme for it in the organisational field of health-care. *J Inf Technol* 22:235–247
- David PA (1985) Clio and the economics of qwerty. *Am Econ Rev* 75(2):332–337
- Davidson EJ (2002) Technology frames and framing: a socio-cognitive investigation of requirements determination. *MIS Q* 26(4):329–358. doi:[10.2307/4132312](https://doi.org/10.2307/4132312)
- Davidson EJ, Østerlund CS, Flaherty MG (2015) Drift and shift in the organizing vision career for personal health records: an investigation of innovation discourse dynamics. *Inf Organ* 25(4):191–221. doi:[10.1016/j.infoandorg.2015.08.001](https://doi.org/10.1016/j.infoandorg.2015.08.001)
- de Vaujany FX, Carton S, Dominguez-Pery C, Vaast E (2013) Moving closer to the fabric of organizing visions: the case of a trade show. *J Strateg Inf Syst* 22(1):1–25. doi:[10.1016/j.jsis.2012.10.006](https://doi.org/10.1016/j.jsis.2012.10.006)
- Dobusch L, Schuessler E (2013) Theorizing path dependence: a review of positive feedback mechanisms in technology markets, regional clusters, and organizations. *Ind Corp Change* 22(3):617–647. doi:[10.1093/icc/dts029](https://doi.org/10.1093/icc/dts029)
- Dou WY, Lim KH, Su CT, Zhou N, Cui N (2010) Brand positioning strategy using search engine marketing. *MIS Q* 34(2):261–279
- Dünnebeil S, Sunyaev A, Leimeister J, Krcmar H (2013) Modular architecture of value-added applications for German healthcare telematics. *Bus Inf Syst Eng* 5(1):3–16
- Edmondson AC, McManus SE (2007) Methodological fit in management field research. *Acad Manag Rev* 32(4):1155–1179
- Eisenhardt KM (1989) Building theories from case study research. *Acad Manag Rev* 14(4):532–550
- Emirbayer M, Mische A (1998) What is agency? *Am J Sociol* 103(4):962–1023
- Fisher KE, Julien H (2009) Information behavior. *Annu Rev Inf Sci Technol* 43(1):1–73. doi:[10.1002/aris.2009.1440430114](https://doi.org/10.1002/aris.2009.1440430114)
- Fry J (2006) Scholarly research and information practices: a domain analytic approach. *Inf Process Manag* 42(1):299–316. doi:[10.1016/j.ipm.2004.09.004](https://doi.org/10.1016/j.ipm.2004.09.004)
- Fuerstenau D, Wessel L, Gersch M (2016) How organizational path constitution prepares digital infrastructure innovation: a case study of integrated care. In: *Americas conference on information systems*, San Diego
- Garud R, Rappa MA (1994) A socio-cognitive model of technology evolution: the case of cochlear implants. *Organ Sci* 5(3):344–362
- Garud R, Jain S, Kumaraswamy A (2002) Institutional entrepreneurship in the sponsorship of common technological standards: the case of sun microsystems and java. *Acad Manag J* 45(1):196–214
- Giddens A (1984) *The constitution of society, outline of the theory of structuration*. Polity Press, Cambridge
- Gioia DA, Corley KG, Hamilton AL (2013) Seeking qualitative rigor in inductive research: notes on the gioia methodology. *Organ Res Methods* 16(1):15–31. doi:[10.1177/1094428112452151](https://doi.org/10.1177/1094428112452151)
- Glaser BG, Strauss A (1967) *The discovery of grounded theory: strategies for qualitative research*. Aldine, Chicago
- Hanseth O, Bygstad B (2015) Flexible generification: iCT standardization strategies and service innovation in health care. *Europ J Inf Syst* 24(6):645–663. doi:[10.1057/ejis.2015.1](https://doi.org/10.1057/ejis.2015.1)
- Hanseth O, Lyytinen K (2010) Design theory for dynamic complexity in information infrastructures: the case of building internet. *J Inf Technol* 25(1):1–19. doi:[10.1057/jit.2009.19](https://doi.org/10.1057/jit.2009.19)
- Hedemark A, Hedman J, Sundin O (2005) Speaking of users: on user discourses in the field of public libraries. *Inf Res* 10(2)
- Hemmer E, Heinzl A (2011) Where is the “I” in “IS research”? The quest for a coherent research stream in the context of human information behavior. In: Heinzl A, Buxmann P, Wendt O, Weitzel T (eds) *Theory-guided modeling and empiricism in information systems research*. Physica, Heidelberg, pp 223–246. doi:[10.1007/978-3-7908-2781-1_12](https://doi.org/10.1007/978-3-7908-2781-1_12)
- Henfridsson O, Bygstad B (2013) The generative mechanisms of digital infrastructure evolution. *MIS Q* 37(3):907–931
- Heracleous L, Barrett M (2001) Organizational change as discourse: communicative actions and deep structures in the context of information technology implementation. *Acad Manag J* 44(4):755–778. doi:[10.2307/3069414](https://doi.org/10.2307/3069414)
- Hertzum M, Pejtersen AM (2000) The information-seeking practices of engineers: searching for documents as well as for people. *Inf Process Manag* 36(5):761
- Johannisson J, Sundin O (2007) Putting discourse to work: information practices and the professional project of nurses. *Libr Q* 77(2):199–218. doi:[10.1086/517843](https://doi.org/10.1086/517843)
- Jonas E, Schulz-Hardt S, Frey D, Thelen N (2001) Confirmation bias in sequential information search after preliminary decisions: an

- expansion of dissonance theoretical research on selective exposure to information. *J Person Social Psychol* 80(4):557–571. doi:[10.1037/0022-3514.80.4.557](https://doi.org/10.1037/0022-3514.80.4.557)
- Kettinger JW, Li Y (2010) The infological equation extended: towards conceptual clarity in the relationship between data, information and knowledge. *Europ J Inf Syst* 19(4):409–421. doi:[10.1057/ejis.2010.25](https://doi.org/10.1057/ejis.2010.25)
- Klöcker P, Bernnat R, Veit D (2014) Implementation through force or measure? How institutional pressures shape national ehealth implementation programs. In: European conference on information systems, Tel Aviv
- Klöcker P, Bernnat R, Veit D (2015) Stakeholder behavior in national ehealth implementation programs. *Health Policy Technol* 4(2):113–120
- Koltay T (2011) Information overload, information architecture and digital literacy. *Bull Am Soc Inf Sci Technol* 38(1):33–35. doi:[10.1002/bult.2011.1720380111](https://doi.org/10.1002/bult.2011.1720380111)
- Krcmar H, Klapdor S, Leimeister JM (2006) Die eGK und die Telematikinfrastruktur für das deutsche Gesundheitswesen Teil 1 und 2. *Krankenhaus IT-J* 1&2:32–34/48–49
- Kunda Z (1990) The case for motivated reasoning. *Psychol Bull* 108(3):480–498. doi:[10.1037//0033-2909.108.3.480](https://doi.org/10.1037//0033-2909.108.3.480)
- Langley A (1999) Strategies for theorizing from process data. *Acad Manag Rev* 24(4):691–710
- Lapointe L, Rivard S (2005) A multilevel model of resistance to information technology implementation. *MIS Q* 29(3):461–491. doi:[10.2307/25148692](https://doi.org/10.2307/25148692)
- Leonardi PM (2013) When does technology use enable network change in organizations? A comparative study of feature use and shared affordances. *MIS Q* 37(3):749–775
- Libaque-Saenz CF, Chang Y, Kim J, Park M-C, Rho JJ (2016) The role of perceived information practices on consumers' intention to authorise secondary use of personal data. *Behav Inf Technol* 35(5):339–356. doi:[10.1080/0144929X.2015.1128973](https://doi.org/10.1080/0144929X.2015.1128973)
- Lingel J (2015) Information practices of urban newcomers: an analysis of habits and wandering. *J Assoc Inf Sci Technol* 66(6):1239–1251. doi:[10.1002/asi.23255](https://doi.org/10.1002/asi.23255)
- Lloyd A (2007) Learning to put out the red stuff: becoming information literate through discursive practice. *Libr Q: Inf, Commun, Policy* 77(2):181–198. doi:[10.1086/517844](https://doi.org/10.1086/517844)
- Locke K, Golden-Biddle K, Feldman MS (2008) Perspective—making doubt generative: rethinking the role of doubt in the research process. *Organ Sci* 19(6):907–918. doi:[10.1287/orsc.1080.0398](https://doi.org/10.1287/orsc.1080.0398)
- Lohmeyer N (2017) Instrumentalisierte Verantwortung? Entstehung und Motive des » Business Case for CSR « im deutschen Diskurs unternehmerischer Verantwortung. Transcript, Bielefeld
- McKinney EH, Yoos CJ II (2010) Information about information: a taxonomy of views. *MIS Q* 34(2):329–344
- Mendelson H, Pillai RR (1998) Clockspeed and informational response: evidence from the information technology industry. *Inf Syst Res* 9(4):415–433. doi:[10.1287/isre.9.4.415](https://doi.org/10.1287/isre.9.4.415)
- Miles MB, Huberman AM (1994) *Qualitative data analysis: an expanded sourcebook*, 2nd edn. Sage, Thousand Oaks
- Miranda SM, Saunders CS (2003) The social construction of meaning: an alternative perspective on information sharing. *Inf Syst Res* 14(1):87–106. doi:[10.1287/isre.14.1.87.14765](https://doi.org/10.1287/isre.14.1.87.14765)
- Neben T (2015) A model of defensive information avoidance in information systems use. In: International conference on information systems, Forth Worth
- Olsson M (2005) Making sense of sense making: information behaviour researchers construct an “author”. *Can J Inf Libr Sci* 29(3):315–334
- Olsson M (2016) Making sense of the past: the embodied information practices of field archaeologists. *J Inf Sci* 42(3):410–419. doi:[10.1177/0165551515621839](https://doi.org/10.1177/0165551515621839)
- Park J (2007) Interpersonal and affective communication in synchronous online discourse. *Libr Q Inf Commun Policy* 77(2):133–155. doi:[10.1086/517841](https://doi.org/10.1086/517841)
- Phillips N, Hardy C (2002) *Discourse analysis: investigating processes of social construction*. Qualitative research methods series, vol 50. Sage, Thousand Oaks
- Picot A, Reichwald R, Wigand RT (2008) *Information, organization and management*. Springer, Berlin
- Pitts MG, Browne GJ (2004) Stopping behavior of systems analysts during information requirements elicitation. *J Manag Inf Syst* 21(1):203–226
- Savolainen R (2007) Information behavior and information practice: reviewing the “umbrella concepts” of information-seeking studies. *Libr Q* 77(2):109–132. doi:[10.1086/517840](https://doi.org/10.1086/517840)
- Scholl W (1992) Informationspathologien. In: Frese E (ed) *Handwoerterbuch der Organisation*, 3rd edn. Schaeffer-Poeschel, Stuttgart, pp 900–912
- Schwarze JC, Tessmann S, Sassenberg C, Müller M, Prokosch H-U, Ückert F (2005) Eine modulare gesundheitsakte als antwort auf kommunikationsprobleme im gesundheitswesen. *Wirtschaftsinf* 47(3):187–195
- Seidel S, Recker J, vom Brocke J (2013) Sensemaking and sustainable practicing: functional affordances of information systems in green transformations. *MIS Q* 37(4):1275–1299
- Siggelkow N (2007) Persuasion with case studies. *Acad Manag J* 50(1):20–24
- Singh R, Mathiassen L, Mishra A (2015) Organizational path constitution in technological innovation: evidence from rural telehealth. *MIS Q* 39(3):643–666
- Suchman MC (1995) Managing legitimacy—strategic and institutional approaches. *Acad Manag Rev* 20(3):571–610. doi:[10.2307/258788](https://doi.org/10.2307/258788)
- Suddaby R (2006) From the editors: what grounded theory is not. *Acad Manag J* 49(4):633–642. doi:[10.5465/AMJ.2006.22083020](https://doi.org/10.5465/AMJ.2006.22083020)
- Swanson BE, Ramiller N (1997) The organizing vision in information systems innovation. *Organ Sci* 8(5):458–474. doi:[10.1287/orsc.8.5.458](https://doi.org/10.1287/orsc.8.5.458)
- Sydow J, Schreyoegg G, Koch J (2009) Organizational path dependence: opening the black box. *Acad Manag Rev* 34(4):689–709
- Sydow J, Windeler A, Müller-Seitz G, Lange K (2012) Path constitution analysis: a methodology for understanding path dependence and path creation. *BuR Business Res* 5(2):155–176. doi:[10.1007/BF03342736](https://doi.org/10.1007/BF03342736)
- Tabak E (2014) Jumping between context and users: a difficulty in tracing information practices. *J Assoc Inf Sci Technol* 65(11):2223–2232. doi:[10.1002/asi.23116](https://doi.org/10.1002/asi.23116)
- Talja S, McKenzie P (2007) Editors introduction: special issue on discursive approaches to information seeking in context. *Libr Q Inf Commun Policy* 77(2):97–108. doi:[10.1086/517839](https://doi.org/10.1086/517839)
- Talja S, Tuominen K, Savolainen R (2005) “Isms” in information science: constructivism, collectivism and constructionism. *J Document* 61(1):79–101. doi:[10.1108/00220410510578023](https://doi.org/10.1108/00220410510578023)
- Vandenbosch B, Higgins C (1996) Information acquisition and mental models: an investigation into the relationship between behaviour and learning. *Inf Syst Res* 7(2):198–214. doi:[10.1287/isre.7.2.198](https://doi.org/10.1287/isre.7.2.198)
- Vandenbosch B, Huff SL (1997) Searching and scanning: how executives obtain information from executive information systems. *MIS Q* 21(1):81–107. doi:[10.2307/249743](https://doi.org/10.2307/249743)
- Veinot T (2007) The eyes of the power company: workplace information practices of a vault inspector. *The Libr Q Inf Commun Policy* 77(2):157–179. doi:[10.1086/517842](https://doi.org/10.1086/517842)
- Vergne JP, Durand R (2010) The missing link between the theory and empirics of path dependence: conceptual clarification, testability

- issue, and methodological implications. *J Manag Stud* 47(4):736–759. doi:[10.1111/j.1467-6486.2009.00913.x](https://doi.org/10.1111/j.1467-6486.2009.00913.x)
- Wang P, Swanson EB (2007) Launching professional services automation: institutional entrepreneurship for information technology innovations. *Inf Organ* 17(2):59–88
- Wessel, L, Harloff, E, Gersch, M (2016) Kann man digitale Innovationen zerreden? Eine Diskursanalyse zur elektronischen Gesundheitskarte in Deutschland. In: Nissen V, Stelzer D, Straßburger S, Fischer D (eds) Proceedings Multikonferenz Wirtschaftsinformatik (MKWI)
- Yin RK (2013) Case study research. Design and methods. Applied social research methods series, vol 5, 5th edn. Sage, Los Angeles