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An Actor-Network Theory perspective to study the non-adoption of a collaborative technology intended to support online community participation

Abstract

Purpose. The purpose of the paper is to explore the value of Actor-Network Theory as an approach to explaining non-adoption of collaborative technology.

Design/Methodology/Approach. The notion of translation and related concepts from Actor-Network Theory are used to explore the case of non-participation in an organizational online community. Semi-structured interviews were conducted with thirty HR professional of a Multi-campus University System in Mexico.

Findings. The study shows that participation in the online community did not take place as expected by those promoting its use. An initial inductive analysis showed that the factors that undermine participation had to do with the interface design of the technology and the individual motivations and benefits derived from participation. A second analysis, using ANT showed how processes of negotiation, conflict, enrolment, alignment, and betrayal that occurred during the emergence and evolution of the new network played a critical role in technology adoption leading to the dissolution of the initiative to adopt the collaborative technology.

Originality/Value. The study shows the value of ANT to better understand the adoption and use of a collaborative technology. The analysis goes beyond existing explanations of participation, which tend to focus attention on such matters as the interface design or the personal motivations and benefits derived from participation. It does so by moving away from solely looking at what occurs within the boundaries of a community and understanding the context within which it is being introduced. It prompts analysis of moments of problematization, interessement, enrolment and mobilization to explore the process of adoption, including the role of non-human actors.

1. Introduction

Organisations invest considerable resources to promote online communities to support their knowledge management initiatives (Tiwana and Bush, 2005); to involve customers in their innovation processes (Jeppesen and Laursen, 2009); to build customer loyalty to the company; and to enhance communication during periods of organisational change (Porter and Donthu, 2008). However, the reality is that once introduced collaborative technologies often remain unused (Seidel and Langner, 2015). This clearly suggests that members' participation is the most critical aspect for online communities to succeed (Wasko and Faraj, 2005; Chiu et al., 2006; Hsu et al., 2007).

To understand what shapes online community participation, previous studies have sought to explain the role of individual-related motivations (Ardichvili et al., 2003; Kankanhalli et al., 2005; Tiwana and Bush, 2005; Chiu et al., 2006); community-related factors (Ardichvili et al., 2003; Porter and Donthu, 2008); structural characteristics of communities (Butler, 2001); technology-related issues (Ren et al., 2010); and the context surrounding online communities (Cox, 2007; Wang et al., 2013) (See Table 1).

Table 1. Findings of previous studies of factors affecting participation in online communities

The richness of these studies reflects the diversity of perspectives that have been adopted to understand participation in online communities and use of collaborative technologies. Theories that have been used include social cognitive theory (Chiu et al., 2006; Hsu et al., 2007); social capital theory (Kankanhalli et al., 2005; Chiu et al., 2006); social exchange theory (Bock and Kim, 2002; Wang, 2007); sunk cost theory (Tiwana and Bush, 2005); theories of social networks and Social Network Analysis (Faraj and Johnson, 2011); and resource-based theory (Butler, 2001). This work has increased our understanding, and Faraj and Johnson (2011) even suggest there is general agreement about what shapes participation. Yet seeking to understand why many online communities fail, these theories have tended to adopt either a technological deterministic or a social deterministic view. The former pays particular attention to technological aspects to explain adoption and use of IS and treats ´the social´ as

the context in which adoption takes place. The latter focuses on social interactions to explain adoption and use, neglecting the role of the technology and relegating it to ´the context´. Both of these perspectives, seem to tell only part of the story. In contrast, a theory such as Actor Network Theory (ANT) bypasses the distinction between technology and context and focuses on the nature and effects of networks that tie together human and nonhuman actors, their motives, interests and intentions.

Moreover, from a careful examination of previous literature, many studies seem to work on the assumptions of what has been labelled a cognitive approach (Marshall, 2008). They tend to:

- adopt cross-sectional designs that look at snapshots of participation (e.g., Bock and Kim, 2002; Kankanhalli et al., 2005; Wasko and Faraj, 2005; Chiu et al., 2006; Hsu et al., 2007), thus obscuring our understanding of community evolution and dynamics.
- adopt a positivist orientation with the attempt to provide causal explanations in the form of statistical relationships among variables and behaviours (e.g., Bock and Kim, 2002; Kankanhalli et al., 2005; Wasko and Faraj, 2005; Chiu et al., 2006; Hsu et al., 2007; Wang, 2007); however, this comes at the cost of abstraction undermining the ability of these studies to reflect the complexity of participation.
- predominately focus on understanding what occurs inside the boundaries of communities (e.g., Chiu et al., 2006; Hsu et al., 2007) neglecting their context. Where context is considered it is seen as a inert, container-like setting thus obscuring the mutual constitution of context and phenomena occurring within it.

These observations suggest the need for further research, moving away from the cognitive tradition which can be seen as offering individualistic, static and representationalist views of organisational phenomena (Marshall, 2008). In response this study adopts theoretical resources from the sociology of translation from ANT to deepen our understanding of participation. In adopting this perspective, we suggest that both social and technical determinism are flawed, and propose instead a socio-technical account in which neither technical nor social positions are privileged. This in turn will allow us to treat both human and non-human actors impartially, and to shed light on issues of network formation to investigate how human and non-human actors recruit each other, negotiate and create alliances to achieve a particular goal; in the case of this study to achieve the adoption and use of a collaborative technology.

Given that theories such as communication media repertories (Watson-Manheim and Bélanger, 2007) and media toolbox (Woerner et al., 2004) pay particular attention to the technologies supporting communication not the people using them, and do not fully explore the evolving nature of adoption and use of technologies, they were not adopted, thus prompting the use of ANT in this study.

The paper proceeds as follows. The following section develops the concepts of control and translation from Actor-Network Theory (ANT) that will be applied to inform the analysis. The third section presents the background of the study and explains the methodology. The fourth section introduces the findings of the case study. The discussion section builds on the findings of the case to argue for the value of ANT to study the adoption and use of information systems. The final section discusses the contribution, limitations and further research.

2. Theoretical resources

2.1 Antecedents of ANT

Actor-Network Theory appeared first in the field of Science and Technology Studies (e.g., Callon, 1986; Law, 1986b; Latour, 1987; Law, 1992). Initially, ANT was concerned with understanding how a series of disparate elements in laboratories came together to be transformed into a coherent and finished product (Durepos and Mills, 2012), and how scientists gained the support of others for their propositions about scientific facts (Van House, 2003). Since then, ANT has been used to analyze many different processes in which human and non-human actors take part to achieve particular goals so that their interests are represented. It does so, by tracing the transformation of actors, networks, and relations and how they emerge, are maintained, and compete with other networks of aligned interests.

2.2 Law's perspective on control

The notion of control as proposed by John Law (Law, 1986a; Law, 1986b; Law, 1992) comprises the concepts of control itself, actors, actor-networks, inscriptions and envelopes. It suggests that those who wish to exercise control on others need to create an actor-network.

2.2.1 Actors and actor-networks

Actors are individual entities who take actions through which they can exert influence on others. The label of actor must thus be equally applicable to all entities within an actor-

network: people, technologies, animals, texts, money, buildings, etc. While actors are individual entities, actor-networks (or simply networks) are groups of actors linked with one another through different relationships, and whose resistance has been overcome (Law, 1992). For a new network to emerge, actors need to align their interests via negotiations, and weaken the presence of other actors that might act against the goals of the network. However, an actor-network always has the potential to change and evolve, since the relationships linking actors may be weakened, or because other actors external to the actor-network can threaten its stability. As such, when a network faces resistance by some actors or competition by some networks, it can become a failing actor-network that can potentially disappear.

2.2.2 Control

For an actor to exercise control over others, it must develop one of various strategies to persuade others to play particular roles. Once other actors have been persuaded, their actions can assist the controlling actor in achieving the goals set for the actor-network. However, those aimed at being controlled, more often than not, offer various sorts of resistance and struggle (Law, 1992). Should these two not be overcome, the controlling actor might fail in its attempt to create a successful actor-network.

2.2.3 Inscriptions and envoys

An actor cannot exert control on its own. Instead, it needs the support of other actors. One of these types of actor is called inscription which are critical to the process of control because they facilitate action at a distance (Van House, 2003:15). They often take the form of "durable and mobile emissaries" (Law, 1986a:22). When technologies are introduced in organizations, for instance, the technical and support documentation accompanying the technology can be seen as an inscription. Inscriptions can act as envoys (Law, 1986b) prescribing or forcing others to behave in certain ways to achieve specific goals aligned to those of the controlling actor; people responsible for sponsoring the use of a technology recently introduced to an organization is a clear example of an envoy. However, not any given envoy or inscription alone, will achieve control; rather, to ensure compliance with the network, they need to strengthen its relationships with other actors of the network.

2.3 The sociology of translation

A translation is a process in which a temporary actor-network progressively takes form, and eventually certain entities end up controlling others (Callon, 1986); it is the process through which networks evolve and transform. Those playing the role of the controlling actor develop different strategies to drive the translation in order to enrol and mobilise other actors. During a successful translation, those being controlled are obliged to remain faithful to the objectives of those who control, and those exerting control are given the right to represent those mobilised (Callon, 1986). Nevertheless, translation processes are not always successful. When those who drive the process of translation fail to get other actors to comply with them, a process of dissidence, rather than a successful translation, takes place.

Below the process of translation and its four interrelated moments - problematization, interessement, enrolment and mobilisation are outlined. The perspective taken in this paper sees the moments of translation as having the potential to overlap, sometimes in a disorderly and iterative fashion.

2.3.1 Problematization

Problematization is the initial stage of a translation process. In this stage actors define the problem they aim to tackle. To do so, they establish an Obligatory Passage Point (OPP) defining the problem in their own terms and making themselves indispensable (Callon, 1986). They involve other actors whose identities and responsibilities contribute to the configuration of a problem-solving network. The focal actor thus establish an OPP to impose its view on others suggesting that other actors would only resolve their problems by passing through the OPP (Law, 1986a). However, before passing through the OPP, they first need to modify their current interests and to align them to those of the controlling actor.

2.3.2 Interessement

The second moment of translation is 'interessement'. Interessement embraces a group of actions by which an actor interests others sufficiently to agree with its proposal (Callon, 1986). At this stage, those being targeted for interessement might be simultaneously implicated in the problematization stage of other networks, and therefore might define their identities and priorities in a manner at odds with the interests of the emerging network. Thus,

in order for the controlling actor to achieve a successful interessement, different strategies and tactics need to be deployed (Sarker and Sidorova, 2006). The final goal is to isolate those being enrolled by impeding any other possible alliance that may challenge the legitimacy of the OPP. Finally, for interessement to be successful, it needs to achieve enrolment (Callon, 1986).

2.3.3 Enrolment

The process of enrolment consists of "negotiations, trials of strength and tricks that accompany the interessements and enable them to succeed" (Callon, 1986:211). If the necessary alliances are to succeed, a definition of roles played by those actors over which control is being exercised is devised according to the scheme proposed in the OPP. Furthermore, negotiations need to take place between the actors targeted for enrolment, as well as with those actors who can potentially threaten the network stability. To fulfil a successful enrolment, alternatives such as "physical violence (against the predators), seduction, transaction, and consent without discussion" (Callon, 1986:214) can be used.

2.3.4 Mobilisation

The last moment of translation is mobilisation of allies. Here the controlling actor needs to get the support from enough allies to modify the behaviour of all others. During this stage, the controlling actor "borrows the force of the passive agents that it has enrolled by turning itself into their spokesman" (Law, 1986b:16). In so doing, a larger network of actors that supports the proposed solution is created, and thus gains wider acceptance. However, there is always the possibility that those represented will not follow their spokesmen, but instead might challenge or refuse it. As Callon puts it: "Translation continues but the equilibrium has been modified…reality begins to fluctuate" (1986:224) and new translation processes start to occur. By definition, this process of ordering and reordering is never completed.

These core tenets of the sociology of translation are used in this paper to trace the failure to create an actor-network with the aim to promote the use of a collaborative technology, which aimed to be seen as the core media for communication and interaction during the implementation of a HR project in a Multi-campus University. The process of translation is thus seen as the informing lens to explore how the technology embraced the emergence of an

actor-network whose main goal was to persuade other actors to adopt the collaborative technology.

3. Methodology

3.1 The case of CODECO

The study focuses on the failure to establish an online community supported by a collaborative technology (CODECO) as part of a Human Resources project (IMPLEMENTATION) within a multi-campus University in Mexico (INSTEC). The IMPLEMENTATION was a project across 31 campuses dispersed around the country and led by the president and vice-president of HR of INSTEC. The purpose of the IMPLEMENTATION was to reengineer the HR practice including such core processes as recruitment, development, evaluation and promotion of employees. The aim of CODECO was to support knowledge sharing and collaboration (sharing of best practices, publication of project-related news and events and storing of project-related documents and procedures) solely related to, and during the IMPLEMENTATION.

After two years of on-going implementation of the project, the world financial crisis disrupted the IMPLEMENTATION. Top management' decisions to reduce expenses in all *INSTEC* campuses were made. This further resulted in the abandonment of face-to-face meetings. Similarly, the leader of the IMPLEMENTATION cancelled his visits to campuses to reduce operational costs. Overall, the rhythm of the IMPLEMENTATION slowed down, mainly as a consequence of a lack of resources, and that motivated the leaders of the IMPLEMENTATION to find alternative ways to enhance communication during this period. The leader of the IMPLEMENTATION introduced CODECO with the expectation that it would become the core media to share project-related information during the IMPLEMENTATION. Resources were allocated to customise CODECO so that its features would be in accordance to the needs of the IMPLEMENTATION. Once the core features of CODECO – scheduling, discussion forums, document repository, email service, and instant messaging - were developed and ready to use (except videoconferencing), a launch session took place to introduce CODECO to all HR staff involved the project. Accompanying the launch session, policies of participation were established by the leaders of the IMPLEMENTATION, and made explicit in the technical and support documentation to use CODECO. This documentation was made available to all people

involved in the IMPLEMENTATION. A member of the HR staff was allocated the responsibility to moderate the use of CODECO and promote participation in the online community.

Initially CODECO was used as a document repository, however, despite the efforts of those promoting its use, participation did not take place and eventually the collaborative technology was abandoned. Continuous efforts were made to add the videoconferencing feature, however the lack of resources to accomplish this aim inhibited further development. After a few months, even those initially promoting the use of CODECO and having an active participation neglected it. Instead, existing media such as email, telephone and face-to-face meetings were used. According to the opinions of people responsible for both the introduction of CODECO and the IMPLEMENTATION, the online community ended up as a failure. The IMPLEMENTATION continued and was successfully implemented across different campuses of INSTEC; however, collaboration and knowledge sharing occurred via existing media; CODECO was abandoned.

3.2 Methods for data collection and analysis

This study follows a case study design informed by ANT. Data collection took place in two different stages. Data were collected mainly through semi-structured interviews with 30 informants, which were selected on the basis to maximize the diversity of opinions following a strategy of purposeful sampling (Creswell, 2007). Interviews lasted between 50 and 90 minutes. Research participants included HR people with different degrees of responsibility during the IMPLEMENTATION including HR staff from Headquarters (3), campus-based Directors (15) and other HR staff (e.g., directors´ assistants, HR analysts) below directorial level (12). From the 30 interviewees, 15 had a Bachelor degree, 13 hold a Master degree and 2 had a PhD. All interviewees were users of CODECO, however, only those working at the Headquarters were involved in both the IMPLEMENTATION and the promotion of CODECO. Narratives were recorded and transcribed anonymously and with previous consent of informants. Other sources of data collection were also used including observation of communication activity in the online community, project- related documentation, and attendance to online sessions and project meetings.

Before conducting the interviews, six telephone interviews were carried out as a piloting exercise. These pilot interviews were preceded by the design of preliminary interview guides. The interview guides were mainly used to maintain the focus on relevant areas following a

conversational style. ANT was not used at this initial stage of data collection; it only informed the process of analysis during the second analysis stage.

Data analysis was based on the combination of a two-stage process of analysis. Each stage followed the six-step analytical procedure suggested by Braun and Clarke (2006). The initial stage followed an inductive thematic analysis that resulted in purely grounded descriptive account of the case, whereas the second stage was conducted using a more theory-driven analysis informed by theoretical resources from Actor-Network Theory. The process of analysis included the following steps: data familiarisation, generation of initial codes, searching for themes, defining and naming themes, reporting findings. These steps were not always followed in a linear way. Rather, this process was iterative.

4. Findings

4.1 Initial findings

When the leader of the IMPLEMENTATION made the decision to introduce CODECO as the core communication channel to support knowledge sharing and collaboration during the IMPLEMENTATION, potential users did not perceive a real need to use it, nor the potential benefits that could be received from participating:

> "I see no real need to use [CODECO]. In terms of communication concerning [the IMPLEMENTATION], I am perfectly satisfied with the forums we already have … we need to bear in mind that technology is not always the solution."

Features related to the new platform design and functionality were also an issue. For example, it seemed that once CODECO was introduced, there was still the need to further develop the Videoconferencing application, a situation which suggested a perceived lack of usefulness for potential users of CODECO:

> "I had a problem with the virtual community; I tried to use the Videoconferencing feature a few times but I failed every other time…It seemed that this functionality was not fully ready by the time [CODECO] was launched …after trying a few time I quit and never used CODECO again"

The problems with the use of the new platform arose not only from the Videoconferencing functionality but also from the other applications of CODECO and from its overall interface design:

"I think the platform is not very well designed… or it might be, but the thing is that I spent a lot of time every time I tried to find some information, not to mention that it takes a lot of time to log in and register"

Another factor that contributed to the non-use of CODECO was the ineffective initiatives led by those promoting its use and adoption. A formal presentation was only made at the end of a monthly meeting where the goal, functionalities and expected benefits of CODECO were discussed. The short time allocated to the formal presentation of CODECO raised, however, more questions than answers to potential users:

I remember that day. We had our usual monthly meeting and at the end of it, [the leader of the implementation] mentioned the online community. We did not get a clear sense of what it was all about; we were running out of time… I certainly wondered what would have happened if this could have been further discussed with all the people involved."

In addition, the promotion of CODECO was further complemented with documentation that included a training manual and a set of policies and guidelines for using it, however this documentation had no impact on the use of CODECO. Rather, the policies of participation seemed to be, to the eyes of users, an arbitrary decision ignored by many users:

"Yes, I remember that policy of participation; it did not make much sense to many of us…I remember we talked about it a long time ago and wondered who was going to follow that policy. As you can see, the policy may be there in the documents, but in practice we do not follow it [CODECO]".

Over time, CODECO was abandoned, whereas the implementation of the HR project continued. During this period, interaction and knowledge sharing were key processes that contributed to the successful implementation of the project, but they were supported by existing media such as mail, telephone, instant messaging, and videoconferencing on a different platform. By the end of the process of data collection, the log file of CODECO evidenced its abandonment, showing null login activity to the online community; CODECO ended up completely abandoned.

This grounded thematic analysis provides some light on how aspects such as a lack of a need to use CODECO, absence of perceived potential benefits derived from participation, problems with some functionalities and the interface design of the platform, and ineffective sponsoring strategies on the part of those promoting the use of CODECO undermined participation in CODECO. However, these findings do not reflect the whole range of influences that shaped participation. Factors such as convenience, perceived benefits, interface design and ineffective sponsoring activities in many ways resemble previous findings of studies that have adopted a

cognitive approach to study participation. Adopting the four moments of translation from ANT, however, has the potential to prompt us to look at the data anew with a different focus to better understand how other aspects – before, during and after the launch of CODECO - found in the wider context of the community shaped the non-adoption of CODECO.

4.2 Findings informed by ANT: The adoption of CODECO as an incomplete translation
4.2.1 Introduction

In the light of the descriptive account of what happened, in this section we draw upon the four moments of the translation process from ANT to show how the effort to make CODECO a technology-in-use resulted in a process of dissidence – an unsuccessful translation. Adopting this perspective prompted us to go beyond of what occurred within the boundaries of the community, and instead to look at how different errors, omissions and limitations that occurred before, during and after the launch of CODECO shaped the failure of making of CODECO the core media to support knowledge sharing and collaboration during the HR project IMPLEMENTATION (See Table 2 for a summary of findings informed by ANT). Informed by the sociology of translation from ANT, these findings show that the factors that shaped participation in CODECO resulted from the failure to create strong links aligning the interests of the actors involved.

4.2.2 Issues during problematization

There was a lack of identification of relevant actors and their interests at this stage. To maintain communication during the IMPLEMENTATION, the leader of the project decided to introduce CODECO; however, he failed to clearly identify the different actors´ interests. His decision to introduce CODECO was made guided by his interest to "enjoy the availability" of the technology without any costs involved to the HR Directorate; however, this decision was made at the expense of the interests and current needs of the potential users of CODECO, who found its use "made no sense to them", since they were satisfied with existing communication channels. This divergence in interests that resulted from privileging the leaders´ interests over the potential users´ interests minimized the commitment of potential users to participate in CODECO and thus threatened its adoption:

> "From my viewpoint, what occurred was that they wanted to enjoy the availability of the platform by adopting it without incurring in any cost; however, their decision privileged their

interests minimizing the importance of what we really needed ... what I mean is that they did not ask us whether we really needed it or wanted it"

Another critical omission made during the problematization stage by those sponsoring the use of CODECO was not to consider the platform as an actor in its own right. This omission left the adoption and use of CODECO open to betrayal, given that the emergent behaviour of CODECO would not necessarily be aligned to the interest of those promoting it.

"Although they were promoting the use of the platform, it seemed to me that they assumed that the technology would work by itself. I know they deployed strategies to persuade us to use the platform, but in some way I would say that they overlooked the platform"

These situations of divergent interests among the leader of the IMPLEMENTATION, the potential users of CODECO and CODECO itself permeated all the translation process, continuously challenging the suitability of the technology to support knowledge sharing during the IMPLEMENTATION.

4.2.3   Limitations during interessement

Interessement refers to the different strategies and incentives that contribute to convince other actors to become part of a network – in this case to support the adoption of CODECO. Even though people sponsoring participation in CODECO deployed a series of interessement strategies, these were unsuccessful in persuading potential users to become allies of CODECO. Assuming the importance to communicate the decision to adopt CODECO as the core media during the IMPLEMENTATION, the leader of the IMPLEMENTATION organized a launch session to introduce CODECO to all potential users, however he failed to communicate a persuasive message to convince others of the potential benefits:

"Before the meeting finished [the leader of the implementation] talked about the virtual community. He mentioned the reason behind its proposal, the core tools available and the expected benefits ... I did not get everything they were saying, things were said quickly and it was difficult to catch everything, besides we had no more time to discuss it."

The session used to introduce CODECO to potential users, though well-intentioned, failed to accomplish its aim, since potential users expressed their lack of understanding of the reasons that motivated the decision to introduce CODECO. In addition, after the launch session not being able to convince potential users of the benefits of CODECO, those promoting the use of CODECO incorporated a series of policies and other documentation aimed at familiarizing potential users with the functionalities of CODECO. However, this strategy worked against an

effective interessement as it caused misunderstandings among potential users and showed the lack of commitment of those sponsoring CODECO to provide training and facilitation to familiarize others with the new platform.

4.2.4 Issues during enrolment

The moment of enrolment requires a definition of the roles of each of the actors conforming to the network and an alignment of their interests to those of the network. However, given that enrolment is temporal, processes of betrayal were always a possibility during the project. Three instances of betrayal occurred during the translation process: 1) CODECO betraying its own adoption; 2) those sponsoring the use of CODECO betraying CODECO; and 3) the leader of the implementation betraying the IMPLEMENTATION.

CODECO was itself a key actor to support its own adoption. Rather than evolving in order to adapt and align itself to the IMPLEMENTATION, CODECO had a different posture and developed properties of irreversibility e.g., the platform did not work with the instant messaging application; the platform presented intermittent technical issues that were not fully addressed during the implementation reducing its performance. This meant that CODECO was never seen as a ready-to-use platform.

A second instance of betrayal showed how even those initially promoting the use of CODECO, stopped using it and returned to the use of existing media:

> "Once I posted a question asking for some job descriptions. My query was never answered [via CODECO]. The following day, I received the job descriptions I asked for, but [he] sent them to me via email … since then all the interactions I had related to the [IMPLEMENTATION] were supported by the media we had before the online community".

A clear example of this situation was the fact that the person assigned with the responsibility to promote the use of CODECO by proving support and training to potential users was using pre-existing media – rather than CODECO- to provide support to potential users:

> "I remembered they persuaded us to use CODECO, and I think they used it for some time, but suddenly I realized I got all the information I needed from them by email, so I wonder why I would use it, if even they were not using it anymore."

This sent a signal to users that was not aligned to the promotion of CODECO, motivating them, instead, to use pre-existing media. What this situation revealed was a process of betrayal to the initiative from the side of those promoting CODECO, threatening its adoption.

Contrary to CODECO, other relevant actors kept changing through the life of the initiative. However, these changes were not necessarily aligned to those of CODECO. An example of this change in the actors´ interests occurred when the leader of the IMPLEMENTATION left the University. The abandonment by this actor significantly undermined the use and adoption of CODECO given his key role as the main sponsor and promoter of CODECO.

Another issue that emerged during enrolment was the underestimation made by those sponsoring CODECO of the role of competing technologies that had an active role in disrupting the interests of potential users to participate in CODECO. Existing technologies such as email, telephone and instant messaging constrained the use of CODECO by providing potential users alternative ways to communicate. This was reinforced given that HR people had to opt for a different platform (made available one year after the launch of CODECO) when they did not find the videoconferencing tool available in CODECO. This created a sense of competition for users between CODECO and the alternative platform, which made it increasingly difficult to align the entire network to the use of CODECO making this initiative vulnerable to failure.

4.2.5   Failure to mobilize actors

The situations described above left no possibility of mobilization of actors in accordance to the interests of making of CODECO the core media during the IMPLEMENTATION. Instead, what occurred, was that people involved in the IMPLEMENTATION continued with it in their own campuses, though, their communicative practice was supported by the media used before the existence of CODECO.

> "In the end, we kept working on the implementation of the project, however, we did not use [CODECO]. I would say that most of my colleagues did not adopt the platform as the main media to communicate during the implementation, rather they and myself kept using the media we had before".

Institutional email, telephone, instant messaging and even the new platform with the videoconferencing tool continued being part of their routines and were collectively used by all HR staff involved in the IMPLEMENTATION.

> "Suddenly, one day we stopped talking about [CODECO] while, on the other hand, we routinely use the media that existed before this initiative ... except that we also used the videoconferencing platform".

Table 2. Summary of findings informed by ANT

5. Discussion

Participation in online communities can be better understood through ANT. In particular, the moments of problematization, interessement, enrolment and mobilization can be used as devices to trace the emergence, evolution and dissolution of an initiative to support participation in an online community via the use of a collaborative technology. Adopting ANT allowed us to see how the factors that shaped participation in CODECO occurred before, during and after the launch of CODECO. Moreover, these factors turned out to have emergent effects that resulted from the lack of strong links created over time between the actors involved.

Firstly, through the lens of the concept of translation, the paper illustrates the interdependencies between human and nonhuman actors, and how processes of negotiation, conflict, enrolment, alignment, and betrayal enabled and constrained technology adoption. This implies that researchers should be aware of the processes that occur before, during and after a translation process, as these moments are opportunities to understand the complex nature of technology adoption as a process. Secondly, this case of the failure to adopt the collaborative technology has shown how ANT provided us with light that other theories could not, by drawing attention to the critical role of non-human actors during the translation process. As mentioned earlier, previous literature adopts either a technological deterministic approach wherein particular attention is paid to technological aspects to explain adoption and use of IS, or a socially-deterministic view where the role of the technology is neglected. Researchers should therefore consider the unplanned and active role of IS and how it might influence human and non-human actors by acting as competitor, manipulator or traitor, thus shaping the process of technology adoption.

The analysis also reveals how an approach based on ANT addresses issues that cognitivist approaches minimize. ANT focuses on contingent events, dynamics and change over time, getting away from the tendency in studies of online community to look at snapshots of activity. Moreover, it also prompts the researcher to consider the wider context than just the community itself, focusing on aspects of the context within which it is positioned to explain its internal development, rather than merely on processes within the community itself. The case shows that understanding what occurred in the broader context of the online community

before, during and after the translation process can also be relevant to better understand technology adoption. The cases of betrayal from the side of relevant actors, competition among technologies, and divergence in the actors´ interests are clear examples of how ANT can provide fruitful interpretations to enhance understanding on technology adoption processes.

While the explanatory power of an ANT lens is demonstrated in this paper and while this specific case study is suggestive of general types of processes that might transfer to other contexts to explain the non-adoption of technologies, the findings cannot be simply generalised to other contexts. Further studies in other contexts with different conditions are required (e.g. other organizational settings, the use of different technologies) to see what are common patterns that produce non-participation. It would be fruitful to adopt theoretical resources from ANT to study contexts within the corporate setting, or across organizations or their units to explore the emergence and evolution of actor-networks supporting the adoption and use of collaborative technologies. It should also be acknowledged, though, that the findings of this study are mainly based on interview data and observation of online activity. Further studies might consider the use ethnographic-inspired methods to remain faithful to the contextual, routine, processual and situated nature of the communicative practice of practitioners.

The case of the failure of CODECO also has some implications for practitioners, sponsors and designers of Information Systems, particularly collaborative technologies. Firstly, the adoption of IS must not be considered in isolation; the adoption of IS can be strongly affected by the lack of enrolment and negotiations taking place between relevant actors. This requires both, an initial identification of relevant actors and the deployment of adequate enrolling strategies. Secondly, technologies and technical issues must be seen as powerful actors that enforce or weaken a network supporting the adoption of IS. In some cases technologies can hinder or positively influence technology adoption by adopting competing, disrupting or enabling roles. New technologies might also have poor performance or perform in ways not previously expected so that those supporting their adoption might feel betrayed and avoid the use of the IS. Thirdly, when implementing IS there is always the possibility that practitioners will adhere to ad hoc practices (using existing media to communicate) rather than adopt new corporate systems. Organizational inertia and routines in the communicative practice of potential users must be considered given that they can be perpetuated, rather than changed

after continuous repetition of these patterns. Fourthly, to be successful, aspects such as management sponsorship, extensive promotion and consultation with potential participants are critical for institutionalize an IS in order to persuade relevant actors to use the IS, and to ensure that the technologies fit the interests of important actors (both human and non-human). Fifthly, actors' interests can be mobilised and aligned to the interests of a particular network to support the adoption of an IS; however, they might continuously shift as they are subject to ongoing translations caused by competition and betrayal. Moreover, different perceptions of the IS by different groups of employees may exist and play a role in shaping its adoption. Lastly, IS might be regarded as actor-networks that compete with each other (e.g., with other computer systems), and are subject to limitations of available resources (e.g., corporate sponsorship, organisational attention, financial resources). Moreover, those supporting the adoption of particular IS may not command sufficient social and political power within the organisation to motivate its widespread adoption.

Overall, the following are some aspects that, if taken into account when developing IS, might increase their possibilities of success. Whereas the following considerations might be beneficial for those cultivating online communities supported by collaborative technologies, these principles may potentially apply to the adoption of any IS whose main goal is to support communication between individuals or groups. What is clear is that the four moments of translation point to different abilities that managers, sponsors and designers of IS might need to develop to achieve a successful translation:

1. Guarantee access to sufficient resources including financial resources and allocation of people to sponsor the IS.
2. Identify potential needs for interaction and media use to explore potential solutions.
3. Be alert to whether existing routines in the communicative practice can be maintained.
4. Incorporate relational aspects into the operation of communities assuring interconnectedness between people is not lost.
5. Make efforts to ensure that communities fit the communicative practice aimed at being supported.
6. Be aware of potential divergences and establish strategies to cope with them.

6. Conclusion

Drawing upon Actor-Network Theory, particularly on the four moments of the translation process, as a means of understanding the messy complexity of technology adoption, the paper has analyzed the non-adoption of a collaborative technology to support online community participation within an organizational setting. The initiative to make of CODECO the core media to support knowledge sharing during the implementation of the HR project was seen as a process of translation in which a focal actor aimed to persuade others to adopt and use CODECO. The case showed that different issues during problematization, interessement and enrolment occurred so that potential users of CODECO could not be mobilized. This in turn shaped the non-use of CODECO, whose potential users and even its promoters ended up using pre-existing media – rather than CODECO - to communicate during the IMPLEMENTATION. Among other factors, it was shown that the lack of alignment of interests between actors, the lack of identification of relevant actors, the deployment of unsuccessful interessement strategies, the divergence of interests among relevant actors, the active role of other media to communicate that competed against CODECO to enroll potential users, the routine developed in the communicative practice, and processes of betrayal to adopt CODECO from critical actors shaped the non adoption of CODECO.

Our case makes primary contributions to IS research by providing light on how the four moments of the translation process from ANT can be applied to analyse the adoption and use of collaborative technology. It therefore promotes the use of ANT to study adoption and use of IS, showing that attention must be paid to collective, technical, political and contextual factors when implementing IS, particularly collaborative technologies.

In particular, the paper makes it evident that actors involved in a translation process are not stable and unproblematic. Rather, the case shows that actors themselves and their actions are temporal effects that can occur during the socio-technical process of technology adoption. This emerging and evolving nature can also be observed in the promoters of technology adoption themselves as shown in the case that even those supporting the initiative to adopt a collaborative technology might shift their interests and enact practices that challenge their own initiative. An awareness of this evolving nature of technology adoption is important as it enables researchers to capture the dynamics that surrounds it.

Furthermore, our research results show that in order to better understand technology adoption there is a need to go beyond explanations that solely refer to problems with the interface design of the technology, lack of promotion of those sponsoring the adoption, and individuals´ motivations and benefits derived from participation. The ANT-informed interpretation illustrated that to better understand technology adoption, attention needs to be paid to what occurs before, during and after the launch of the technology, and to what occurs within the broader context in which the technology is intended to be used.

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