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Tensions to Frictions? Exploring Sources of Ineffectiveness in Multi-Level IT Use

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Abstract

There is a notable paucity of multi-level analyses of IT use in IS research. Often, analyses limited to a single level are problematic, as multi-level effects cannot be accounted for. For example, online communities, such as the one examined in this paper, build on network effects: they can provide more value to all members collectively whenever each individual member participates more actively. This example also highlights the importance of usage effectiveness – the rather commonsense, yet often explicitly unexamined, idea that IT systems are not used for their own sake, but to attain relevant goals. Given these challenges, we set out to explore what factors contribute to ineffectiveness in multi-level IT use in the context of an online community. Our initial analysis reveals two novel concepts – frictions and tensions – that could help researchers and practitioners in better understanding the obstacles to achieving effective multi-level IT use.

Keywords: IS use, multi-level analysis, effectiveness, qualitative research

Introduction

Acceptance and use of information technology constitute one of the most prolific research streams in the field of Information Systems (IS) (Burton-Jones and Grange, 2013; Cordoba, et al., 2012). The tradition of acceptance studies stretches back to at least the 1980s with the Technology Acceptance Model (TAM) (Davis, 1989). Studies on the continued use of IT (Kim and Malhotra, 2005) form a natural extension to this research by examining actual use and use-related behaviors as well as their endurance (cf. Barki, et al., 2007; Burton-Jones and Straub, 2006; Limayem, et al., 2007). Most of these existing studies have been conducted on a *single-level* of analysis, typically focusing on individual use (cf. Limayem, et al., 2007; Venkatesh, et al., 2003). This has resulted in a notable paucity in *multi-level* analyses of IT use (Burton-Jones and Gallivan, 2007). Yet, single-level research can only be valid if "none of the constructs being examined emerge from attributes that exist at a lower level; [...] [or] are affected by correlated variables at a higher level, [...]" (ibid., p. 660). Clearly, this is often not the case in IT use where cross-level effects are common. For example, Sedera and Tan (2007) alleged that successful extraction of business value from an ERP system involves conscious effort on the part of organization's members to: (1) leverage on relevant system functionalities to accomplish individual tasks, and; (2) seek consensus among colleagues on a consistent interpretation of the use of these functionalities. Such a multi-level perspective on system use is most likely to manifest in online communities due to their reliance on network effects (Faraj and Johnson, 2011): the more active each individual member participates in an online community, the more value it generates for all members as a collective. These examples accentuate the importance of *effectiveness* (Burton-Jones and Grange, 2013) – the idea that IT systems are rarely, if ever, used for their own sake; rather they are used in order to attain predefined goals (ibid.). Thus, *effectiveness* is only realized when IT use behaviors aid in achieving desired outcomes. Multi-level considerations add complexity here as the quest to achieve collective outcomes may be influenced not only by collective (e.g., aggregate) behaviors, but also by individual use behaviors, and vice versa.

In line with recognizing these challenges as well as with the availability of guidelines for multi-level research (Burton-Jones and Gallivan, 2007), more and more multi-level studies are being conducted (see Kane and Labianca, 2011; Leonardi, 2013; Nan, 2011; Sun and Bhattacherjee, 2011; Turel and Zhang, 2011). For example, Kane and Labianca (2011) examined the impact of IS avoidance on patient care across individual, shared group and configural group levels. Their findings suggest that when groups of doctors and nurses have a distinct avoidance configuration, with the central individuals or central groups being avoidant, it severely limits the ability of different groups or individuals to work together and, accordingly, affects patient care. Achievement of effective multi-level use is, thus, an important issue that in our view consists of two considerations: (a) what actually constitutes effective multi-level IT use and what factors facilitate effectiveness, and (b) what factors hinder effectiveness or contribute to ineffectiveness. In this paper, we endeavor to examine the latter by focusing on the following research question: W*hat factors contribute to ineffectiveness in multi-level IT use* in *online communities?* We confess that this choice is largely pragmatic and takes advantage of an opportunity to study an online knowledge sharing community where we could observe ineffectiveness in achieving both individual and collective purposes. We, thus, became interested in better understanding how the ineffectiveness observed came about. We do so through an interpretive case study (Walsham, 1995) of a group of twenty software architects' use of an online knowledge sharing community.

The remainder of this paper is structured as follows. First, we introduce key concepts that are relevant in guiding our study of IT use from multi-level and effectiveness perspectives. We then review our chosen research method. Next, we present excerpts from the case data and our *initial* analysis, offering an introduction to two novel concepts emerging from our data, *frictions* and *tensions*, that could help researchers and practitioners in better understanding the obstacles towards achieving effective multi-level IT use. We end by considering the limitations of our work and our plans for developing it further.

IT Use: Key Concepts from Multi-Level Research

According to Burton-Jones and Gallivan, (2007), system usage is defined as "a user's employment of a system to perform a task" (p. 659). This definition holds for both individual and collective levels because the user could be an individual, a group or an organization. Responding to the recommendations by

Burton-Jones and Gallivan (2007), our study will explore multi-level IT use by focusing on the three guidelines as prescribed: identifying the function, structure and context of usage at each level.

Function, Structure and Context of Multi-Level IT Use

Function of usage refers to the desired outcomes of IT use. For example, IT systems are often used to improve the work performance of both individual workers and collectives (same function across levels). However, it is also possible for an IT system to have different functions across levels; while a new technology may be used by individuals to enhance their IT skills, it may also be used by the organization to render staff redundant through automation. The function of usage arises from a particular *structure*, embodying interactions and actions of individuals that characterize system use. To understand usage structure on the collective level, it is important to identify *interdependencies-in-use* among individuals, i.e., "dependencies among members of a collective that relate to their use of a system" (Burton-Jones and Gallivan, 2007, p. 663). Evidence of communication, collaboration and coordination during IT use are indicative of the existence of collective form(s) of usage. On the collective level, usage can either be shared or configural – both forms originate in the attributes of the individual, but differ in the characteristics of the emerging collective use. Shared form of collective use refers to *homogeneity* in the collectives' use of IT. For example, similar levels of intensity, frequency or breadth of use are shared among the members of a group. Conversely, configural form of collective use refers to a *distinct pattern* in the collective use of IT. These patterns can be described using three dimensions: system-centered, task-centered and user-centered (Burton-Jones and Gallivan, 2007, p. 668). A group of users may have a distinct pattern for using certain features of the system; a pattern of employing the system for different tasks; a pattern of engaging with the system with specific cognitions or emotions; or a distinct pattern involving some or all of these dimensions. Lastly, there are *contextual* factors associated with each element of usage: system, task and user (ibid., p. 671). These contextual factors can influence the kinds of functions for which individuals and collectives use the system and the interdependencies between users.

Defining Effective Multi-Level IT Use

Effective IT use is deemed to have been realized when IT use (structure) takes on a form that in actuality helps to achieve the desired outcomes (Burton-Jones and Grange, 2013). As such, effective use comprises three dimensions: transparent interaction, representational fidelity and informed action (ibid.). The key underlying assumptions here, building on representation theory of information systems (Wand and Weber, 1995), are that (a) the purpose of an information system is to faithfully represent a real-world domain, and (b) people desire faithful representations because they provide a more informed basis for action than unfaithful representations do (Burton-Jones and Grange, 2013, p. 5). Given these assumptions, *transparent interaction* refers to the extent to which a user can, in an unimpeded manner, access and interact with the system's representations. *Representational fidelity* refers to the extent to which representations and information a user obtains from the system are a faithful reflection of the relevant domain. *Informed actions* refer to the "extent to which a user acts upon these faithful representations to improve his or her state" (Burton-Jones and Grange, 2013, p. 11). Overall, thus, effectiveness is seen not in absolute terms, but rather in relation to user perceptions and interpretations. This three-dimensional model of effective use was outlined at the *individual* level. Accordingly, we extend the work of Burton-Jones and Grange (2013) to suggest that *effective* ***multi-level*** *IT use* may be constrained by three cross-level conditions: (1) transparent interaction across structure, i.e., extent to which use of a system at an individual level (does not) impede use at the collective level and vice versa, (2) representational fidelity across function, i.e., extent to which information and representations (outcomes) obtained from a system at an individual level are a faithful reflection of the domain and the outcomes at the collective level and vice versa; and (3) informed actions between structure and function, i.e., extent to which use of a system at an individual or collective level contributes to outcomes at both individual and collective levels. We have summarized this into an overall framework (Figure 1).

Possible Causes of Ineffectiveness in Multi-Level IT Use?

While reasons for ineffectiveness in multi-level IT use have not been explicitly explored in IS research, there are studies on related topics that could offer initial insights. A key concept that keeps resurfacing in that regard is *misfits* (Strong and Volkoff, 2010), variously also referred to also as misalignments (Sia and

Soh, 2007) or discrepancies (Sun, 2012). In short, these refer to contradictions or a lack of fit among the elements of the current system use activity (ibid.). Strong and Volkoff (2010), in one of the recent studies of '*misfits*', discuss these as potential contributors to a *lack* of effectiveness (and efficiency) in enterprise systems use. They identify six categories of misfits (functionality, data, usability, role, control and organizational culture) and two types of misfits – deficiencies and impositions. While deficiencies refer to missing functionality, data, etc.; impositions refer to required ways of working with a system. Both may stem from the system's inherent (deep structure) or second order (latent structure) characteristics. Deep structure refers to the specification of a domain offered by the system (Burton-Jones and Grange, 2013; Wand and Weber, 1995). The deep structure of an online community, for example, is typically made up of elements such as user profile pages, forums, and wiki-s. As people use the community, the deep structure is populated with data instances. In combination, the structure and data then provide users with *representations* (ibid., p. 6). Latent structure, conversely, is not designed and scripted into the IT artifact as deep structures are, but rather arises from these as a second order structure during use (Strong and Volkoff, 2010). Latent structures may include, for example, role and control prescriptions, as well as organizational culture (ibid., p. 750). While functionality and data misfits may largely be rooted in the deep structures, role, control and culture misfits are likely to be rooted in complex conditions emerging from these (i.e., latent structures) (ibid.).

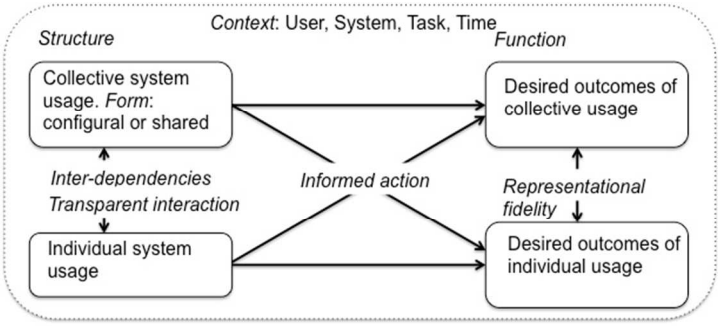

Figure 1. Research Framework (synthesized from Burton-Jones and Gallivan, 2007, and Burton-Jones and Grange, 2013)

Research Setting

EntCorp is a global corporation whose business entails the development, retail and implementation of software solutions aimed at improving customers' operational functions, focusing primarily on areas such as business process management (BPM), enterprise mobility and integration. EntCorp's headquarters is located in Western Europe and it currently employs around 450 employees spread across every continent. In addition, the company works with a large network of global and local implementation partners. In view of this context, EntCorp established an online knowledge sharing community in 2006, involving employees of EntCorp, partners, resellers and customers. Joining the community requires registration and some areas are private (only accessible to customers or partners). At the time of data collection (2012 and 2013), there were about 7,000 users of the community, of which a few hundred could be considered active. The community is expected to fulfill the information needs of various groups, but a key group of actors are the software architects (referred to as architects from here on). Architects play a critical role in the adoption process of EntCorp's products, because they analyze a particular organization's business problems and may (or may not) recommend EntCorp's products as an appropriate fix for these problems. For us, this setting - with both internal and external users as well as many possible desired functions for the system - represents an excellent opportunity to explore IT use from a multi-level perspective.

Method

We conducted an interpretive case study (Walsham, 1995) with the primary source of data of individual in-depth telephone interviews, conducted in 2012 with twenty architects in total (six current employees of EntCorp, three ex-employees of EntCorp and eleven externals). Architects working across US, Europe and Asia were chosen to participate to have a fair representation of the actual user population. On average, the

interviews lasted about 30 minutes; all interviews were recorded and fully transcribed. A secondary source of data was direct observation of activities taking place in the online community (in 2012 and 2013). We observed all activities of the interviewees that left a trace on the community – updates to their profile, questions posed on the forum, questions answered and comments posted.

Our data analysis was guided by the research framework (Figure 1). We identified the variety of individual and collective functions for which the architects were using the community. Using both interview and observational data, we then examined the individual and collective structures of usage. Once we had this general overview of multi-level use of the community, we focused specifically on identifying the factors contributing to ineffectiveness in use. First, we used descriptive coding (Miles and Huberman, 1994; Saldana, 2013) to summarize cases of ineffective tendencies in multi-level use. For example, we observed that on the collective level, external architects tended to discuss the need for collective identification of 'best practices', while on the individual level they did no information dissemination themselves. We grouped multiple descriptive codes to the theoretical concepts of various *misfits* (cf. Strong and Volkoff, 2010). This set the groundwork for our second cycle pattern coding (Table 1) to develop explanations (Saldana, 2013, p. 210) in terms of the three constraining cross-level conditions discussed above.

Interview Text	Descriptive Codes (underlined) Theoretical Concepts	Pattern Codes: Emerging Themes
Architect #8 (external, not experienced): "*If you are looking for a best practice, it is important to see that the person who is providing this information knows exactly what he is speaking about because from EntCorp's perspective [this may] not be really a good practice or something, so it would be useful to know his experience…*"" "*I don't write that many things on the community… hehe… Mostly I post questions or look for [information]…*"	Information quality Goodness vs. correctness of information Level of experience Info search (no dissemination) Data misfit	Comparing these passages reveals issues with *representational fidelity across function*. Novices and experts alike use the community to find information. Novices, however have more difficulty in making sense of the information, because they do not yet know all the technicalities that the information produced by the experienced architects contains. Novices, thus, feel inexperienced, perpetuating their tendency to not disseminate information (even though the information they would produce could explain issues in a way more suitable for other novices).
Architect #20 (external, experienced): "*I ask a question because of what I want to know. So it seems logical to me that I'm there for the content and not for the people.*"; "*I do not share on the community. I am still too uncertain or I have little experience …*" "*I find information often too specific or too general. And in between, for me, is a blank spot that is not covered.*"	Info search (no dissemination) Personal ties Information quality Level of experience Blank spot Data misfit	

Table 1. Coding Examples

Case Findings

In this section we briefly consider each of the cross-level conditions constraining effective multi-level use of the community. Due to space considerations we only present short summaries of our findings.

Transparent Interaction across Structure: Ineffectiveness stems from architects' self-censored use of the online community on both individual and collective levels

EntCorp's objective, in setting up the online community, was to support individual users in becoming competent architects. There are three typical individual use behaviors (structure of usage) carried out in order to achieve this function. A less experienced external architect tends to focus on increasing their general awareness, often done through using the documentation available on the community. A more

experienced external architect working on specific projects tends to focus on finding information to help with technical problem solving, often done through searching through existing threads on the forum or asking new questions. An internal architect (experienced) tends to use internal private systems to find information (Technobabble: an internal mailing list), while the community is used to disseminate information. EntCorp's objective in creating the online community was also to build a cohesive network or a collective of competent architects. A key norm influencing how individual architects interact with each other on the community is credibility. For EntCorp's internal architects we observed considerable pressure to always appear as a credible expert on the community, *avoiding giving the wrong answer at all costs*. However, inexperienced architects also shied away from disseminating information. Given these interdependencies, we found two *configurations* of collective use in the community (Table 2).

Configuration	Individuals	Description of Pattern
Boosters	# 1, 2, 3, 5, 7, 9 and 19	Task-centered. Boosters see themselves as having 2 key collective tasks: promoting EntCorp's products and increasing the collective level of expertise. They use the community for dissemination, but use a variety of systems (phone, Technobabble, e-mail) for search.
Supporters	# 6, 8, 10, 11, 12, 14, 16, 18 and 20	Task- and user-centered. Supporters see the community as having an important collective function of increasing the collective level of expertise, but they do not see it as their task. They approach the community with an expectation that it's a place where *other* people (e.g., experienced or internal architects) share expertise openly.

Table 2. Two Configurations of Collective Use: Boosters and Supporters

We observed multiple issues with *transparent interaction across structure* here. For example, internal experienced architects know each other well, use Technobabble for private conversations, and are guided by a strong norm to look credible on the community. As a result, the community has a limited role in creating personal networks for the internal architects, it duplicates many of the discussions on Technobabble and it requires the internal architects to be careful in terms of the data they put on the community. Consequently, the ease with which individual internal architects can use other tools besides the community (Technobabble) to achieve the same (or similar) function actually impedes their collective use of the community. Some of the potential sources of ineffectiveness, e.g., misfits, are experienced by the users, e.g., the internal architects are clearly aware there is a control imposition of keeping certain information out of the community (creating potential data deficiencies). Conversely, other sources of ineffectiveness seem more inherent. For example, less experienced external architects seem to be guided by assumptions that it is 'logical' to be on the community 'for content and not for people' as well as not to engage in disseminating information, whereas internal architects are guided by assumptions that they should always maintain credibility on the community and are more likely to disseminate information to other architects they already know. However, neither external nor internal architects seem to be explicitly aware that this way of interacting (the formation of 'Boosters' and 'Supporters') is actually impeding both party's use of the system on the collective level by perpetuating a form of 'don't ask, don't tell' cycle.

Representational Fidelity across Function: Ineffectiveness stems from outcomes being poor reflections of goals on both individual and collective levels

While above we considered some of the *intended* functions for using the community, we often discovered that the information and representations (i.e., outcomes) obtained from the system were not necessarily reflective of these functions. For example, we uncovered problems with trying to increase the general level of expertise in EntCorp's products: "Q: *So the community is a resource for solving practical problems?* A: *Yes, but ultimately it's wider, there is a special corner where architects can share patterns, the real solutions … This is knowledge that you build up over the years and it is very difficult to capture in the community.*" (Architect #6, external, over 5 years of experience)

Multiple issues with *representational fidelity across function* may be observed here. For example, both novice and expert architects (particularly external ones) use the community largely to find information. However, information is produced in the community by 'Boosters' (very experienced, often internal, architects). This expertise, collected through years, is often difficult to codify in the community, creating a

"blank spot" within representations (see Table 1). Secondly, novices often have difficulty in making sense of the information provided, because they do not yet speak the jargon that the information produced by the experienced architects contains. As a result novices feel inexperienced, perpetuating their tendency to not disseminate information themselves. As with transparent interaction across structure, we note that some of the potential sources of ineffectiveness are experienced by the users. Architects are clearly aware there is a data misfit - a discrepancy between desired information on the community (collectively decided 'real solutions') and actual information, which is available and captured by such a community (examples of code, etc.). Conversely, other sources of ineffectiveness go unrecognized, such as the role misfit (the 'silent' role less experienced architects assume in the system is inconsistent with their ability to contribute useful information, creates imbalances in the workload by overloading the more experienced architects). A broader consequence of this is a situation where the information and representations (i.e., outcomes) obtained from the online community at the individual level poorly reflect the representations at the collective level: they do not reflect collective competencies about 'best practices', and the like.

Informed Actions between Structure and Function: Ineffectiveness stems from usage structures impeding the achievement of desired outcomes on both individual and collective levels

While the above discussion highlights situations where the achieved outcomes were not necessarily reflective of the intended functions, we now turn to cases where the usage structures do not necessarily contribute to the effective achievement of these functions. For example, we found frequent mention of problems in achieving the collective goal of being an actual community, rather than a set of individual users: "Q: *[Is] the website a central point ...?* A: *No it is not ... Well, regardless of how it should be, but it is not for me. It's more of a product reference ... and when you cannot find it here then you go to your social network, your professional network ... then you just ask or email.*" (Architect #6, external)

Many of them also made suggestion as to what could be changed in the surface and deep structure of the community to better facilitate informed actions: "*Template needs to be defined... [...] features should be added... if its a partner, there should be something in groups that they could start communicating... in the landing page itself I want to see what are the top five things in the different sectors... so you should be able to create a kind of dashboard*" (Architect #3, internal). The issues observed in relation to transparent interaction and representational fidelity contribute to the ineffectiveness observed in performing informed actions. For example, the individual usage structure adopted by many externals and novices of going through the forums, while making oneself unavailable to answer questions may benefit the individual in supporting informed actions of technical problem solving, but it impedes the achievement of successful community building, which in the long run also impedes the achievement of individual informed actions of learning from others' experiences and best practices. Architects are not always aware of this influence of interaction and representational issues on ineffectiveness in informed action. They are, however, keenly aware of how the particular configuration of the system (deep structure) – particularly the impositions and deficiencies in terms of *functionality* - lead to ineffectiveness in the achievement of desired goals. Missing templates and group pages, non-customizable dashboards – all are perceived to contribute to the ineffectiveness in achieving both individual and collective-level functions.

Discussion: Introducing the Concepts of Tensions and Frictions

What our analysis of the case data shows is that ineffectiveness in multi-level IT use is a complex phenomenon that seems to have multiple sources and manifests itself in various ways. As described above, what can be considered as various misfits (in terms of data, control, functionality, etc.) are visible in the case – some of these are experienced by the users, while others seemingly not. While extant research (cf. Strong and Volkoff, 2010) is useful in helping to pinpoint and conceptualize some of the sources of ineffectiveness, they come up short in terms of offering a parsimonious framework that helps to holistically make sense of what we observed - most likely because the aim of these prior works has not been to actually study ineffectiveness per se. Our aim with this research is, thus, to take up the challenge of trying to provide such a framework; we offer some initial insights in this short paper.

Further reflecting on the different sources of ineffectiveness described above, we noticed, that a key distinction extant research was unable to accommodate related to the observation that some of the misfits were *implicit* in use situations, while others *explicitly manifested* in actual system use. It became

necessary to iterate back to theory to discover if we could find suitable concepts to better label and theorize about the various sources of ineffectiveness we were seeing in the data. We found two relevant concepts: *frictions* and *tensions*. Tensions is a relatively familiar term within IS research (Carlo, et al., 2012; Ribes and Finholt, 2009; Sutanto, et al., 2013). Some studies do not explicitly define the term and follow its commonsense meaning (Ribes and Finholt, 2009); others equate it with the idea of paradox (Sutanto, et al., 2013); while yet others define it using dialectic theory (Carlo, et al., 2012). In dialectic theory (Benson, 1977), contradictions "represent poles of perspective that frequently work against one another, creating oppositional pulls, or tensions, that vary in degree. Tensions arise not because contradictions are simple alternatives or even necessarily mutually exclusive; rather because they consist of poles which simultaneously conflict and coexist" (Pike, et al., 2013). Accordingly, we define tensions as the *oppositional pull arising from contradictory poles within an IT use situation*. This suggests that oppositional poles are inherent in IT use; tensions may always arise from the push-pull between different poles within a situation, but many of these tensions may never manifest as *explicit conflicts*.

However, what we observed in our data was the presence of both implicit or inherent tensions, as well as the specific manifestations of these tensions, experienced by users as specific misfits, contradictions, and the like. We, thus, began a search for a concept that would allow us to capture this distinction. While IS research has made scarce use of it, we opted for the concept of *friction*, because it is defined as the resistance that one surface or object *encounters* when moving over another (Oxford Dictionary). The term, thus, implies an explicit encounter of resistance in a way that tension does not. In sum, we define friction as the ***actual experience*** *of dissonance from the oppositional pull arising from contradictory poles within an IT use situation*. We suggest that while implicit tensions may exist in system structures, as the users engage with the system, some of these tensions can become manifested as explicit frictions. For example, as described earlier, we noticed that architects were clearly experiencing a dissonance (friction) in the form of a data misfit between desired information on the community (collectively decided 'best practices' explained in detail) and actual information available (examples of code, manuals, high-level explanations). Conversely, they remained unaware that this friction was a manifestation of underlying tensions in the latent and deep structures of the system. There is an implicit tension in how the community should represent a domain. A faithful representation for internal experienced architects is different from a faithful representation to novice external architects, but without recognizing each other's collective needs the individual architects take on mis-aligned roles in the community, so that their usage perpetuates the creation of the 'blank spot' of information and ineffectiveness in representational fidelity.

Pointing out the distinction between tensions and frictions, thus, allows us to trace sources of ineffectiveness to (1) inherent contradictions built into system deep structure during development, (2) inherent contradictions emergent in latent structures when the system is put into use, and (3) manifested contradictions during use. As the manifested contradictions (frictions) are only a subset of the tensions, it allows for the consideration of situations where the recognition of a friction may not necessarily lead to reduction in ineffectiveness because the experienced frictions offer an incomplete picture of the underlying tensions. Particularly, frictions are often experienced on a *single level*, either individual or collective (e.g., "in between, for **me**, is a blank spot"; "where **architects** can share the real solutions ... this knowledge [...] is very difficult to capture in the community"). The two examples demonstrate an experience of an individual and a collective data misfit; however we found very little evidence of users experiencing *cross-level* frictions. Yet, most underlying tensions contributing to ineffectiveness are, in fact, *cross-level*. For example, the tension in roles suggests an oppositional pull between the 'silent' role adopted by many external (both novice and experienced) architects individually, and the more active role these same architects expect 'others' (an ambiguous collective) to take on.

In sum, our contribution lies in introducing the concepts of tensions and frictions, as well as linking them to prior research on potential sources of ineffectiveness in multi-level IT use. While prior research has largely focused on the idea of misalignments or misfits (cf. Strong and Volkoff, 2010), we contend that these often represent only the visible surface sources of ineffectiveness (frictions), or both frictions and tensions, but without a way to distinguish between the two or understand whether the source is a single or a cross-level phenomenon. We have offered only our initial thoughts on a framework that could help make sense of sources of ineffectiveness in multi-level IT use. In developing the research further, our aim is to generalize from the exploratory case study to theory (cf. Lee and Baskerville, 2012) by elaborating on the framework fully. Future research can, then, address the limitations of a single case study by applying and extending the framework.

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