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Alternatives to Firm Innovation with IT in the Face of Performance Gaps

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Completed Research Paper

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Abstract

What do firms do when they choose NOT to innovate with IT when they face performance problems and why? Though counterintuitive, we suggest that studying this question enables us to: explore alternatives to the dominant rational maximizer logic prevalent in innovation research; overcome the pro-innovation bias critique; and more carefully study the very earliest time period of the innovation process. We answer this question through an exploratory, qualitative study of what firms do when they encounter problems (specifically performance gaps) and we pay special attention to what they do when they elect not to adopt new information technology solutions to solve them. Through systematic analysis of our qualitative data set and application of a problemistic search/sensemaking lens, we discover that common actions include tinkering, stretching, making do and going back to prior IT. Because firms wrestle with complex environments with multiple, weak and ambiguous cues which hinder the identification of performance problems, and feel pressed to economize on scarce resources, they develop smaller and more familiar solutions rather than attempting unfamiliar and more resource-demanding innovations. When these solutions work, they become long-term alternatives to IT innovation. We conclude with a discussion of how our approach succeeds in going beyond the dominant paradigm, informs an agnostic stance towards innovation and promotes a call for a new frontier of research into the pre-innovation phase of IT innovation research.

Keywords: innovation alternatives, performance gaps, critical incident, qualitative analysis, problem solving

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Introduction

After careful study and review of the IT innovation literature, we propose in this paper, a new frontier of exploration: when firms choose NOT to innovate with new IT in the face of performance problems – what do they do instead and why? We realize this is a somewhat counterintuitive question in a field that has been more interested in studying innovating with IT as opposed to not innovating with IT. However, we suggest that by studying the question we pose, we can in fact learn a great deal more than we currently know about several important IT innovation issues. Answers to our question might inform alternative logics at play in IT innovation processes (i.e. non-maximizing) beyond the dominant paradigm (Fichman 2004). They also might enable us to get beyond the 'pro-innovation' bias which the field has been critiqued for promoting (Abrahamson 1991; Fichman 2004; Rogers 2003) and open up a space for considering when IT innovation creates more problems than benefits. Finally, answers to this question would also enable us to study the very earliest time period of the innovation process which has been largely neglected (Fichman et al. 2014). Thus, this research reports on our efforts to answer this question through an exploratory, empirical study of what firms do when they encounter problems (specifically performance gaps) and elect not to use new information technology solutions to solve them.

Theories of innovation have long considered performance gaps as a central motivation for organizations to innovate (Ettlie 1983b; Zmud 1984). Interestingly, however, empirical evidence for the impact of performance gaps on organizational innovation adoption is mixed: some studies find support for this relationship (see Abrahamson 1991 for a review), and some others find no support (Ettlie 1983a; Zmud 1984) or only indirect support (Rai and Patnayakuni 1996).

Thus literature tells us that sometimes firms who experience performance gaps increase their IT innovation adoption. Sometimes firms experience performance gaps and there is no increase or decrease in IT innovation. What are these firms doing and why are they doing it? Particularly when there is evidence that as Fichman claims "...taken in aggregate, technological innovation is not just beneficial, but in fact essential..." (Fichman 2004, p. 317).

To address our research questions we turn to different literature streams that shed light on this relationship. Subsequently, we provide a brief overview of the theoretical concepts we theorize are at play during this phenomenon. Then we also explore the question through a qualitative, critical incident driven examination of non-innovation events, which uses small businesses as the research context. We present our results with as much richness as the paper format allows and conclude with what this exploratory study contributes to new frontiers of examining innovation and where future research should go.

Review of Performance Gaps and IT Innovation Literature

Given the scope of research that has emerged in the field of firm level, IT innovation research, we present here a targeted review specifically focused on the literature which informs our research interest. Based on a broad review of the field, we establish the following baseline understanding for what follows below. 1) We use Fichman's logic of the dominant paradigm (Fichman 2004) as our foundation for establishing the frontier of innovation research we wish to go beyond, 2) we intend the notion of IT innovation to refer to what firms do when they take up a technology they did not have before, and not in the sense of creating a technology, 3) we are interested in the organization as the unit of analysis and therefore organizational decision makers as informants. We accept that there may be some way in which the vast literatures on individual level theories of technology non-adoption/rejection, non-use, resistance (e.g., Beaudry and Pinsonneault 2005; Ferneley and Sobreperez 2006) may be informative, but since our central interest is in firm-level problem-solving behavior and not in user-level reactions to an imposed technology, we leave such work to future research as we state in our discussion.

Performance gaps have been defined as perceived discrepancies between performance expectations and actual levels of performance, which encourage organizations to question the adequacy of their current practices, search for alternative practices, and identify and adopt innovations that will address the gap (Abrahamson 1991; Cyert and March 1963; Ettlie 1983a).

Several origins of performance gaps have been suggested in the literature on innovation. On the one hand, the "efficient-choice" stream attributes performance gaps to both demand-pull and supply-push forces. When demand-pull forces are at play, organizations notice declining performance against already set expectations, or rising output expectations being demanded from them at the environmental level (Ettlie 1983a; Rai and Patnayakuni 1996). Supply-push forces introduce performance gaps by highlighting the increasing capabilities of available technology, hence bearing the promise of technologically-driven higher organizational performance (Ettlie 1983a; Zmud 1984). On the other hand, the literature stream drawing primarily from institutional theory sustains that performance gaps emerge or are noticed by means of the institutional work of fashion setters and other actors at the institutional level who engage in discourse production to reveal such gaps, raise awareness of their importance as management problems, and advocate the adoption of innovations purportedly capable of narrowing these gaps (Abrahamson 1991; Abrahamson 1996; Baskerville and Myers 2009; Swanson and Ramiller 1997). Regardless of whether identified on objective grounds or constructed via managerial discourse, perceived performance gaps, noticed by decision makers can accelerate the diffusion of innovations.

We note that when performance gaps have been considered explicitly in the literature as the trigger for innovation, they have been treated as independent variables belonging to the environmental characteristics category (e.g., Chau and Tam 2000), or left untested as prior conditions (e.g., felt needs in Rogers 2003). More often, however, empirical research studies have included for exploration other environmental characteristics, such as competitive pressures or competitive intensity (e.g., Grover 1993; Iacovou et al. 1995; Kimberly and Evanisko 1981). While these variables are similar to performance gaps in intent, inasmuch as they link characteristics of the competitive environment with innovation responses, they differ in that they do not make explicit the logic of a gap that is perceived by a decision maker, and also in that they rely first and foremost on efficiency assumptions.

To date, evidence of the impact of performance gaps on organizational innovation is inconclusive. Both Abrahamson's (1991) and Hage's (1999) reviews of the innovation literature provide several examples of studies which have found support for a direct causal link between performance gaps and innovation. In IS, some studies have also found support for this link (Chau and Tam 2000), whereas some others have found no effects (Ettlie 1983b; Zmud 1984) or only indirect effects (Rai and Patnayakuni 1996) between performance gaps and innovation adoption. Further, in the scant literature on systems discontinuance, which explores the issue of system performance gaps as they motivate replacement intentions and decisions, findings are also mixed, with some studies that find support for this causal link (Furneaux and Wade 2011; Kelly et al. 1999) and some others that do not (Swanson and Dans 2000).

As mentioned, the conceptual/empirical gap and the inconsistent empirical results underpin our motivation for this study as they suggest that sometimes a performance gap doesn't induce an IT innovation response and thus leave open the question of what these firms do to resolve the gap and why they do not to innovate.

The 'what' element of our inquiry demands attention to the earliest phases of the innovation adoption process and involves individual decision makers as actors who represent the firm's interest, interpret the environment and the firm and make decisions which result in firm actions. Consequently we turned to theoretical guidance from two research approaches oriented towards organizational problem solving, namely problemistic search (Cyert and March 1963) and sensemaking (Weick 1979; Weick 1995), to guide our investigation. These theories help us connect decision makers' cognitions (how they read their environments and make sense of their firms' problems) with firm behavior (the execution of actions other than IT innovation to solve firms' problems).

For the 'why' element of our inquiry, we explored some prior research to inform our thinking. We concluded from our literature review that to date we have several conceptual arguments, though extremely limited empirical evidence for why firms don't pursue IT innovations in the face of performance gaps. Thus our effort in this research would be to explore and confirm these conceptual suggestions. Prior literature suggests the following reasons for firms to choose alternatives to IT innovation: the

innovation is not known hence it cannot be adopted (Rogers 2003); if the innovation the firm would choose to solve the gap can be easily copied by competitors, then motivation to adopt the innovation is not strong enough (Abrahamson 1991); if the current IT system is large, complex and long lived, maintenance may be preferred to solve a gap (Swanson and Dans, 2000); if the organizing vision around the IT innovation is poorly developed or its evidence is weak, the innovation may not gain enough traction (Currie 2004; Swanson and Ramiller 1997); or if the mindful organization gauges that the innovation is not suitable to them for internal reasons– i.e., current resources do not match what the organization would need to adopt and implement the innovation it – then the organization will not engage with it (Fiol and O'Connor 2003; Swanson and Ramiller 2004).

Theory Background

Problemistic Search

The concept of problemistic search is embedded in a broader theoretical approach about how managers in organizations make decisions. According to this approach, organizational decision makers regularly monitor organizational performance against aspiration levels, and draw inferences as to whether they are performing within the range of their aspiration levels or below them (i.e., succeeding or failing) (Cyert and March 1963; Levitt and March 1988). Whereas successes tend to be met with routinized responses or inertia (i.e., continuing doing what has been done in the past), failures will prompt decision makers to search for new forms of action (Cyert and March 1963; Levitt and March 1988; March and Simon 1958), lower their aspiration levels so that the attained outcome meets their adjusted expectations (i.e., the failure is no longer framed as such), or decrease organizational slack (Cyert and March 1963; Levinthal and March 1993).

Problemistic search is understood as a response that decision makers enact when facing immediate problems, whereby they try to identify a course of action which can adequately solve their problem. Problemistic search is cognitively-bounded and satisficing (March and Simon 1958). This means that individuals will assume simple concepts of causality based on previous experiences, and will tend to stay within the neighborhood of known problem symptoms and potential solutions, settling for a satisficing solution as soon as one is located (Cyert and March 1963).

Sensemaking

Sensemaking is the process of selecting a portion of the environment for further attention and making sense of it while acting upon it at the same time (Weick 1995). Sensemaking processes are triggered by mismatches between equivocal cues being encountered in the environment and the cognitive schema (i.e., cause map) previously stored to make sense of such cues; sensemaking happens when these mismatches are severe enough so as to disrupt habitual work, thereby forcing individuals into meaning-creating actions that allow them to arrive at workable meanings and rebuild normality (Weick 1995; Weick et al. 2005). New meanings that are useful for reducing equivocality and hence cope with environmental change are selected for use (Weick 1993; Weick 1995).

Because sensemaking is about actions that are undertaken in response to equivocal environmental change, it entails experimentation. During a sensemaking process, individuals will try out plausible solutions to the situation at hand until one is found that seems to work (Weick 1979; Weick 1995).

In what follows, we present the methods and findings of our research study, which specifically examines the circumstances and reasons why some organizations decide on alternatives to IT innovations in the face of performance gaps, and explores what they do instead.

Methods

It is an interesting challenge to design a method to capture something that may or may not be happening. The findings reported in this study come from a subset of data collected for a larger research project about the early stages of organizational innovation. The data in the larger study consists of 108 sequences of events (the unit of analysis) describing what firms are doing at this early stage of the organization innovation cycle. These sequences represent activities at 29 firms and were extracted from 42 interviews

conducted (13 firms were interviewed at 2 points in time to capture any further changes in decision events that were contemporary with the first interview). Nearly 40 hours of interviews were conducted. Table 1 shows some descriptive information about participants and their businesses.

Our research into early stages of organization innovation demanded that we use qualitative methods, investigating firms' activities when decision makers were faced with noticing performance gaps, interpreting them and determining actions which may have involved considering IT innovations. We needed to generate rich data with which to support the development of how and why theories (Eisenhardt 1989; Strauss and Corbin 1998; Yin 2009). We needed multiple examples of firms in diverse settings, facing this situation. We also needed access to decision makers, with a method that was sensitive to how they would 'tell the story' regarding the situation they faced without biasing their recall. We decided on a multiple case design (meaning multiple firms), and interviews with decision makers as informants (to capture the specifics of particular events as they unfolded around particular situations). We determined to be open to reports of multiple, unique events within any given firm and consider both past events and current emerging events. We used the critical incident interviewing technique (Flanagan 1954) as it diminishes the cognitive effort required to answer questions and enhances recollection of specific details (Chell 2004). Likewise, to abate the effects of memory failures on the data, we captured a combination of past events (happening during the three years preceding the interview) with events taking place at the time of data collection, and during the analysis we checked for differences between them.

Small businesses were selected as the context of study as we felt they would supply ready access to identifiable decision makers (business owners who make most decisions) and they are generally recognized as innovation laggards (Iacovou et al. 1995; Rogers 2003; Thong 1999). Eligible businesses had to be independently owned, have senior management centralized on the owner, have 50 or fewer employees, and have annual revenue of up to $1 million. These criteria are in keeping with the definitions and measurement limits established in Canada and Colombia, the countries where data were collected.

For the study we report here we identified 39 sequences of decision events pertinent to our research questions. This subset of data retains sequences describing performance gaps originally noticed inside the firm (demand pull). The left-out sequences belong into either a very large subset of sequences that do not provide evidence of performance problems (i.e., they describe unproblematic situations where there is an opportunity to innovate with IT), or into a fairly small subset of sequences that describe externally constructed performance gaps emerging from supply-push forces, and not immediate problems that need to be addressed right away (Cyert and March 1963), hence they may lead more readily to prolonged action deferral (Levinthal and March 1993; Levitt and March 1988). As exploratory research we believed our selection would allow a crisper exploration of the circumstances under which performance gaps fail to result in IT innovation, and increase our chances of observing what organizations do other than innovating with IT so as to narrow their felt performance gaps.

Most of the retained sequences refer to performance gaps perceived as being related to current IT systems. Indeed, it was unusual to find in the data organizational processes that were not already enabled by IT in some way.

We note that 17 of the selected sequences (Group 1) are cases where IT innovation was constructed from the start as the solution to the performance gap, actions were carried out promptly aiming at locating a suitable IT innovation, and the time span between sensing the gap and adopting an innovation was fairly short. This supports the view of a strong link between performance gaps and IT innovation. However, over half of the sequences tell a different story. The remaining 22 sequences (Group 2) are cases where alternatives other than IT innovation were constructed and tried out first as solutions to the gap, and IT innovation did not occur, or took place much later if the initial solution had failed. These 22 sequences back our intuition: performance gaps sometimes get solved by means of non-IT innovation alternatives.

Data analysis for the larger study began by organizing the data into sequences of events, and then coding every interval by thematic category, in a process akin to open coding in grounded theory (Corbin and Strauss 1990), and writing conceptual memos; this process unfolded iteratively until theoretical saturation was reached. For this study, we conducted a comparative analysis which employed the categories coded earlier, aiming to identify systematic differences between Groups 1 and 2, specifically in regard to responses attempted by firms to solve the gap and rationales invoked. For example, a typical sequence in Group 1 would contain a clear and painful performance problem and responses such as

search or experimentation executed to find a suitable IT innovation, whereas a typical sequence in Group 2 would contain a "messier" problem to which a firm responds by attempting to fix the technology producing the gap, rather than by innovating. The findings below focus on the responses and rationales that uniquely characterize sequences in Group 2, and distinguish them from sequences in Group 1.

Table 1. Summary view of demographic characteristics of participants

Actor's ID	Owner			Business	
	Gender	Age	Highest level of education	Main area of work	Number of employees
1*†	Male	28	Bachelor's degree	Construction services	2
2	Female	51	College degree	Arts and crafts	1
3†	Female	41	College degree	Fashion design	2
4*†	Male	41	College degree	Construction services	1
5†	Female	57	Professional certificate	Bookkeeping services	3
6†	Female	44	High School degree	Arts and crafts	4
7	Female	53	College degree	Event planning services	1
8†	Male	39	Pursuing Masters	Waste collection services	12
9†	Male	35	College degree	Graphic and web design Services	3
10*†	Male	39	Pursuing PhD	Publishing services	2
11†	Male	47	College degree	Wholesale trade	26
12*†	Male	34	High School degree	Web design services	18
13*†	Male	48	No data	Insurance and Investment advice	2
14†	Male	64	College degree	Home furnishing retail	9
15*†	Female	45	Master's degree	Market research services	4
16	Male	27	Master's degree	Telecommunication services	5
17*†	Female	62	Bachelor's degree	Leather manufacturing	5
18*†	Male	58	High School degree	Leather manufacturing	5
19*†	Male	54	Bachelor's degree	International trade services	3
20*†	Male	57	Master's degree	Accommodation services	29
21†	Female	37	Postgraduate diploma	International trade services	50
22	Female	ND	Bachelor's degree	Food manufacturing	2
23*†	Male	56	Bachelor's degree	Performing arts	24
24*†	Male	40	Pursuing Masters	Legal services	37
25†	Female	52	Master's degree	Chemical manufacturing	36
26	Male	58	Master's degree	Management consulting Services	16
27	Female	43	College degree	Telecommunications reseller	1
28*†	Female	31	Pursuing Masters	Event planning services	3
29†	Male	40	Bachelor's degree	Industrial Design services	5

* Interviewed at time 1 and time 2. All others were interviewed only at time 1.
† Participant whose data were included in this study.

Findings

Innovating with IT

In our data, when performance problems lead firms to consider right away the adoption of an IT innovation, they often lack adequate knowledge of the IT market, which is complex and in constant motion. Thus, performance gaps are not immediately followed by innovation, but by such knowledge building activities as search, boundary spanning and experimentation. The owner of a waste removal business, quoted below, discovered platform as a service (PaaS) through online search:

I was looking for a solution for our business day-to-day activity, so I was typing things like database, online database, you know? Because I wasn't even aware of the term [PaaS], and then you find one company that offers one service and then you start looking at the terms, what they call it, and then you start googling those terms, [terms like] software as a service, and then you get into cloud, cloud solutions, and then PaaS, that was something that came out in the end. (Participant 8)

Alternatives to Innovating with IT

When participant firms don't construe IT innovation as their first solution to a performance gap, they do one of two things: they try to solve the problem by fixing the technology producing the gap or they go back to their prior technological set-up. We distinguish between three action-based features of fixing responses, namely tinkering, stretching and making do. Tinkering refers to the introduction of small changes to the under-performing technological set-up, aiming at improving its functioning while leaving its core unchanged. The introduced changes are known to be suboptimal; they are viewed as workarounds. Not only are these changes small, but also they do not involve significant effort either.

Tinkering: Typical tinkering responses include memory or processor upgrades done to hardware in order to extend its lifespan and avoid expensive purchases which would solve the performance gap more fully, as in the following quote:

[Once we upgraded our software], we had as much more memory put on [the workstation] as we could, and we upgraded the processor too. We didn't want to buy a new workstation, because the computers that can run 3D design software are the most expensive there are. Those machines have to have super processors, a video card, a super-duper hard drive, so those workstations are about $2000-2,500. So we tried to work with the one we already had, and we managed to do it [...] (Participant 29)

Business owners realize that by tinkering with their IT they might only be buying time; they might know from the start, or get to notice quickly, that the larger change may be delayed for a while, but perhaps not indefinitely. Tinkering responses are worthwhile if they solve an important aspect of the performance gap, for as long as they solve it. When they do not, the business owner is pressed to try out a different response. The quote above continued as follows:

[...] but the machine was still very slow, so we ended up buying another workstation. (Participant 29)

Stretching: Business owners engage in stretching when they make minor additions to their current IT set-up attempting to arrive, as closely as possible, at the result that would be obtained if a larger change (i.e., a new IT innovation) was adopted. Additions are minor in the sense that they require very little consumption of resources, as in the quote below where a small calculator was added to stretch the functionality of the cash register and avoid the purchase of more expensive point of sale technology.

A cash register is a cash register right? [Laughs]. [Mine] doesn't do things, like I can't put things like 0.5 or whatever so I have a calculator beside it and go like 0.5 at 15.15 a meter equals... and then I can put that amount in. But [when the cash register was bought], it doesn't tell you that for the whole description, it tells you OK it does all these things and for setting up for the taxes and it does all the figuring out and you think that's great and then you had to go into quite a bit more money to have one that did all the other stuff. The calculator cost me two bucks, I can push the numbers in, instead of spending like $500 or $600 more for one that can take the partials. But those are things you don't know about until you get into it. (Participant 6)

Making Do: In contrast, business owners engage in making do when they discard the addition of new elements to the under-performing technological set-up, no matter how small, and try to work strictly with resources they already have so as to alleviate, as much as possible, the negative consequences produced by the identified gap, as in the example below. An insurance broker who regularly used one full license and one read-only license of his CRM software to enable IT-based collaboration with her personal assistant, had been experiencing technical problems with his read-only, and rather than figuring out an alternative way to allow IT-enabled collaborative work, he decided to make do with printouts produced by her assistant. He showed one to one of us and said:

I'll show you. [name of personal assistant] has got the main database, she prints this and I know who I have to phone. Phone calls are over here and people I have to see are over here. I'd still like to have [the read-only] fixed so she doesn't have to waste her time printing this out, I could look on it once a day and I could … you see, what I don't have is if I decide I want to call you to review your insurance, I can go on [the read-only] and I can see where's your phone number and then I give you a call. I can't do that here [showing printout], I have to ask [name of personal assistant]. (Participant 13)

In summary, fixing responses are attempts to solve a performance gap as much as possible with as little as possible. It is clear for the individuals involved that the gap is not entirely eliminated. Nonetheless, in the eyes of participants fixing responses are viable alternatives to IT innovation if they re-establish an acceptable level of performance while economizing on resources; under those circumstances these responses can stabilize, thus constituting a long-term barrier to IT innovation.

Going back: This happens once in our data. Going back takes place when business owners adopt and implement an IT innovation, keep it for some time, but then face problems with it, abandon its use and go back to a prior technological setup, construing it as a more effective alternative than the more 'modern' technological innovation they attempted without success. In the quote below, the participant abandoned her custom-built software and went back to spreadsheets:

We are now giving the data to our customers in a different way, we are no longer using the software and it's not in our plans to rebuild it. The problem was that the software was very slow, service was slow, and our customers have no patience, so we had to look for more traditional methods which would allow our customers to do their queries [...]. So right now what we're doing is that they submit their requests [for queries] to us, and we work on them on spreadsheets, and we deliver them that way. (Participant 15)

Beyond constituting an example of a failed IT innovation, this case suggests that episodes of technological reversion can become inhibitors of future innovations. Here, the person involved became extremely cautious of the benefits of IT innovations against their costs.

Exploring Why Alternatives are 'Better' than the IT Innovation

In our data, two reasons appear to underpin the choice of alternatives to IT innovation: problems in constructing meaning about the problem; and interacting resource constraints which hinder IT innovation adoption.

A limited capacity to spot performance gaps is conducive to the development of these alternatives. Through a process of meaning construction, organizational decision makers can attach meanings to environmental cues or refine previously held meanings, so as to identify a performance gap and act upon it. For example, environmental cues which appear at first to be indicative of a small problem can build up over time so as to signal a larger problem. Or a decision maker can develop new knowledge capabilities – e.g., by going to a training session or talking to people in their network – which help them diagnose a problem situation they hadn't seen before and identify suitable courses of action. Our data suggest that this process of meaning construction sometimes unfolds in a very limited fashion and inhibits innovative action. In particular, decision makers may construe cues as weak (not worthy of attention) or ambiguous.

Ambiguous cues are those which fail to indicate a single plausible interpretation of the issue or the course of action. For example, a law firm was developing in-house a software program which would integrate intellectual property management with billing and other administrative functions of the business, thereby reducing duplication of tasks and increasing work efficiency. The owner noticed that software development was extremely slow, and project milestones were not being met, but he also recognized that

there was some progress, and pieces of functionality were slowly but gradually being released. As a result, the software enabled adequate operational performance in some areas, but general performance aspirations were not being met, as the software was not integrating operations across functions as expected, and duplication of tasks was still common place. As this situation continued on for over three years, the firm owner was unsure as to whether he should continue fueling development efforts or stop them altogether. Initially he explained:

With an in-house programmer we've been developing stuff and using it, but progress is slow, way slower, partly because he does our IT maintenance and also developing the software. So he's developed a few applications for time reporting, for tracking work orders, etc. (...) There's like little pieces, otherwise we would have fired him long ago! (Participant 24)

During a later interview, he described how, as progress with software development continued to be very slow, cues pointed more clearly at the need to define a different course of action to solve the felt performance gap:

[*The in-house software development] never really worked, we didn't get the applications we expected, we hired somebody extra to see if he could help to move things forward, but that didn't work either. We did make some progress, but it wasn't a definitive solution as we needed it to be. (...) Now, we are doing what we initially didn't want to do, but the need was so great that we felt forced to do it, which is searching for off-the-shelf software that we can use right away [...].* (Participant 24)

When interpretations changed over time through a more thorough – or prolonged –process of meaning construction, and participants started to perceive the cues as strong or unambiguous, they could articulate more clearly the performance gap and engage in actions which would lead to IT adoption (as in the quote above). We observed then that meaning construction is a process that tends to unfold gradually, as cues build up or new knowledge capabilities are built that assist with the interpretation of incoming cues, hence it helps explain time lags between noting a performance gap and innovating with IT.

Finally, consistent with prior research, resource constraints (money, time and knowledge) weaken the performance gap – IT innovation relationship, inasmuch as they limit the alternatives which small businesses know about or are able to develop when attempting to react to a felt performance gap. Firms experience money constraints when their owners feel that they have less money than they would need to attend to all their business and personal needs, and are unwilling to incur in business expenses which are not viewed as strictly necessary. Similarly, time constraints in the small business context derive from tensions concerning time allocation for personal and business purposes, and a feeling of dissatisfaction when time allocated to the business takes over personal time. Time constraints limit the exploration made by participants of plausible courses of action. Knowledge constraints (both of technology and the product/service marketplace) can both delay innovation or severely reduce the quantity and quality of the courses of action considered, as well as the business owner's ability to distinguish among competing courses of action. Likewise, lack of IT knowledge discourages personal involvement in decision making processes of this sort. Indeed, those who deem themselves not competent enough to make this kind of decisions share a feeling of disempowerment, expressed in the use of language such as "*I'm a fish out of water*", "*with IT they rip you off, they sell you a pig in a poke, and you don't know, they tell you stuff, they trick you out of your money, that's so annoying*" "*they all offer something a little different , I don't know enough about it, but I know I'm not comparing apples to apples*", or "*I don't have a clue, I don't have the technical criteria to say yes or no*".

When participants faced a performance gap and simultaneously experienced resource constraints, money especially, they attempted to address the performance gap by means of responses that demanded fewer resources than the IT innovation alternative would require (as noted in the prior section). We also noted in our data that time, money and knowledge constraints interact with one another producing new and more severe constraints, which cannot be grasped when each constraint dimension is viewed in isolation. Participants described situations where the manifestation of one constraint interacted with pre-existing constraining forces to create a distinctly new limitation to action, thereby complicating technological innovation much more than if only one constraint was operating. Space constraints and the quantity of data we could draw on serve to limit how deeply we could investigate this in this study. We consider this a key area for future research.

Discussion

In our study, firms who did not come up with an IT innovation as their first solution when facing a performance gap differed from those who did in two distinct ways. First, they first responded to the gap by fixing the technology producing the gap (by tinkering, stretching or making-do) or by going back to a prior technological set-up. The selected theoretical frameworks satisfactorily explain these alternatives: the problemistic search framework tells us that when organizational actors are faced with a performance problem, they will first try out familiar solutions that are cognitively available to them (such as fixing and going back). A satisficing solution will be one that not only solves, or at least alleviates, the performance problem, but also economizes on scarce resources. Additionally, sensemaking tells us that if the tried solution works adequately, it will be retained until new cues suggest further problem-solving work is needed. This is how these solutions stabilize and become long-term alternatives to IT innovations.

In firms where resource constraints are the order of the day, such as the ones we studied, satisficing non-innovation solutions appear to be instrumental in resolving the dialectic tension that exists between the need to address performance problems and the need to preserve scarce resources. In that sense, small firms are an extreme case which allows us to see more clearly the dialectic tensions that are present, to varying degrees, during the early stages of IT innovation process, and the range of syntheses that firms may attempt to resolve these tensions before cognitively engaging with IT innovation. This is an important insight, as it invites us to seriously consider the dialectic dimension of the organizational change (Van de Ven and Poole 1995) that IT innovation presupposes even before being adopted, which prior research and promoters of IT innovation in practice have largely failed to acknowledge.

Second, these firms engaged in more limited process of knowledge construction or faced severe resource constraints. Our study empirically supports three of the conceptual arguments for why IT innovation does not follow right after a performance gap is identified: when suitable IT innovations are not known firms cannot innovate with IT until they engage in knowledge building activities that help them learn about which IT innovation might address their needs; resource constraints of money, time and knowledge both individually and interactively deter firms from adopting IT innovations to solve performance gaps. Our research loosely backs the Swanson and Dans' (2000) argument that life expectancy and prolonged maintenance (i.e., fixing responses) seem to co-evolve, but reframes their conjecture, because we encountered cases of fairly small and simple IT systems whose life expectancy was being deliberately extended due to resource constraints. Therefore, we speculate instead that life expectancy of a system is not directly related to the objective size or complexity of an IT system, but is instead a contextual, subjective assessment by the focal firm related to the resources a firm deems it possesses for IT replacement or IT innovation.

By contrast, analyzed data do not support the other two arguments. The data did not hint at easy-to-copy IT innovations as a consideration for rejecting or delaying the adoption of an IT innovation. This lack of evidence may be specific to the selected research context – small businesses are known to be late adopters– and could be investigated by future research. The last argument was not explicitly examined in this study, because we focused specifically on demand-pull performance gaps, where rhetorics may play a less prominent role in motivating IT innovation among organizations. However, taking into account that our data contained well-established IT products and services, with arguably mature organizing visions, such as 2D graphics software, point of sale technology, CRM, etc., we infer that organizing visions are a less salient construct to explain IT innovation among small businesses, possibly because of these businesses' large distance from discourse-making actors in the IT field.

Contributions

Our research contributes to previous scholarship in at least three additional ways. First, prior literature has focused on factors that contribute to firms innovating with IT based on a dominant maximization logic. Instead, we deploy a set of cognitive lenses focused on problem solving and sense making to investigate what organizations do when they face performance gaps but don't innovate. By addressing the question with these distinct lenses our study provides valuable insights into such understudied aspects of innovation as late adoption and rejection (Rogers 2003; Swanson and Ramiller 2004). We also contribute to a richer understanding of the early and late stages of the innovation process (Fichman et al. 2014), especially as these stages overlap in situations where replacement is considered (Furneaux and

Wade 2011). In particular, our study suggests that non-adoption courses of action (i.e., fixing current IT and going back to a prior IT) can turn into long-term alternatives to IT innovation when they re-establish an acceptable level of performance that helps conserve scarce resources thus embracing an innovation agnostic stance. Beyond what others have suggested, our findings indicate that the pro-innovation bias can be tackled by awarding attention to responses other than innovation, especially when such responses become effective alternatives to innovation that seem adequate to the actors involved.

Our second contribution is to more descriptively articulating the complexities surrounding both the definition of a performance gap and the development of suitable courses of action. First, limited construction of meaning around environmental cues weakens the relationship between performance gaps and IT innovation. In essence, it is hard cognitive work for decision makers to see and make sense of performance problems that IT innovation can solve. Performance gaps that might be solved by IT innovations are not static, objective facts. Instead they are dynamic, evolving phenomena. Second, figuring out an 'appropriate' IT innovation is extremely complex in today's dynamic and fragmented marketplace. Sorting this environment out is much more of a cognitive feat than a rational economic action and requires careful attention to what decision makers in firms are doing. In a process of meaning construction that unfolds limitedly and produces weak or ambiguous cues over time, decision makers are more likely to develop familiar courses of action and try them out before venturing into an innovative path. We believe the dominant IT innovation paradigm has simplified this processes and assumed that gaps are readily detectable and firms can quickly narrow their action choices down to an IT innovation. Our research helps depict a more complex and dynamic sensemaking phenomenon that occurs not just in the setting of finding the IT innovation, but also in the context of interpreting performance gaps.

Finally, the results of this research invite us to reflect about the treatment given to resource constraints. Most prior research has treated resources such as money and knowledge as IT adoption enablers, but our data suggest that the effect of these resources is closer to the idea of inhibitors (Cenfetelli 2004; Cenfetelli and Schwarz 2011). These are theoretically distinct constructs and not simply the negative reflection of enabling factors. We have found that business owners' motivation to adopt an IT innovation does not increase simply by having time, money or knowledge in their hands, and have noticed instead that the lack of such resources can hinder IT innovation even in the presence of strong motivating factors.

Our study opens several opportunities for future research including: research to encompass multi-decision maker informants in larger organizations; research to study in greater depth the sensemaking process of decision makers encountering increasingly complex IT product and service marketplaces for IT innovation; deeper investigation of the interactions of resource constraints and how these may unfolder over time hindering IT innovation adoption by firms; exploration of cross-fertilization opportunities between research on user-level rejection behaviors and this area of research; and finally, future research will need to carefully examine how and to what extent competing courses of action (i.e., IT innovation, IT fixing responses, IT reversion) differ in terms of their long-term consequences for organizations.

Conclusion

This paper investigates the alternatives firms carry out to address performance gaps and why they choose not to innovate with IT. We find that organizations attempt to fix the IT system they already have (tinker, stretch or make do), even if they know that is a suboptimal choice, or they go back to a prior IT set-up, thereby reverting rather than innovating. Our analysis also indicates that organizations do not respond to a performance gap with IT innovation when cues about the gap and plausible IT solutions are weak or ambiguous or when they face resource constraints, especially interacting constraints, which make more difficult for them to innovate with IT.

By opening up this new frontier of IT innovation research, we hope to have shed light on 'what is going on' in the earliest stages of the IT innovation adoption process. Our findings suggest that firms and decision makers face complex environment with multiple, weak and ambiguous cues that must be attended to, made sense of and acted upon before they get to the point of framing both their performance problem and a possible IT innovation from which to proceed along a selection/evaluation path. We further find that sometimes alternatives to IT innovation adoption effectively solve performance problems even if in general, IT innovation and advances are beneficial. We invite future research to expand upon this new frontier.

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