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Actor-Network Theory and Inter-Organizational Management Control: A Research Note

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Abstract

This paper offers suggestions to researchers for studying the process of inter-organizational management control systems (MCS) using actor-network theory (ANT). The theory assumes that realities are the result of interactions of multiple actors with different interests. Using this theory, the paper suggests understanding the inter-organizational MCS from two main aspects: firstly, the MCS in the making and secondly, the MCS in action. To take on these, the paper calls for a qualitative research specifically using the case study approach. This approach emphasizes on rich descriptions of the phenomenon intertwined with the context, which is appropriate for a dynamic and meticulous theoretical assumptions such as those of the ANT. Finally, this paper documents ways in which a sound qualitative research can be produced through specific data collection and analysis processes.

Keywords: Actor-network theory, management control system, qualitative research

1. MANAGEMENT CONTROL RESEARCH

The management accounting literature recognizes management control as the systematic activities undertaken by managers to ensure that use of organizational resources and employees' behavior accorded with organizational objectives (e.g. Das & Teng, 1998; Langfield-Smith, 1997; Otley, 2001). Due to the growing need for management control system (MCS) with effective designs and uses, considerable research has been conducted to discover optimal designs and conditions and reported organizations' experiences of dealing with these systems. These include control systems to manage relationships and activities between collaborating organizations as well as the control system within an organization. Within inter-organizational relationship studies, many tend to examine inter-organizational relationship using transaction cost economic theory and agency theory. Agency theory typically gives attention to the incentive problem and information asymmetry issue occurring in an inter-organizational setting. Transaction cost economic theory maintains that three discrete structural mechanisms (market, hierarchy and clan) govern a transaction. In this regard, Dekker (2004) argued that treating any inter-organizational relationship as 'a generic intermediate mode between market and hierarchy' (p. 29) is unseemly, as it in fact comprised of heterogeneous phenomena. Instead, it is also important to consider social factors and political motives by which studies could be built using social theories such as institutional theory and actor-network theory (ANT).

This paper's particular interest is of ANT. This emerged from realizing that people that has the capacity acting and interacting with each other to prompt, enable, shape and impede a change process. It is a taken-for-granted assumption in everyday life in which ANT seeks to embrace this. In addition to that, the uniqueness of the ANT lies in the other assumption that each party or actor—human and non-human has its own interests. A general contention in management accounting change research is that the process and result of actors' interactions to align different interests would trigger, develop and shape the change within an organization. This has been used in a number of studies on management accounting change (e.g. Chua, 1995; Chua & Mahama, 2007; Dambrin & Robson, 2011; Miller, 1991; Preston, Cooper, & Coombs, 1992; Robson, 1991, 1992; Skærbæk, 2009). In this vein, the current paper focuses on the effects of inter-organizational management control systems to an organization; it seeks to explain how the ANT can be used in studying this phenomenon. This paper starts with a brief explanation on the important components of the theory, followed by the application of the theory in previous

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research. Subsequently, the paper discusses on the research method appropriate for studying the phenomenon using the ANT.

2. ACTOR–NETWORK THEORY

ANT was first developed by Micheal Callon, Bruno Latour and John Law to understand how science and technology is created. Its basic assumption is that any entity is the result of the assemblies and interactions of heterogeneous actors and their networks. It does not infer any consequence or antecedent; instead claims that actors have their own interests and agendas. ANT's distinctiveness is shaped by the symmetrical attention it gives to human and non-human entities, suggesting the analytical view that the explicit roles of intermediary objects and inscriptions are brought to the fore (Hassard, Law, & Lee, 1999). This paper highlights on the theoretical constructs of Latour's (1987, 2005) sociology of translation, namely the actor–network, translation process and inscriptions.

Actors in ANT consist of humans and non-humans actors; there is no difference between people and objects (Law, 1992). The term 'actors' is defined as entities that are able to associate texts, humans, non-humans and money (Callon, 1991). As the theory emphasizes the notion of symmetry, McLean and Hassard (2004) explained that, in order to understand complex social situations, human, non-human, social and technical elements shall not be separated in analysis. The theory's central idea is that human and non-human actors are enrolled in a network that aims to achieve particular goals through a process of translating interests (Hassard et al., 1999; McLean & Hassard, 2004). Within this process, the actors, the networks in which they participate and the ideas they advocate are continually translated in order to achieve network stability. When the stability of the network is reached, and when the actors can be represented as a united, single actor, the network is referred to as an actor–network (Hassard, Law & Lee, 1999; McLean & Hassard, 2004). ANT advocates that all phenomena are the effects or products of heterogeneous networks (Law, 1992). This concept can be applied in diverse areas to investigate how facts or objects are held together by a diverse set of elements.

Translation is the process by which an actor enrolls others (Callon et al., 1986) by assembling and aligning the multiple actors' interests in constructing a network (Callon, 1986; Callon et al., 1986; Latour, 1987, 2005; Law, 1986). In the process, knowledge claims are continuously transformed and resources are mobilized as the central actors translate other actors' interests to accept their claims and proposed solutions (Callon et al., 1986; Latour, 1987, 2005). Alongside this, as the entities within a network that includes human and non-human actors are removed or added to that network, its characteristic and structure, and the actors themselves, are changed or translated (Callon, 1986; Skærbæk, 2009; Vikkelsø, 2007). However, the network formed is subject to dismantling; it is inherently unstable because the entities within it 'can move people and materials around' (Mouritsen & Thrane, 2006, p. 247). As a result, with the continual translation of interests, managing relationships is always 'in the making' (Latour, 1987) in order to produce and secure the alliances needed to support one objective and not others.

To achieve network stability, claims must be widely accepted and taken for granted (Townley, 2007) to be considered black boxes[1] (Latour, 1987, 2005). Emsley (2008) noted that, when a black box is reached, actors move towards convergence and management accounting practices becomes 'factual' and 'uncontestable'; there is a point where 'actors have no need, or wish, to resolve the issues any further and their reality is as close to what they believe is the "truth" as necessary for their various interests' (p. 380). There are varying degrees of the black box remaining closed, since existing actors can disengage from a network while new actors with different interests can enroll (Emsley, 2008). Therefore, from the ANT perspective, the concern is what makes a network stable, albeit temporarily (Alcouffe, Berland, & Levant, 2008; Mouritsen & Thrane, 2006).

To explore the process of constructing a network, Callon (1986) proposed four moments of translation that unfold during the simultaneous production of knowledge and construction of a network of relationships. Problematization is when a focal actor determines a set of other actors, defines their identities and interests and establishes an obligatory passage point to render them indispensable in a network. An obligatory passage point is achieved when all actors are convinced by the focal actor that the alliance can satisfy their interests. The second phase is interessement, which involves the processes sought by the focal actor to lock the other actors into the roles proposed for them. The success of the interessement leads the actors into alliance, where they are enrolled into a

[1] The term 'black box' indicates that when an object is successful, the focus is only on input and output and not internal process (Latour, 1999). Paradoxically, as argued by Latour (1999), 'the more science and technology succeed, the more opaque and obscure they become' (p. 304).

network. Enrolment is a set of strategies by which a set of interrelated roles is defined and attributed to the actors and by which they accept those roles. This is achieved through multilateral negotiations and fabrications during the interessement phase. Finally, the mobilization process refers to how the focal actor ensures that spokespeople adequately represent the propositions and their representation is stable.

A translation process requires intermediaries that describe a network in material form (Callon, 1991). In the process, an intermediary is either produced by a ready-made entity that was created by the translator offering an identity and role to actors, or by the process of inscribing an object to be an inscription. Inscriptions are used to define roles and describe the inter-relationships of entities in networks, generally in the form of texts, discussions, graph, presentation, technical objects and other elements (Callon, 1991; Latour, 1999). Emsley (2008) stated that inscriptions enable actors to engage with each other and allow disagreements to be stabilized as the inscriptions continuously construct, localize and reify the translation process. Latour (1999) suggested that inscriptions allow new translations and articulations while keeping some types of relations intact.

The essential quality of inscriptions is that they enable a point 'at the centre' to influence 'action at a distance on many other points' (Latour, 1987, p. 222). To be able to act at a distance, Latour (1987) posited that the inscriptions, or immutable devices, possess three characteristics: mobility, stability and combinability. These characteristics enable the inscriptions to be brought back to the central point for analysis. An example of inscription is accounting information, which represents and translates organizational aspects, is part of the outcome of measuring, categorizing and inscribing activities, objects or events into financial information (Cuganesan & Lee, 2006; Dambrin & Robson, 2011; Robson, 1991, 1992). Despite the fact that accounting information is also the result of the process of translating different interests and technologies, its credibility for representing reality could be questioned, but its power is in rendering organizational aspect visible thereby creating distance and control (Cuganesan & Lee, 2006; Quattrone & Hopper, 2005; Robson, 1991, 1992). For instance, Chua (1995) found that inscriptions enabled comparative and normalizing judgment, enabling people remote from organizational activities to have an overview of relevant situations and compare them to others in order to exercise better management. Other studies that document the various ways in which accounting acts as inscriptions are common in management accounting literature and are described in the following sections.

2.1 The positions of management control systems within the actor–network theory perspective

A theory is when a particular perspective is used as a lens to view a reality whereby the theory composed of a set of explanatory concepts (Ahrens & Chapman, 2006) for understanding events and actions and organizational processes and structures. Along this, researchers' observations find meanings and significances expressed by theoretical concepts (Llewellyn, 2003) whereas the research outputs are identified in regards to the literature to which the research is relevant (Keating, 1995). ANT explains management control in two ways, consistent with Alcouffe et al.'s (2008) suggestions regarding streams of management accounting studies that use the theory. Firstly, management controls are explored as 'accounting in the making' and secondly as 'accounting in action'.[2] The following subsections discuss the assumptions underlying these strands of research.

2.1.1 Accounting in the making

Research on 'accounting in the making' explores the processes of accounting practices being produced, modified and accepted. In these studies, the translation processes were intended to bring others to accept as fact accounting systems and their solutions in order to achieve a black box (Bloomfield, Coombs, Cooper, & Rea, 1992; Preston et al., 1992). The aim of the translation processes is for the facts and accounting practices to be accepted by users and providers without modifications.

Law (1992) suggested that 'if we want to understand the mechanics of organization it is important not to start out *assuming* whatever we wish to explain' (p. 380). Similarly, as posited by Cuganesan and Lee (2006), an accounting technology is not the result of something that is an inherent property or a predefined consequence of some antecedent condition. As Emsley (2008) put it, an innovation 'is not something that can be simply "taken off the shelf" and inserted into an organization like a piece of software into a computer' (p. 378). Through the processes of translation, initial innovation ideas involving pre-existing accounting techniques are continually reshaped as actors strive to enable their operation within an organization (Arnaboldi & Azzone, 2010; Emsley,

[2] The two general approaches to approaching management accounting practices using ANT are consistent with Latour's (1987) first Rules of Method, which state that 'we study science in action and not ready made science or technology; to do so, we either arrive before the facts and machines are black-boxed or we follow the controversies that reopen them' (p. 258).

2008; Latour, 1987, 2005). The reiterative translation processes entail accounting techniques and their associated roles being articulated discursively as actors translate their interests to an organization's reality and innovation (Robson, 1992).

Emsley (2008) stipulated that understanding actors' diverse interests is important because they affect the translation processes and different ways in which a change process is perceived as successful. To explain, as Emsley (2008) found, even in the same company, two manufacturing plants ended up adopting different applications of Juran's cost quality model, despite the intention to replicate the model from one plant to another. Emsley (2008) documented the difference as due to the diverse interests of the actors who translated the model, which could not be explained by contingency theory—this would posit that some variables of the two plants or situations could be similar. Translating management accounting process can also be viewed as a process in which actors' recurring struggles stabilize the disturbance and disinterested parties to overcome controversy and resistance through persuasion, network enrolment and mobilization of resources (Cuganesan & Lee, 2006; Latour, 1987; Law, 1992). Preston et al. (1992) recognized that, 'resistance not only impedes and constrains the process, but also shapes it in specific ways designed to overcome the scepticism' (p. 589). For example, Arnaboldi and Azzone (2010) documented how controversies evoked problems and solutions that resulted in a better performance management system.

Overall, ANT argues that MCSs are the results of an alliance between the heterogeneous elements of the actor–network and its construction process. Actors' diverse interests, roles and interactions and the controversies that emerge determine how practices are translated. These arguments form the basis of understanding management accounting practices in using the ANT perspective. The next section discusses the literature on accounting in action that is largely centered on accounting's roles in society.

2.1.2 Accounting in action

The second strand of management accounting research uses ANT studies 'accounting in action' through the roles played by accounting practices within organizations and in society once they are black-boxed. In this type of research, accounting information is regarded as an inscription that 'act at a distance' (e.g. Chua & Mahama, 2007; Cuganesan & Lee, 2006; Quattrone & Hopper, 2005; Robson, 1991, 1992). Accounting has been documented to act at a distance in different ways. This is because, as argued by Vikkelsø (2007), when a technology designed for a specific function enters a network, its capability and the function is determined by that network. In this vein, Mouritsen and Thrane (2006) explained that the entities in a network 'can be accorded a role in making practice possible' (p. 247), such as the role of accounting and MCSs to stabilize network behavior. This is consistent with several other studies suggesting that accounting inscriptions in the form of performance metrics influence organizational change (e.g. Chua, 1995; Quattrone & Hopper, 2001; Robson, 1991). Specifically, Quattrone and Hopper (2001) contended that as accounting provided 'pre-scriptions' from centers of calculations, it entailed a process of creating knowledge that formed part of actors' broader attempts to construct an organization. In their case, the incompleteness of accounting triggered accounting knowledge to be interpreted differently, which subsequently drove organizational change.

As mentioned previously, management accounting practices, their nature, goals and uses are continuously negotiated and translated, concurrent with the translation of actors and their interests. Several studies on the context of inter-organizational relationships have revealed the various roles played by accounting practices regarding the formation and management of organizational boundaries and the assorted factors that shape the roles. Mouritsen (1999) documented that, in a company that attempted to blur organizational boundaries, management control practices from a distance drew together and organized the internal and external flows. Mouritsen and Thrane (2006) also showed that management control technologies were responsible for creating network boundaries as they found that MCSs inscribed and made visible the relationship between organizational partners, thus enabling the relationship's problematization and transformation.

Overall, the primary role of a MCS within ANT is as an inscription by which it inscribes and makes visible organizational activities to enable action at a distance. The nature, goals and uses of accounting are continuously negotiated and translated as they serve actors' diverse interests. In managing an inter-organizational relationship, accounting makes that relationship visible and controllable; it could be a response to controversies and a result of a process to align the interests of actors and of an individual organization.

2.2 Approaching ANT

The paper focuses on conceptualizing ANT to understand management control in action. To this end, we focuses on objects of study of management control systems within inter-organizational partnership or a network and the function of management control within the participating organization. We choose to signify these objects as particular theoretical components: the operation of control mechanisms as inscriptions to identify how control take its form. Specifically, the tenets of ANT give rise to theoretical questions which are: 1) What constitutes the control network? 2) How are controls pursued in the network? 3) Under conditions where controls are in place, how could controversies be created? 4) How are network controls internalized in an organization?

To apply the theory, apart from individual actors, studies can also considers organizations—such as the case organization and partnering organizations—as actors. This approach is consistent with Skærbæk's (2009), which regarded a parliament department and ministries as actors. While the theory suggests that researchers 'follow the actors' (Latour, 1987) to understand a phenomenon, doing so is impractical (Latour, 2005). The number of actors and study duration must be limited for the research project to be affordable and manageable (Latour, 2005; McLean & Hassard, 2004). Similarly, we may only focuses on its relationships with those involved with the case organization from the point of its formation or that have a large stake in the case organization and significantly influence its activities.

The primary justification for using the theory is its emphasis on non-human actors in analysis. Another justification is the consideration of intangible elements that largely comprise theoretical assumptions such as interests. Appreciating interests in this study are important given actors' varying actions that influence the phenomenon. Regardless of these justifications, the theory has been criticized for ignoring ordering and classification (McLean & Hassard, 2004). Specifically, as argued by McLean and Hassard (2004), the theory lacks 'an attempt to produce some kind of shape, a pattern, which in one way or another can be discerned and performed' (p. 513). McLean and Hassard (2004) suggest that we need to know the importance or success of particular elements that describe reality more than we need to discover the actions, relations and outcomes of organizations supporting or interfering with one another.

3. DESIGNING A METHOD FOR USING THE ACTOR-NETWORK THEORY

As outlined in the previous section, ANT offers a perspective for understanding how and why MCMs are developed and used in a network of organizations. In answering research questions, researchers must have an in-depth understanding of the issues that require contextual insight into management and organizational processes in their natural setting. This is attainable through qualitative research that accentuates interpretations of people's meanings (Denzin & Lincoln, 1994; Miles & Huberman, 1994; Patton, 2002). In establishing that qualitative research is appropriates for this purpose, there is a need to describe how individuals view the world by identifying the relevant spectrum(s) of the research paradigm that guide the research design and data collection efforts.

3.1 The research paradigm, qualitative tradition and interpretive inquiry

Morgan and Smircich (1980) indicated that social science researchers should recognize their beliefs about humans and their world (ontology/reality) to determine the appropriate nature of knowledge (epistemology), methodology and research techniques. Malmi (2010) suggested that recognizing and understanding research paradigms is important to provide focus, devise efforts and assist the research community in compiling knowledge about issues of interest. On this note, our ontological view is that the reality is socially constructed. The epistemological requirement of this perspective is analyzing the specific processes, systems and changes through which reality is created (Morgan & Smircich, 1980). Studies with this stance seek to comprehend reality by understanding the methods that people use in everyday life to make sense of their situations (Morgan & Smircich, 1980; Patton, 2002; Tomkins & Groves, 1983). The paradigm focuses on the routines and details of everyday life by capturing the norms, understandings and assumptions that people take for granted (Patton, 2002).

From this perspective, accounting is viewed as a socially constructed phenomenon; it is seen to participate in actors' social construction of realities (Parker, 2012). Understanding reality as socially constructed supports the use of qualitative techniques, which enable researchers to investigate 'from within the subject of study' (Morgan & Smircich, 1980, p. 498) to understand the process of social change. It is a naturalistic/interpretive method of enquiry (Chua, 1986; Hopper & Powell, 1985; Tomkins & Groves, 1983) that requires an understanding of phenomena and human behavior in their natural setting. Therefore, this approach could better elucidate

practitioners' views of the world and develop theories about accounting in action and in this case on the effect of network's management control to an organization.

Parker (2012) argued that the reality is created by the interaction of organizational actors with one another and in their contextual environment. Qualitative research adopts a holistic view and relies on rich descriptions of reality, where phenomena and situations need to be understood as a whole (Denzin & Lincoln, 1994; Patton, 1980). A phenomenon is considered a naturally occurring event, program, relationship or interaction that a researcher does not attempt to manipulate; it has a predetermined course (Patton, 1980). Therefore, researchers' main task is to explain how people come to understand, account for, take action and manage their day-to-day situations (Miles & Huberman, 1994). Regarding management accounting research, Parker (2012) contended that the qualitative tradition allows for exploration of the intricacies of the implementation, structures and outcomes of management accounting together with organizational processes and their interplay with their surroundings. Van der Meer-Kooistra and Vosselman (2006) suggest that the focus of qualitative studies is on understanding how the structures and practices of management accounting and controls interact with, reflect, create, and the effects of events and changes within specific organizations or organizational relationships. These reciprocal relationships between accounting and society should be understood 'from inside' organizations (Chua, 1986; Parker, 2012). Therefore, adopting qualitative research enables us to understand the interplays and meanings of how MCMs are designed and operate within their context and how the relevant phenomenon and context influence one another. In doing so, the data must derived from multiple sources in the form of quotations obtained from interviews, observation data and documents collected using a case study approach.

3.2 Case study as a research strategy

When commencing the data collection process, from the outset, the aim of the study is to answer the 'how' and 'why' questions regarding the development and operation of MCMs in an organization. Such questions, as argued by Yin (2003), deal with operational links that must be traced over time. This means that researchers encounter diverse constructs that need to be connected to develop a narrative that yields answers to the research questions (Yin, 2003). Case study is a viable approach for this, given its ability to provide rich descriptions of the phenomenon studied. Yin (2003) described a case study as 'an empirical enquiry that investigates a contemporary phenomenon within its real-life context especially when the boundaries between phenomenon and context are not clearly evident' (p. 13).

If quantitative methods such as surveys are used to examine the relationship between the aforementioned elements, they might only provide the direction and average strength of these elements' cause and effect (Yin, 2003). Using a case study, the intricate aspects of actors' relationships can be analyzed in greater details and offers rich explanations. The phenomenon of management control can be described on different aspects including their development, design and operation in the inter-organizational relationship and in within an organization and intertwining these descriptions with the contextual information. This approach appreciates organizational and network contexts that encompass the phenomenon of MCMs' development and use. It involves considering historical and contemporary events surrounding accounting systems practice to focus on the rationales and processes of implementing and using MCMs. It also focuses on the technical properties of how inter-organizational management control systems can transform an organization.

Nonetheless the above, a common perception of case study limitations involves the generalizability of the findings and replicability of the case research (Keating, 1995; Yin, 2003). As a case study involves a single setting, which is unique in terms of factors such as operations, culture and structure, the concern is whether the findings are applicable to the other settings. Conversely, Yin (2003) explained that a case study is not intended to represent samples and to enumerate frequencies (or statistical generalizations). Instead, it is used to expand and generalize existing and emerging theories (analytic generalizations) by offering common explanations of events or identifying multiple events that possess similar theoretical features (Eisenhardt, 1989; Parker, 2012; Yin, 2003).

3.3 Reliability and validity issues

In empirical studies, issues of reliability and validity are readers' and researchers' main concern. Reliability in field study is concern with preserving the data integrity and the logic of conclusions (Atkinson & Shaffir, 1998). This is primarily through maintaining audit trails where all evidence, procedures and the process during which the decisions or ideas emerge should be comprehensively documented. The test of validity in field studies is concerned with whether researchers are investigating the phenomena that are purported to be studied (McKinnon, 1988). There are three types of validity: construct validity, internal validity and external validity. External validity reflects

more quantitative techniques, whereby the data collection procedures and use of statistical analysis are the conditions of representativeness. Whereas, internal validity in field studies is more concerned with how the researchers make inferences when events cannot be observed (Yin, 2003). As inferences are made based on earlier occurrences, interviews and documentary evidence, this approach raises questions of how correct these inferences are and whether they are drawn from converging evidence while all trivial explanations and possibilities have been considered (Yin, 2003). These questions can be addressed mostly in the data analysis phase as will be discussed in the next section.

For construct validity, Lillis (2006) argued that a case study data collection process that derives from multiple sources has inherently addressed this issue. However, in securing the construct validity, Yin (2003) suggested that researchers need to establish a chain of evidence by maintaining and linking any evidence to the report, starting with research questions, to the case study conclusions. Following this, a research need to cross-reference interview data with internal organizational documents and archival records. Further, the constructs, their definitions and the decision rules need to be developed using the theoretical framework, whereby the results of applying the theories to the data are compared with previous published studies to ensure the researcher's logical reasoning. In addition, Yin (2003) advised that the draft case study report be reviewed by key informants such as peers and participants.

To better reflect the nature of interpretive research, which focuses on rich descriptions of people's meanings, notions of 'authenticity and plausibility' (Lukka & Modell, 2010; Parker, 2012) more recently been offered to assess the credibility and rigor of the research. Parker (2012) argued that the credibility of qualitative research lies in the research questions being addressed, the types of data collection and the research methods used; the accounts should be appropriately and convincingly authentic and plausible. Authenticity is achieved through richness of description that indicates to readers that researchers have been in the field (Lukka & Modell, 2010; Parker, 2012). Plausibility is achieved when the findings and arguments make logical sense to readers through accounts of alternative explanations for the observed phenomenon (Lukka & Modell, 2010; Parker, 2012). To pursue both authenticity and plausibility, in discussing how the theories are reflected in the data, the merits of other theories and findings from prior literature are considered to explain a study's empirical findings. In addition, the research findings narrative need to indicate that the researcher's interpretations have been drawn from multiple evidence sources.

3.4 Data collection process

Normally a research site for case study research would be able to provide fertile ground for exploring many management accounting issues in practice. Understanding the organization's complexities, its relationship with its partnering organization and how these are translated into managing and controlling network operations was expected to be an intriguing subject for exploration. But most importantly is an access opportunity offered by an organization to ensure the sustainability of our research.

The data collection process can be done in two stages: the pilot study and the intensive study. The purpose of the initial stage was to collect background information about the research site, refine issues to be investigated, identify people to be interviewed in the second stage and refine the interview questions developed from the theories used. Ahrens and Dent (1998) stated that during the initial stage, apart from negotiating further access, researchers should be opened to broader issues outside the original research agenda. For example, organizational members' concerns raised during initial interviews might need to be pursued, since they could indicate accounting issues that could, in turn, cause researchers to formulate credible proposals for the intensive study (Ahrens & Dent, 1998). The second stage involves intensive data collection through interviews with employees on selected issues and reviews of internal management documents and archival records.

Interviews can be used as the main data source of data for understanding the ANT and management accounting change phenomenon due to their effective means of understanding organizational processes (Patton, 2002). We formulate the questions in advance with the appropriate wording and prompts about experiences and behaviors, opinions and values, knowledge and background/demographics on the topic generated from the theoretical framework, such as the interactions of actors and objects around MCMs. Open-ended questions allow interviewees to talk freely about their perceptions, experiences and beliefs regarding the management control aspects of implementation, application and other related issues. Semi-structured questions allow the researchers to take into account interviewees' different experiences and knowledge of management issues. The interviews must involve people from various divisions and management levels. While asking the interview questions, we make direct observations about interviewees' behavior, such as their physical gestures and tone, and recorded the information in field notes. Ask to view certain organizational materials related to MCS to assist our comprehension of the

subject discussed to have a clearer picture of the actual processes and use of technologies within these processes. Document and archival records can provide knowledge of the history and context of a case. Examples of documents are memos, minutes of meetings, administrative documents, formal studies or evaluations of the case and articles in mass media, while archival records include organizational charts or budgets and survey data. Yin (2003) suggested that documents are important for corroborating and augmenting evidence from other sources by verifying and providing details for specific information. The documents and archival can be collected during the field study, supplied by the interviewees and obtained from library and internet searches.

3.5 Qualitative data analysis

The process of data analysis in qualitative research involves interpreting text against the research questions and theoretical frameworks (Miles & Huberman, 1994). One of the challenges of qualitative analysis lies in making sense of large amounts of data. The process entails reducing the raw data and identifying significances, patterns and essence of what the data conveys (Patton, 2002). As asserted by Patton (2002), there is no formula, rule or straightforward test in determining the significances, in devising the analytical thought process and in establishing reliability and validity. Instead, Patton (2002) pronounced that the best approach is to 'do your very best with your full intellect to fairly represent the data and communicate what the data reveal given the purpose of the study' (p. 433). The current paper relies on Dey (1993) and Patton (2002) to guide the data analysis, as is explained in the following subsection.

Codes are used to represent the researchers' meaning of the data. The codes can be derived from the practical descriptions of control practices and from the theoretical elements. To exemplify the process, in understanding the development and operation of MCMs, the nodes for descriptive purposes included information on different types of control practices and their development, use and consequences. The nodes derived from theoretical elements ranging from the interests of different actors, alignment of interests, various alliances and inscriptions to the boundary objects. Apart from those nodes, nodes on the organization's contextual information are important including its history, business operations, internal environment and external institutional environment.

The initial analysis process involves reading the data to determine the applicable existing nodes. During this process, new nodes can be created where necessary. This stage involves the researcher's crude understanding and interpretation of the data. Impressions, intuitions and explanations regarding certain moves can be recorded using the memo and annotation functions and linked to specific parts of the data when necessary. The subsequent step involves rereading the data under every node. The interpretation at this stage is more insightful, as the researchers have gained more knowledge, in a general sense, of the data. Further, the nodes incorporated data from multiple sources, which enabled cross-referencing to ascertain the validity and reliability of certain points. Data reflection was made in relation to the similarities, differences and interdependence between points (Dey, 1993). The preconceptions gained from this led to the data being recoded, highlighted, re-arranged and deleted. Again, annotations and memos were applied to certain information to record the researcher's thoughts and reflections on the data.

Reporting the results involved clarifying and corroborating the disparate elements found in the data analysis into a coherent whole (Dey, 1993). Producing accounts of the analysis is another analytical process, in which the explanation the researcher sought to offer involved their deliberation on the form and significance of the concepts or relationships determined earlier (Dey, 1993). The researcher also need to consider other possible explanations for the emerging findings, including specific conceptualizations found in the literature, such as those on accountability, public management and strategic management as well as other existing theories such as contingency theory, institutional theory and stakeholder theory. The purpose of this procedure was to demonstrate the plausibility of the theories used by the researcher to describe the findings (Lukka & Modell, 2010; Parker, 2012). The process of reading and classifying the data to produce an account is non-linear and reiterative. The phases are recurrent and the whole process is akin to the successive cycles, as the researchers comprehend more evidence and concepts and connections become clearer (Dey, 1993). The outcome of this process is reported in a narrative form.

4. CONCLUSION

This paper outlines the strategies for studying MCSs in a network of organizations. The study demonstrates that the dynamics of inter-organizational relationships and MCSs can be explained using ANT. Prevalent theories used by other studies to describe management control practices within inter-organizational relationships, such as transaction cost economics, agency theory and contingency theory, normally focus on two-way relationships to

examine the selected predetermined variables. In the current study, the dynamics of these variables can be captured by considering histories and contexts, locating other interdependent actors that co-produce the relationship and identifying important instruments and objects. The ANT's contention regarding actors' diverse interests could unveils various other motives such as those of legitimacy, efficiency or accountability. To undertake this, from the outset, the current study views MCMs as socially constructed phenomenon. This requires interpretations of people's meanings ascribed to organizational processes that can be obtained using qualitative research. This paper argues for using the case study approach due to its ability to provide rich descriptions of the phenomenon under investigation within their contextual setting that are derived from multiple data collection techniques.

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