Stakeholder analysis and engagement in projects: From stakeholder relational perspective to stakeholder relational ontology

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Abstract

This paper investigates the stakeholder analysis and engagement in the field of project management. In response to the limits of prior studies, we propose a relevant conceptual approach by moving from a stakeholder relational perspective, anchored in recent studies on Social Network Theory, to a stakeholder relational ontology, anchored in Actor–Network Theory (ANT). We apply our approach to read and understand a longitudinal case study of an Information System (IS) project. Our most important findings suggest that this approach based on ANT improves stakeholders’ analysis of and engagement in a project by shedding light on the dynamic and emergent nature of the relationships, since we demonstrate that the nature, roles, and relations between stakeholders co-evolve with the project’s definition and trajectory. Consequently, we can provide project managers with a relevant approach that informs them about what to observe in stakeholder project networks, as well as how and when to observe them.

Keywords: Managing stakeholder; Actor–Network Theory (ANT); Relational ontology; Information System (IS) project

1. Introduction

In the field of project management, many authors have clearly highlighted the extraordinary importance of stakeholders in projects (Beringer et al., 2013; Cleland, 1986; Freeman, 1984; Littau et al., 2010; Savage et al., 1991; Winter et al., 2006). The management of a project’s stakeholder means that the project is explicitly described in terms of the individuals and institutions that have a stake or an interest in the project. Whatever the nature of the project, various researchers (Achterkamp and Vos, 2008; Brown and Jones, 1998) have acknowledged that project failure is generally not the result of lacking or ineffective project management practices, but of inappropriate social interactions between the project stakeholders.

In this study, our focus is on the stakeholder analysis of and engagement in projects. Stakeholder analysis is an essential part of stakeholder management (Aaltonen, 2011; Freeman, 1984; Jepsen and Eskerod, 2009; Magness, 2008; Mitchell et al., 1997). In turn, stakeholder engagement includes communicating with, involving and developing relationships with stakeholders (Chinyio and Akintoye, 2008; Greenwood, 2007). As noted by Yang et al. (2009a,b), stakeholders should be engaged as early as possible and this engagement is essential for stakeholder analysis and decision-making.

These matters seem clear and sufficiently addressed. In reality, this perception is unfortunately a pipe dream. Despite
its popularity, the literature on stakeholder analysis of and engagement in projects suffers various limitations (Jepsen and Eskerod, 2009; Littau et al., 2010; Pacheco and Garcia, 2012; Yang et al., 2009a,b). We classify these limitations into three main improvement areas: the relevance, the dynamic, and the emergence of stakeholder analysis and engagement.

Firstly, prior studies have a provided rich and solid basis for identifying, classifying, and categorising stakeholders as well as understanding their behaviour to manage them better (Crawford, 2005; Cummings and Doh, 2000; Mitchell et al., 1997; Savage et al., 1991). Despite these rich classifications, various studies call for improvements in these approaches, as they do not provide methods and tools with which to identify all stakeholders and their interests (Pouloudi and Whitley, 1997; Yang et al., 2009a,b). In particular, Jensen and Sandström (2011) underline that stakeholder theory may be failing to reach one of its central aims: being useful to managers.

Secondly, Parmar et al. (2010) call for improved descriptions of how firms manage their relationships with stakeholders over time, i.e. for longitudinal analyses. According to Eskerod and Vaagaasar (2012), to date, the majority of projects do not regard stakeholder management as a dynamic and on-going process. Stakeholder analysis is therefore not only a front-end, but also a longitudinal process.

Thirdly, our literature review reveals that prior studies have not addressed the emergent nature of relationships. In particular, prior studies on stakeholder analysis from the Social Network Theory anchored in a relational perspective have actually shown developments by studying the “resultant” effects of stakeholder relationships (Bourne and Walker, 2005; Rowley, 1997). Nevertheless, the “emergent” effects have been understudied. The studies overlook the importance of the emergent nature of stakeholder networks, i.e. the co-evolution of the stakeholder identity and the project over time.

Consequently, our literature review points out two main implications and necessities. The first implication is to consider developing a relevant framework to identify the key stakeholders and maintain good relationships throughout the project. The second implication is that this framework should integrate stakeholder relationships’ dynamic and emergent nature and, thus, project management stakeholders’ time perspective.

In the face of these implications, we propose to develop a relevant conceptual approach based on a theory rarely used in understanding of the stakeholder analysis and engagement in the field of project management. This theory, called the Actor–Network Theory (ANT), is anchored in a relational ontology. Accordingly, our research question is: How can a relevant approach based on ANT provide a dynamic and emergent stakeholder analysis of as well as engagement in a project throughout its duration? In other words, our main contribution is to demonstrate how ANT can be used as a relevant conceptual approach that allows stakeholder analysis and engagement during the project.

The remainder of the paper is organised as follows: we begin the article with an overview of the stakeholder literature, taking the movement from a dyadic perspective to a relational perspective into consideration (1). We argue that a relational ontology anchored in ANT offers a worthwhile perspective for stakeholder theory advancement (2). Consequently, from our understanding of ANT concepts, we propose an approach to stakeholder analysis of and engagement in projects (3). We then briefly describe our research methodology on the basis of a longitudinal case study of an Information System project, called “Pupitre Virtuel”, to which we apply our method to read and understand the evolution of the project. (4). Thereafter, we report our conceptual method’s findings (5). Finally, we discuss and comment on the implications of our research (6).

2. Theoretical background

2.1. From a stakeholder relational perspective

Initially, most stakeholder literature concentrated on the dyadic relationships between individual stakeholders and a focal organisation (Freeman, 1984), considering the organisational interactions with stakeholders as independent relationships. One of the most significant contributions to this dyadic perspective is by the stakeholder identification and salience framework of Mitchell et al. (1997). The stakeholder salience framework allows classifying stakeholders according to their power, legitimacy and their claim’s urgency. According to Rowley (1997), this dyadic perspective is appropriate for classifying different types of stakeholders. However, this analysis is limited to explaining how organisations react to stakeholder influence because they do not respond to each stakeholder individually; instead, they respond to the “interaction of multiple influences from the entire stakeholder set” (Rowley, 1997, p. 890). Accordingly, the analysis should integrate the complex arrangement of multiple and interdependent relationships in stakeholder environments. Which is why the stakeholder theory moved from a dyadic perspective (Freeman, 1984) to a relational perspective based on a network perspective (Pouloudi and Whitley, 1997; Rowley, 1997).

Applying the Social Network Theory (Granovetter, 1973) to stakeholder management, Rowley (1997) examined and described how aspects of an organisation’s stakeholder network, namely the network density and focal organisation’s centrality, affect the organisation’s response to stakeholder demands. Density is a characteristic of the entire network. It measures the relative number of ties in a network that link actors. As the network density increases and the number of ties between the network members grows, communication across the network becomes more efficient, facilitating the voluntary diffusion of norms, values, and shared expectations. Concurrently, centrality refers to an individual actor’s position in the network relative to others. From this analysis, Rowley (1997) argued that a firm can resist stakeholder pressures better if it is a central actor in its stakeholder networks and if these are less
densely interconnected. Given the behaviours related to resisting stakeholder pressures, the author identified four types of firms: a commander, a compromiser, a subordinate, and a solitarian.

On the basis of Rowley’s (1997) research, numerous scholars have acknowledged that stakeholder relationships do not occur in a vacuum of dyadic ties, but in a complex network of intertwining relationships. Various scholars used such analysis, for instance, in the context of IS projects (e.g., Coakes and Elliman, 1999; Walsham, 1993) or in construction (e.g., Bourne and Walker, 2005; Cova and Salle, 2006). Rather than focusing on stakeholder attributes, the network perspective views stakeholder characteristics and behaviours as arising from the social structural environment. It also emphasises the interactions between stakeholders for a better understanding of the decision-making process.

2.2. To stakeholder relational ontology

Despite the richness and advances of these previous studies on the stakeholder relational perspective, we argue that this approach should be adapted to integrate the dynamic and emergent nature of stakeholder networks.

Research anchored in a stakeholder relational perspective focuses only on the “resultant” effects of relationships, ignoring the “emergent” effects of the stakeholder network over time. This research considers pre-existing actors who meet in a network and establishes the relationships between them. For instance, in their systematic literature review of stakeholder methods, Pacheco and Garcia (2012) show that such studies suggest that once we have an idea of who the main stakeholders are, the basic interactions between them should be identified. Consequently, how stakeholders evolve throughout a project due to the interactions between them and the project over time, is understudied. Although Rowley (1997, p. 890) underlined the “interdependent relationship in stakeholder environments”, the effects of this interdependency on the stakeholders and the project over time remain understudied (Yang et al., 2009a,b). Rowley (1997) took stakeholder and project characteristics for granted by presuming that networks’ a priori existence was a manifestation of stakeholder dynamics (Papadopoulos and Merali, 2008). One of the main reasons for this was that this research tends to ignore time in stakeholder analysis and engagement, reducing it to a log effect. Consequently, research on a stakeholder relational perspective considers the network, its elements and characteristics as stable and innate properties, thus overlooking that the stakeholder and the project properties co-evolve over time.

We propose a relevant approach that integrates dynamic and emergence mechanisms in order to thoroughly improve stakeholder analysis of and engagement in projects. We thus base our analysis on the Actor–Network Theory (ANT) (Callon, 1986; Latour, 2005). ANT views a network as a process that shapes and reshapes relationships. This thinking invites us to think about individuals, organisations, and entities in terms of “ceaseless change, emergence and self-transformation” (Nayak and Chia, 2011, p. 282). It implies a switch from a relational perspective (“weak relationality”) of stakeholder analysis and engagement to a “strong relational ontology” (Slife, 2004). Slife (2004) thus regards everything, including each person, as first and foremost a nexus of relationships. Instead of recognising a stakeholder network and “organisation” as stabilised entities, we believe that people’s actions are always locally defined and emergent, and that this local emergence includes the material as well as the social structures and processes (Orlikowski and Scott, 2008). This perspective emphasises the understanding of project management through unpredictable and emergency project features and integrating human and non-human (materiality, artefacts) in the analysis. As noted by Pouloudi et al. (2004), the application of stakeholder analysis has been predominantly restricted to human stakeholders. Vidgen and McMaster (1996, p. 225) boldly defined stakeholders as any “human or non-human organisation unit that can affect as well as be affected by a human or non-human organisation unit’s policy or policies”. Anchored in this relational ontology, we suggest the transposition of this mode of thinking to the stakeholder theory in project management by mobilising ANT.

3. ANT and its application to stakeholder theory

3.1. ANT and stakeholders

The basic idea of ANT (Akrich et al., 2002a,b; Callon, 1986; Latour, 2005) is that to achieve a goal, a network or “assemblage”, requires a faithful alliance between humans and non-humans and, thus, the social and the technical. This theory seems to fit stakeholder management perfectly.

ANT has been used in many different and sometimes contradictory ways, and in a variety of disciplines. Organisational Studies and Information Systems are its two main application areas. ANT is increasingly criticised and considered (Czarniawska and Hermes, 2005; Dery et al., 2013; Faik and Walsham, 2012; Walsham, 1997). Although ANT has been largely used to study projects especially IS projects (Dery et al., 2013; Elbanna, 2010; Meier and Missonier, 2012; Ramiller and Wagner, 2009; Wagner et al., 2010), few studies (Blackburn, 2002; Pollack et al., 2013) have mobilised this theory in the field of project management and, a few authors have underlined its usefulness for stakeholder management (Luoma-aho and Paloviita, 2010; Pouloudi et al., 2004; Vidgen and McMaster, 1996). We assume that ANT would be particularly useful in this area for the four following reasons. Firstly, it provides a framework for conceptualising a project as an emerging network (associations, relations) that extends and transforms over time. This network is social, but also includes non-human actors. Indeed, one specific aspect of this approach is anchored in the principle of “symmetry” which asserts that the concept of “actor” should also be extended to non-human actors. A non-human can be any object or more precisely, as Latour (2005) explains, a series of heterogeneous inanimate actors called “actants”. It could be a technology, its components, a contract, or even a knowledge.
Indeed, intentions cannot be traced to a purely human origin, and they are also effects of a network. For instance, Callon and Law (1995) showed how the manager of a company is able to see, decide, and act because a network of actants such as reports, telephones, the internet, paperwork, desks, or administrators create the capacity for choice and intentions. The possibility to act is not what an actor does, but “what actants provide with their actions, with their subjectivity, with their intentionality, and with their morality” (Latour, 1999, p. 18). Secondly, ANT proponents refuse to pre-empt the actor identity, regardless of their relationships or effects within a network (Latour, 1988). Thirdly, from this perspective, a project’s success is considered to be dependent on the active participation of those who are determined to advance and, thus, form a convergent network (Callon, 1991). Fourthly, mainstream stakeholder analysis usually only operates at a project’s front-end as a basis for on-going decisions and planning (Jepsen and Eskerod, 2009), whereas ANT offers the potential for a dynamic and thorough examination of the on-going, influential interactions between actors about the project.

Contrary to stakeholder studies anchored in a relational perspective, an actor network does not mean that pre-existing actors come together in a network and establish relationships. Entities stand in relation to all other entities that constitute them. The network (or the “collective”) is not a collection of pre-existing things, but a property emerging from relationships (Callon and Law, 1995). As Callon and Law (1995, p. 486) explained, relationships are prior to essences, or are “things in themselves”.

### 3.2. Proposition of a relevant conceptual approach based on ANT

In response to our research question, we need a relevant approach with which project managers can analyse stakeholder engagement, considering the dynamic and emergent nature of stakeholder networks. On the basis of ANT, we propose a conceptual approach divided into two interrelated steps and which considers temporally evolving phenomena. The first step aims to analyse the morphology of the stakeholder network (the project) and allows the network’s degree of convergence to be qualified (Section 3.2.1). The second step aims to follow and visualise the network evolution over time (Section 3.2.2). We also suggest that the “process of translation” (Callon, 1986), which is divided into four stages labelled problematisation, interessement, enrolment, and mobilisation, can be used to guide project managers’ stakeholder engagement strategy. This process can be understood as a type of consensus-seeking process, a multifaceted interaction in which one entity assigns others a role. In Table 1, we offer an overview of our conceptual approach. Subsequently, we detail the different stages and their contents. Later in the text, we return to the stages of stakeholder analysis by the numbers 1 to 5, and to the stages of stakeholder engagement by using A–B–C.

#### 3.2.1. Morphological stakeholder network analysis (front-end)

1. **Identify stakeholders and analyse stakeholder relationships.** Anchored in a relational ontology, the identification of

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Table 1: Conceptual approach.
a project’s heterogeneous stakeholders, their roles and their definitions cannot be separated from their relationships. They take the form of different subsets called “poles” (Callon, 1991, 1992). Consequently, like traditional methods of stakeholder identification that use a list of specific stakeholders in a given context, firstly, we use Callon’s (1992) list of “poles”: “Science”, “Technology”, “Market”, etc. Then, to deeper observe their relationships, Callon (1991) recommended observing the “intermediaries”, i.e. “anything passing between actors which defines the relationships between them” (Callon, 1991, p. 134). He defines actors according to their interactions with others, through the intermediaries that they put into circulation. The nature of the intermediaries that the stakeholders produced or will have to produce during the project informs their identity and helps identify the “poles”. Intermediaries may be material (documents, contracts, technical artefacts, money, technical drawings, and schedules), or intangible (skills, knowledge, informal exchanges). The diversity of intermediaries confirms the existence of several coordination methods (Callon, 1992), and the amount and frequency of movement of intermediaries reflect the intensity of interactions. More intermediaries mean more and varied interactions and, therefore, strong links.

(A). Problematisation. With problematisation, the focal actor (e.g., the project manager or a firm) frames the problem to be solved in the project in its own terms, identifies other relevant actors, and highlights the problem’s influence on the other actors. The focal actor outlines broad strategies for addressing the problem at hand. In this process, as underlined by Luoma-aho and Paloviita (2010), firms mark their terrain by mapping the issue of interest and the relevant actors.

(2). Identify stakeholder interests. The notion of interessement allows for identifying and understanding stakeholder interests in a project. The analysis is here similar to traditional stakeholder analysis which recommends identifying stakeholders’ area of interest (their stake). This identification is linked to interessement as a strategy of engagement, i.e. a persuasive process that makes an identified actor interested in a project implies this actor’s transformation into an ally (Akrich et al., 2002b).

(B). Interessement and enrolment. Interessement focuses on the persuasive processes, which, in stakeholder terms, are addressed as stakeholder management or stakeholder alignment. According to Callon (1986), when an actor agrees to play the role it has been assigned, this implies a successful interessement, which suggests that the “enrolment” can take place. Enrolment includes actors accepting the roles defined for them and explained during the previous phases. The enrolment means assigning each representative stakeholder group (pole) a role. An actor’s ability is mainly responsible for arousing the interest of others in his project. Akrich et al. (2002b) explained that to enrol another actor, an actor has access to devices that can take various non-rhetorical (seduction, coercion, solicitation) or rhetorical (texts, conversations, etc.) forms. The interessement can therefore realise the network of considered alliances. Thus, a network of actors whose interests are aligned is a converged network (Callon, 1991).

(3). Assess stakeholder influence. Based on the studies by Callon (1991), we examine the structure of a project’s stakeholder network and its influence on the project manager’s response strategies. Callon (1991) believes that a network can develop in two directions: convergence to or divergence from its stakeholders.

Convergence measures the extent to which the process of translation and its circulation of intermediaries lead to an agreement (Callon, 1991). In a network, convergence does not mean that each element acts or becomes the same, but that the actor activities fit together despite their heterogeneity. As a whole, the network should be able to concentrate its efforts on a single point. Conversely, in a divergent project (a weakly convergent project), actors find that their status is constantly questioned and that mobilising other network parts is difficult. Actors resist the role that the network assigns them and respond unpredictably to instruction. Consequently, key actors may first pursue their interests elsewhere and, if they grow too divergent, become vulnerable to collapse (Alderman and Ivory, 2011). To observe the trajectories of convergence or divergence, Callon (1991) proposed two dimensions: the degree of alignment and the degree of coordination. (1) The degree of alignment of interests and goals concerns individuals’ motivations, which align their interests and goals. This occurs during the translation process by means of interessement’s active work. A network is aligned when each stakeholder’s respective interests are aligned with the project’s global interest (Callon, 1991). For instance, Callon (1991) explained that if a network includes three actors “X–Y–Z”, and the relation between X and Z necessarily implies Y, then the network’s degree of alignment is strong. Intermediaries are passed between the actors to assure a certain degree of convergence among them. (2) The degree of coordination concerns different forms of coordination (hierarchy, trust, knowledge sharing, and contract) in the network. Callon (1992) referred to weak coordination when a network has no specific local rules, and to strong coordination when local and general rules shape a network.

(C). Mobilisation. During mobilisation, the initiator or focal actor uses methods to ensure that allies act according to their agreement and do not betray the initiator’s interests. With the stakeholders and, thus, the allies mobilised, an actor network achieves stability. This stability means that the actor network and its underlying ideas have become institutionalised and they are no longer seen as controversial (Mähring et al., 2004).

3.2.2. Dynamic stakeholder analysis (over the project)

(4). Identify controversies. In an on-going project with time, cost, and quality pressures, it is essential that the project
actors are not only aware of, but also know precisely where and when to identify and observe these dimensions. Here, in terms of ANT, the concept of “controversy” appears to be very helpful. A controversy can be anything (argument, idea, ideology, etc.) that challenges the network’s status quo and thus affects and changes the stakeholder interactions (Latour, 2005). A controversy emerges when issues that were taken for granted are questioned and discussed. This thus implies requiring very strong interactions to redefine the relationship. Consequently, researchers and project actors have to examine the basics of each controversy (its components) in a project network because, firstly, controversies reveal interactions, which emphasise that the relationships between humans and non-humans are never fixed. Secondly, the effects of controversies in the network reveal new definitions and, thus, the evolution of the trajectories. The aim is to observe controversies that occur within a network (or outside) and their effects. We explain the details of the identification of controversies in our methodology (see Section 4.3).

(5) Analyse effects of controversies on stakeholder network. At the end of each controversy, the researcher or project manager should again focus on the intermediaries, count them, and identify their nature to determine their effects on the stakeholder network and on the degree of convergence. Consequently, the network depends on the changes occurring after the controversy, but the focal actor sometimes needs to re-engage the process of translation (problematisation, interessement, enrolment, and mobilisation) to reinforce or build another stakeholder network. Finally, this approach is sensitive to the project’s time.

4. Methodology

4.1. Research design

To illustrate our conceptual approach based on ANT, our findings were based on a real-time qualitative longitudinal study. This illustrative case study comprised an Information System (IS) project. The main objective of the project was to generalise a technology (called the Pupitre Virtuel) in all French schools. Eight people were members of the project team. A longitudinal study was needed to observe the process of the stakeholder network, the dynamics and emergence of its assemblages, and its evolution over time. The case was selected because it was exemplary, i.e. its conditions allowed us to apply our framework (Yin, 2008). Indeed, firstly, Pupitre Virtuel was a rich opportunity to understand the evolution of a project because it featured various stakeholders (project managers, a team developer, technology, users, national institution, and private partners). Secondly, this project also provided us with interesting opportunities to live the (everyday) events as well as to identify and understand the interactions between stakeholders (actors and objects) belonging to different spheres and, thus, in real-time. This project started in March 2003 and finished in December 2005. One of the authors had first-hand knowledge of the project because s/he had participated in it from the beginning to the end. As an internal expert, s/he evaluated specific aspects of the project and received regular project updates. Despite her/his involvement in the case, the researcher undertook participant observation, utilising the case study approach. As participant observers, s/he conducted the study without informing the project actors of the research goals. One of the authors was present throughout the project as a “moderate” participant observer, a role which enables a balance between involvement and detachment: the project members were told that s/he was researching how users appropriated the new system and s/he did not act or intervene on any aspect of the project. By regarding the project as an actor network, our analysis considers an individual level involving associations and practices — both of which the project formed — between humans and non-humans within the project.

4.2. Data collection

We used four sources of data: observation, interviews, data archival, and e-mails. These mixed methods ensure the richness of the findings and the purpose of triangulation (Yin, 2008), as well as allowing us an in-depth examination of the process (Langley et al., 2013). (1) We benefited from 242 days of participatory observation of the various project actors in the different project groups. We transcribed our observation in a daily journal. (2) We conducted 35 one-on-one interviews (26 open interviews and 9 semi-structured interviews), each lasting an average of 1 h, with actors in different functions and positions within the project. We conducted interviews during three periods: the exploratory period — open interviews, the in-depth period, and the control period. We summarised each interview on an index card after recording and transcribing it in detail on a computer. In total, 38 h of interviews were recorded, and 336 pages were transcribed. (3) We collected 85 public and official documents (the partnership contract, presentations of the technology and the project), internal and private documents (e.g., the seven versions of the new partnership contract, legal documents, etc.). The documents were annotated, and systematically listed under the themes they addressed. (4) We had the opportunity to gather more than 110 e-mails shared between the actors of the two firms during the entire observation period. We had access to the project’s intranet, and one of the main stakeholder of the project (ERI’s manager) agreed to transfer all mails he received from other stakeholders to us and those he sent to all the project actors. Finally, a report of approximately fifty pages describing the case study was submitted to the key actors for their agreement, which validated our interpretations, and thus increased the construct validity and the internal research validity (Yin, 2008).
4.3. Data analysis

Since time is central to our analysis, and as recommended by Langley et al. (2013), we combined different methods to examine the project evolution (the network) and, thus, the stakeholder analysis and engagement in depth. Real-time observation was useful to observe how these processes unfold over time. Interviews and data collections are particularly suitable for tracing event chronologies and meaning over long project periods. The data analysis was based on a chronological database (Van de Ven and Poole, 1995), which seemed the most appropriate approach for describing and understanding the project from start to finish. A chronological database aims to highlight the course of a studied phenomenon over time. Based on our conceptual approach, all the data were coded: the daily journal, interviews, documents, and e-mails. To ensure the stability and reliability of our codes, we used the data analysis software ATLAS/Ti and, at different intervals, coded the data several times following the guidelines by Miles and Huberman (1994).

To identify the nature of the network link, as recommended by Callon (1992), we made an inventory of the intermediaries exchanged between each project group by qualifying and quantifying these. We then developed a matrix code to “map” the actors. To identify the intensity of the network link, we constructed an adjacency matrix to quantify the ties (symmetrical matrix). The accumulation of the intermediaries between the actors was identified using the multiplicity network, which acted as a measure of intensity or frequency of interaction and thus of network ties. Callon (1991) advocated a method of counting the number of intermediaries circulating among the actors and groups of actors to calculate the degree of alignment numerically. This operation was repeated during the analysis after all network controversies had been identified. It was thus possible to provide a visual map of the network’s emergence and evolution that shows all the stakeholders constituting the network, their intermediaries and links.

We relied on the principles of Latour (2005) and recommendations by Venturini (2010) to identify controversies. We created a summary table for each controversy that includes the following markers: (1) its nature, i.e. the subject of the controversy and its stakes; (2) the actants (humans and non-humans) involved; (3) its stabilisation, mentioning whether a compromise was reached; (4) a redefinition of the technical object; and (5) its effects on the network within the convergence dimensions. The aim was to observe controversies when they occur within the network (or outside) and their effects.

![Fig. 1. Visualisation of front-end stakeholder network.](image-url)
5. Case study findings

5.1. Morphological analysis: an initial convergent stakeholder network

In keeping with our conceptual approach (see Table 1), our morphological analysis allowed us to identify and classify the main stakeholders into seven “poles” and their relationships at the front-end of the project (see Appendix A).

(1). Identify stakeholders and analyse stakeholder relationships and (A) problematisation

A French region (which we call Alpha) and a team of university researchers and designers initially invented and developed Pupitre Virtuel in 1999, which the local government (LG) supported financially. Concretely, this technology, an ENT (Espace Numérique de Travail — numerical space of work) called the “Pupitre Virtuel”, should make information, resources, and services universally available in real-time to students using a login and a password. This local project was part of a broad national project that the French Ministry of National Education (MEN) devised to develop and establish an ENT in all French schools. In addition, the MEN, an influential stakeholder in the project, believed that this Pupitre Virtuel was a very innovative technology. Since 2000, this innovation has been tested by 11, pilot-user schools in the Alpha region.

The project manager (the LG), who aimed to generalise Pupitre Virtuel for most French learners, conducted problematisation as a strategy of engagement. In 2003, the project team (the LG and some university researchers) wanted to generalise its use across the country. The project team therefore needed to improve the software to ensure that a large number of students could use the programme at the same time. To do so, the LG identified the actors who needed to generalise Pupitre Virtuel (e.g., private actors with expertise and funding, the Ministry, the researchers and their universities, the pilot users and the experimental technology) and got them interested in the project. The LG subsequently decided to resort to private funding for the generalisation. In October 2003, a private and (very) small company (which we call ERI) met the requirement and the LG chose it to integrate the project.

(2). Identify stakeholder interests and (B) interessement and enrolment

The actor interessement in the project occurred over two long months of on-going negotiations between the identified actors. After several compromises by each actor, a partnership contract was signed in February 2004. At this time, the partners aligned their respective interests and goals for their mutual collaboration. The inventor of Pupitre Virtuel and his team (university researchers and designers) wanted to spread it and offer a structure for deployment throughout the country. This deployment could not occur without a committed partner. This partner was ERI, a company recognised for innovative technology projects and for providing funds. The profitability of ERI’s investment in the project depended on the technology that the team’s researchers had invented and on their knowledge. The technology, Pupitre Virtuel, required researchers’ technical competencies and ERI’s market competencies to be generalised. The experiments with Pupitre Virtuel technology in certain schools were included in the project to test the technical evolution of Pupitre Virtuel. Lastly, for the LG (project manager), the project’s success would lead to the Alpha region receiving high visibility as a precursor of an innovative national education project. This success would depend on the technical qualities (provided by the designers) and commercial qualities (provided by ERI). The interessement was successful and each of the entities’ roles in the newly created actor network were defined and coordinated (enrolment). ERI therefore had an exclusive exploitation licence for Pupitre Virtuel while at the same time, it was responsible for the commercialisation and technical developments of Pupitre Virtuel. ERI’s manager had very strong assumptions about Pupitre Virtuel technology, which pilot users had tested for four years and which the French Ministry recognised.

(3). Assess stakeholder influence and (C) mobilisation

According to the definition of the density given by Rowley (1997), we conclude that this project’s stakeholder network is dense: the number of ties that link actors in this network is high. Indeed, at this time, ERI had to order technical developments from Pupitre Virtuel inventor and designers who now worked in a new company, Centile engineering, a data-processing company. The inventor of Pupitre Virtuel directed this company. The LG was responsible for the project in his region. The university continued to work with the designers and used Pupitre Virtuel. The French Educational Ministry published recommendations for its technical and commercial development. The developers improved the technology and the region’s users tested it. Therefore, at this step of the project in February 2004, we observed a convergent network. The actors’ interests were aligned; each entity had a strong interest in attempting the project. Furthermore, the roles and tasks were clearly assigned and well defined in the partnership contract. Each actor’s competencies complemented and were essential to the project goal. Fig. 1 shows the visualisation of the front-end stakeholder network Fig. 1.

At that time, the project appeared ideal as all the stakeholders were very involved in and trusted the project. Additionally, no stakeholder appears to have a more central position in the network relative to others. Nevertheless, the mobilisation stage became very complicated.

5.2. Dynamic analysis: from convergence to collapse

(4). Identify controversies and analyse their effects on stakeholder network

During the Pupitre Virtuel project, we identified five controversies.
First controversy: coordination of project stakeholders. In March 2004, the first controversy appeared. This controversy concerned the project’s internal stakeholders and involved the technical developments’ specificity, which required the Pupitre Virtuel components to be generalised, and these development costs. ERI’s manager requested more details about the transactions between the two firms. He felt that Centile’s invoices for Pupitre Virtuel developments were not justified. The technical development costs appeared to be high.

Centile’s manager felt that the Pupitre Virtuel content did not allow for detailed development specifications and the components required specific developments. Only Centile interacted directly with the technology and notified ERI about its assumptions regarding the technology, which was supposed to allow effortless improvements. Pupitre Virtuel revealed the complexity of its components’ merger. The stakeholders thus compromised as they had to collaborate to generalise the technology. A mail exchange between the two managers expressed their willingness to work together:

“The difficulties we encounter are from my perspective basically due to a lack of common practices and we must each make the necessary effort to iron out these differences in opinion and work methods. We will soon forget our initial ‘hiccups’ and the only thing that matters is the will to work together and to succeed in our projects to the best of our respective interests”.

[ERI’s manager (May 2004)]

“...The only thing that matters is the will to work together and to succeed in projects...”

[Centile’s manager (May 2004)]

Effects on the network: the compromise strengthened the convergence, even after the controversy had redefined one part of the relationship between ERI, Centile and Pupitre Virtuel. However, the alignment of the resources was weakening from the initial complementarity roles of ERI, Centile and Pupitre Virtuel to ERI’s dependency on Centile and Pupitre Virtuel. However, their strong vision for the project and the need to reinforce the convergence allowed them to compromise.

Second controversy: questioning the quality and reliability of the Pupitre Virtuel components. In July 2004, a new controversy emerged between ERI, Centile and Pupitre Virtuel. The quality and reliability of the Pupitre Virtuel components were questioned and their improvement suggested. The project actors were also informed that they had lost two new Pupitre Virtuel project implementations in other schools, which had been necessary for the project’s visibility and generalisation due to doubts about Pupitre Virtuel’s quality and reliability. Interactions between Pupitre Virtuel and the external actors had led to questions about its reliability. Moreover, the technologies chosen for the new projects had not yet been tested. These choices called the reasons for ERI’s interest in the project into question: Pupitre Virtuel’s reputation, experience and quality. The technology would not be able to keep its promises. ERI wanted to build new Pupitre Virtuel foundations:

“While the main advantage of Pupitre Virtuel is its three years’ experimentation and our technical know-how, they are not convinced of the scalability capacity of our solution. Our growing business skills with Pupitre Virtuel, improved over three years of experimentation, are useless”.

[ERI’s manager, meeting (June 2004)]

Centile’s manager was opposed to this decision:

“Pupitre Virtuel components do not need to be called into question. They have proven their reliability and are recognised by a strong and large community of developers. Actors involved in invitations to tender know nothing”.

[Centile’s manager, meeting (June 2004)]

Effects on the network: the convergence of the three stakeholders — ERI, Centile, and the Pupitre Virtuel — was weakening. ERI’s manager wanted more transparency regarding the technology’s technical functioning. He wanted to open the Pupitre Virtuel “black box”. Consequently, ERI asked Centile for the technology’s code source. The firm then recruited a new computer developer to work exclusively for it. At the same time, ERI decided that Centile was no longer a credible technical spokesperson for Pupitre Virtuel. ERI then decided that its new computer developer would be the technical spokesperson for the technology.

Third controversy: assignment of new responsibilities. In November 2004, Pupitre Virtuel encountered technical difficulties when learners could not access Pupitre Virtuel’s services. The LG was worried and wanted a quick solution:

“Everything is going wrong! Many users cannot access their Pupitre Virtuel. Everyone is complaining!”

[Member of the LG (5 December 2004)]

ERI and Centile blamed each other for the technical questions. During this controversy, the technology Pupitre
Virtuel was looking for a credible spokesperson. The involved actors could not compromise. Faced by the technical status quo and the users’ distress, the project manager entrusted the exploitation of the technology to an external company.

Effects on the network: this third controversy weakened the convergence and strengthened the divergence. It revealed the dissolution of the project network’s initial organisational structure.

Fourth controversy: questioning of the technology components. In December 2004, the French Ministry (MEN), an influential project stakeholder, delivered a formal report that revealed the national recommendations and norms that had to be followed in such projects. The French Ministry argued that the Pupitre Virtuel components were not sufficiently reliable and sustainable. Centiles’ manager believed that the components were reliable and did not require modification. Conversely, ERI’s manager believed that Pupitre Virtuel’s future was unthinkable without Ministry support. He wanted to rebuild Pupitre Virtuel to meet the Ministry recommendations. Centile was opposed to this decision, arguing that the reinforcement of the components would be sufficient. The controversy concerning the virtual desk’s component reliability was essentially redefined to consider the components and their reliability.

Effects on the network: this controversy reinforced the weakening of the convergence and the divergence of the network. ERI searched for another stakeholder, a new partner outside the Pupitre Virtuel network, to help develop a new Pupitre Virtuel platform, while Centile worked on the initial Pupitre Virtuel. The entities in the network shared the same common goal (the generalisation of the Pupitre Virtuel), although their visions differed.

Fifth controversy: questioning of the partnership contract. When ERI received the Pupitre Virtuel source code in December 2004, the ERI’s computer developer realised that the software technology included open source software, covered by a general public licence, and a private licence software. Alerted to this discovery, ERI was worried about the partnership contract’s legitimacy. A controversy arose among all the project members about the nature of the licences covering the Pupitre Virtuel components.

According to ERI, the presence of free software in the technology called for the reconsideration of the partnership contract; it casts doubt on the validity of the exclusive exploitation licence. Conversely, for the LG, the university and Centile, the partnership contract was still relevant. Each company requested technical and legal experts to detail the contents of Pupitre Virtuel and to assess the lawfulness of the contract. Pupitre Virtuel, which was essentially defined by the nature of its components and their development, was looking for a reliable spokesperson.

In January 2005, the respective experts’ reports disagreed on the validity of the exclusive licence exploitation and reinforced the controversy. Therefore, the project members decided to negotiate a redefinition of the relevant clauses in their partnership contract. Fundamentally, ERI’s manager was not against the use of open source licences, as they could be a competitive advantage against property licences in the public sector. The aim was to find a compensation for Pupitre Virtuel’s exclusive licence exploitation and to redefine the modalities of their collaboration.

“I don’t want the partnership contract to be broken; in the national context, we have no interest in revealing these tensions about our partnership. The main issue is that we have to reach compromises without breaking the partnership to pursue the project”.

[ERI’s manager (March 2005)]

However, despite seven new versions of the contract, the stakeholders could not reach an agreement. They decided to resolve the issue through a new actor in the network: a court. Finally, in December 2005, after two and half years, the project had only one remaining major supporter: ERI. Consequently, the LG and the University of the Alpha region cancelled the Pupitre Virtuel project.

Effects on the network: this latter controversy stressed the collapse of the Pupitre Virtuel network. The stakeholders were placed in a “controversial situation” that was irreversible, because they were unable to compromise.

The longitudinal follow-up of the five controversies reveals the trajectory of the Pupitre Virtuel stakeholder network along a convergent/divergent continuum. This type of observation allows the visualisation of its trajectory from its convergence to its progressive divergence and finally to its collapse (cf. Fig. 2).

To conclude our case study findings, we note that at the front-end, the Pupitre Virtuel network was convergent because through the process of translation, the key stakeholders and their interests were well identified and aligned, the resources were complementary, and the coordination was strong. Nevertheless, along the string of the five controversies, the network faced weakening convergence, which led to extreme divergence. Consequently, the continued weakening of the alignments of interests, resources and coordination led to the network’s collapse. More precisely, we found that two main stakeholders (the private actor ERI and the Pupitre Virtuel technology) resisted the role that the network had assigned them and responded unpredictably, even though they had accepted their roles at the front-end. Thus, although the interests had been aligned at the beginning, these key stakeholders later began to pursue interests elsewhere. When it grew too divergent, the Pupitre Virtuel network became vulnerable to collapse. The collapse occurred when the important actors ceased to be mobilised by the network’s intermediaries, that is, when they no longer believed that the project served their interests and they withdrew.
6. Discussion, managerial implications and further research

6.1. Theoretical contributions

The primary purpose of this study was to contribute to stakeholder research on project management by proposing a relevant approach based on ANT to provide a dynamic and emergent stakeholder analysis and engagement throughout a project. Consequently, the main theoretical contribution sheds light on the relevance of switching from a stakeholder relational perspective to a stakeholder relational ontology aimed at effectively improving the stakeholder analysis of and engagement in projects. Despite the richness of Rowley’s works (1997), his relational approach, anchored in the Social Network Theory, is “moment-to-moment” and misses the flow of interactions with dynamic and emergent dimensions. Consequently, the stakeholder decision-making is viewed as the result of the network structure (its density and centrality) at a specific moment in the project. Instead, the conceptual approach that we proposed considers the effects of the evolution of the network and stakeholders’ influences on the stakeholders, on the network and on the project. We are thus equipped to analyse, follow and understand the network and its members’ influences. As such, decision-making and response to this influence can be better adapted. For instance, our case study reveals that the interactions between the Pupitre Virtuel network stakeholders and their evolution had consequences for the network. More specifically, each entity as well as its place, role and boundaries were redefined and transformed inside and outside the network and across the project. These interactions changed the alignment of interests, resources and coordination, and partially weakened the convergence in the Pupitre Virtuel project network. Therefore, the project also developed due to the connections between the heterogeneous stakeholders.

Our findings moreover indicate that, at the beginning of the project, the stakeholder network’s density was high. For instance, ERI’s centrality was relatively high. Thus, the study by Rowley (1997) improved our understanding of ERI’s response after the first controversy, suggesting that it adopted a “compromiser” role, because it attempted to discuss and negotiate with its stakeholders (Centile and Pupitre Virtuel). Nevertheless, our study revealed that this role changed throughout the project. This evolution emerged from the evolution of the interactions between the stakeholders and the project. After the fourth controversy, ERI decided to adopt a “solitarian” role by developing a new platform and searching for a new stakeholder outside the network. This was not only a network configuration response at a moment. Instead, it emerged from relations and events that ERI had experienced in the network from the project’s start. From the ANT view, anything that exists emerges from relations with something else (Latour, 2005). If the fourth controversy had emerged early in the network, ERI’s response might have been different.

Hence, our mode of thinking resolves a problem that Jepsen and Eskerod (2009), and Pouloudi and Whitley (1997) underline: the false assumption that a coalition of stakeholders is stable across the course of a project. In particular, Pouloudi and Whitley (1997) revealed that stakeholders might interact and influence each other. By considering relational ontology, we integrated the coalition of stakeholders’ inadequate delimitation, which changes over a project’s duration in so far as different stakeholders may be important at the different process stages, into our stakeholder analysis. We thus share the conclusions by Luoma-aho and Paloviita (2010), who explain that categorisation (such as stakeholders and non-stakeholders) risks have excessively strict boundaries between a subject and an object, and do not adequately describe various networks.

6.2. Implications for practice

The empirical evidence of the study has value in itself, since empirical investigations in the field are still rather scarce, of which a comprehensive review of existing project stakeholder analysis supports (Aaltonen, 2011). The main practical contribution lies in demonstrating the usefulness of our conceptual approach as a useful method for project managers that informs them about what to observe in a stakeholder network in a project and how and when to do so.

- What to observe concerns firstly the associations between actors and non-humans in the project. ANT provides a unique approach to integrate and define previously ignored non-human entities and their influence. We also suggest that stakeholder analysis (divided into 5 stages: relationships, interests, influences, controversies, and effects) is linked to stakeholder engagement where the “process of translation”
(Callon, 1986) (problematisation, interessement, enrolment, and mobilisation) can be used to guide project managers. If the process of translation is successful, a network of aligned interests is formed. Secondly, in order to identify stakeholders and understand their evolution throughout the project, practitioners have to observe not only human but also non-human actors that they produce or put into circulation and their associations or influence during the project. Such observation allows us to deeply understand the nature and evolution of stakeholders during the project. For instance, practitioners have to focus on human stakeholders, such as the users or the project’s partners, as explained in traditional stakeholder analysis, as well as on the technology that they used or developed in the project, the software components, or the partnership contract. In our case study, the role and place of the stakeholder ERI in the network change according to its relation with not only other human’s stakeholders (Centile), but also non-human’s stakeholders (the technology when they discover its open source software; the partnership contract, etc.). This kind of observation is very important because every entity (e.g., project manager, technology, users, software components) is the result of the actions that it can and does form with both human, such as members of the Ministry, and non-human, such as computer systems, contracts, or open source software.

- **How** to observe the stakeholder network with a stakeholder relational ontology implies focusing on the relationships to identify the stakeholders. Here, we observe the intermediaries in the project; that is, what is produced and put into circulation to deeply identify the stakeholders all along the project. Our observation concerns the reworking of the traditional notion of causality, where the future is determined in terms of a linear causality. We suggest that no predetermined, unchanging agents can cause something to happen. The causes and effects emerge through interactions. Consequently, our type of observation of a project network focuses on the ways in which an actor is defined according to his or her relationships. Here, the thoughts, feelings, actions, and even identity of any actor (such as project managers) are the result of the actions that the actor can and does form with other entities, which may be human, such as team members and the French Ministry, or non-human, such as computer systems, contracts, or open source software.

- **When**: at the beginning of the project (morphological analysis) and at each controversy (dynamic analysis of the project). By focusing on controversies, the analysis is dynamic because it is not only a front-end, but also a longitudinal process as recommended by Eskerod and Vaagaasar (2012). Indeed, we propose to follow the controversies throughout the entire project and take into account the effects of each controversy on the network and thus on the stakeholders. As such, we consider the evolution of stakeholders’ roles and natures after each controversy throughout the project. Consequently, the analysis is dynamic in so far as it allows a project to be perceived as an emerging network (associations, relations) that extends and transforms over time. Controversy appears thus to be a relevant marker of the stakeholder network’s transformation and evolution throughout the project. We assume that the project manager does not have to necessarily observe and foresee everything at all times, but s/he should be aware of the relevant markers, such as the associations and controversies.

### 6.3. Limitations and suggestion for further research

All research studies have limitations, and this study is no exception. Firstly, beyond the theoretical and managerial contributions of our work, our study has a methodological limitation regarding the external validity of the mentioned results and, thus, their scope. This study provides a single case study of a failed French education IT project. Accordingly, our proposed approach requires more case studies to confirm the scope of our framework. Although this framework was applied to a second IT project that did succeed, for the sake of brevity, we have chosen to present only one case study. However, at this stage of our research, we cannot claim that our results are broadly applicable. Nevertheless, the initial aim of our work was to provide analytically rather than statistically generalisable results (Yin, 2008), with the aim of enriching the most recent work on stakeholder management in projects. Secondly, project actors did not use our conceptual approach in practice. We proposed this framework based on ANT concepts and used it to read and understand the evolution of stakeholders’ network in the “Pupitre Virtuel” project. Thirdly, the application of ANT to stakeholder theory has limitations. It is important to understand that ANT regards the network as a concept rather than as a thing; it is a tool that helps describe something (Latour, 2005). Thus, the project is a proposed emerging network that extends and transforms over time.

Finally, these limits lead us to emphasise two avenues of research, which seem promising. One perspective would be to extend the qualitative approach to new areas of investigation and other project contexts and thus improve external validity, because we acknowledge that our findings, related to our single case study, have a strong internal validity to the detriment of their external validity. A second promising research perspective could apply our framework in real time and observe how it helps actors manage the project. Ultimately, we hope that our work will contribute to a deeper understanding of stakeholder analysis and engagement in projects. More generally, this research aims to be a step towards improving our understanding of stakeholder management in temporary and project-based organisations.

### Conflict of Interest

The authors have no conflict of interest.
**Appendix A. Matrix of stakeholders’ identification and their relationships**

<table>
<thead>
<tr>
<th>Features</th>
<th>Groups actors</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>The local government (LG)</td>
</tr>
<tr>
<td><strong>Aims in the project</strong></td>
<td>Generalise IT’s use on the national territory and generalise it to ensure a large number of users, have return on investment</td>
</tr>
<tr>
<td><strong>Status in the project</strong></td>
<td>Project manager in the local project</td>
</tr>
<tr>
<td><strong>Activity in the project</strong></td>
<td>Planification and execution of time, cost, and resources</td>
</tr>
<tr>
<td><strong>Intermediaries produced</strong></td>
<td>Funds necessary for IT development</td>
</tr>
<tr>
<td></td>
<td>A person manages local experimentations in the department</td>
</tr>
<tr>
<td><strong>Poles</strong></td>
<td>Financial pole</td>
</tr>
</tbody>
</table>
