

## **Latour's contribution to the accounting literature through Actor-Network Theory: A critical appraisal**

For nearly a quarter century, Bruno Latour has been a vanguard figure in the eclectic field of "science studies." Indeed, his writings chart the course of this newly emergent discipline. "Science studies" describes research that uses the methods of the social and human sciences (sociology, anthropology, philosophy) to understand how humans go about their scientific and technological pursuits. At the base of this research are questions about how scientific knowledge is created. ... Latour's boundary-defying work has predictably provoked controversy, and he has become a favourite target of critics who seek to maintain borders between the disciplines (Lowood & Sussman, 2003, p. 1).

This paper examines the influence of Bruno Latour on accounting research through his work as a founding father of so-called actor-network theory (hereafter referred to as "ANT") which was originally developed in the mid to late 1970's as a means to understand the social construction of science<sup>1</sup>. Essentially, ANT is an analytical framework used to study the roles of humans and non-humans in the structuring of society (Latour, 2005). It is through a series of complex interactions between humans and non-humans and the ways in which they interlock within networks of construction and reconstruction which allow the production of accepted facts or knowledge (McNamara, Baxter & Chua, 2004, p. 57). As Latour (2005) himself stated:

What I want to do is to redefine the notion of social by going back to its original meaning and making it able to trace connections again. Then it will be possible to resume the traditional goal of the social science but with tools better adjusted to the task (Latour, 2005, p. 1).

ANT has since been influential in a wide range of disciplines<sup>2</sup> from economics (see, for example, Bledin & Shewmake, 2004) to geography (see, for example, Rutherford & Holmes, 2008) with a number of accounting researchers having used it as a lens to explain accounting in a social context (see, for example, Robson, 1991; Chua, 1995; Lowe, 2001a; b; c). A brief biography of Latour, an overview of what ANT is and the development of ANT have been provided in Appendix One.

The purpose of this paper is to provide a critical appraisal of the application of ANT in the accounting literature. Through this analysis we seek to highlight the insights provided by the work of Latour and draw attention to his significant influence on the accounting literature.

This paper contributes to the literature in four ways. First, it identifies accounting articles that use ANT as their theoretical foundation and conducts a critical appraisal of the literature through a discussion of the contribution and limitations of these articles. Second, to highlight the impact of these articles on the research community, a citational analysis is used; a method recommended by McRae (1974) and Brown (1996) and others. Third, the paper contributes by analysing the application of ANT in accounting research through the five critical notes on ANT as identified by McLean and Hassard (2004). Finally, using the insights provided by the critical analysis, guidance is provided about issues to consider for future accounting studies based on ANT.

This paper is structured as follows. The following section describes the method that was used to identify the major works in the accounting literature that are conceptually grounded on ANT and to gauge their respective impacts through citational analysis. Having identified the influential articles, the paper then analyses their major contributions and limitations. The next section provides a critique of the accounting research to date informed by the framework put forward by McLean and Hassard (2004) and Latour (2005). In doing so, it is hoped that this will provide clarity on a range of issues/concerns with the application thus far of ANT in accounting research. The final part of the paper seeks to inform future researchers by drawing on some lessons identified from the issues/concerns identified in the previous section.

### **Method for Selection of ANT Literature**

Data, in the form of journal articles, were sourced via a comprehensive literature review. The articles were selected on the basis of those which used ANT as the theoretical underpinning for their investigation. For the purpose of scope, only those articles that

addressed problems within an accounting context were examined. The result of this investigation revealed there are a total of 27 articles in the accounting literature utilising ANT that we use to develop our discussion (see Table 1 for details). A two step approach was employed to locate relevant *ABI/Inform Global (Proquest)* database using the key words “actor network theory” and “accounting” under scholarly journals. This process yielded some 21 articles. Second, the reference list of these articles were subsequently examined to identify any others that did not show up in stage one. An additional 6 articles were found through the latter approach.

INSERT TABLE 1 ABOUT HERE

As a measure of impact we subsequently traced them through a citational analysis. The citational analysis were undertaken through ‘Google Scholar’<sup>3</sup> and the ‘Social Science Research Index (SSRI)’ and are reported in the first two columns of Table 1. These columns in the table are followed by the author(s) name along with year of publication and Journal. The final column indicates whether the article was used in our discussion. The basis of this decision was essentially citation numbers, the use of ANT as the primary theoretical foundation for empirical case analysis and the practicalities of not being able to critique every published paper. Examination of the table shows that of the 27 articles sourced, 13 formed the basis of our examination. An explanation of those not included is shown in the notes accompanying the table.

The method adopted in this study is similar to that articulated by McRae’s (1974) and Brown’s (1996) citational analysis of influential accounting articles. In doing so we acknowledge that no method is perfect and as such is subject to certain limitations. For example, numbers of citations are somewhat misleading as self citations and negative citations all contribute to the total citations, also citation counts tend to favour older articles. Also ‘halo effects’ will generate additional citations as a result of hot topics linked to well known authors. Finally while we attempted to make our search as comprehensive as possible, we may not have uncovered all of the influential studies in accounting that use ANT as their theoretical foundation. As an example, some studies

may have been published in languages other than English and our search procedures failed to locate these studies. Given that Latour is French this is a real possibility. Moreover, the *ABI/Inform Global (Proquest)* database does not cover all accounting journals. These limitations should be taken into account when analysing the findings reported in this study (Brown, 1996).

It can be observed from our analysis that ANT was first introduced to the accounting literature in 1991 by Robson in *Accounting Organisations and Society (AOS)*, closely followed by Miller (1991). In addition to AOS, most of the articles have been published in a small number of quality journals including *Management Accounting Research (MAR)*, *Contemporary Accounting Research (CAR)* and the *Accounting Auditing & Accountability Journal (AAAJ)*. While the notion of 'quality' is debatable and open to interpretation (see, Hopwood, 2007), all of these journals have an SSRI designation which is an implied measure of quality. The next section will explore the influence of Latour's work on the accounting literature.

### **Latour and Accounting Research**

The results of our investigation show a willingness on behalf of accounting researchers to use Latour's ANT in their investigations. ANT has been highly influential in studies of the discursive processes of accounting change across the past 20 years. Indeed, ANT has been applied to a variety of accounting issues and settings. The most common application is to the study of changes in management accounting practices such as the introduction of new costing systems within public sector organizations, especially, hospitals (see, for example, Preston, Cooper & Coombs, 1992; Chua, 1995; Lowe, 2001a; b; c). These studies have used as their case setting a specific organisation (or section of an organisation). However, this theory<sup>4</sup> has also been applied to wider controversies in the accounting world that transcend a specific institutional setting. For example, analysis of the study of the genesis of accounting standard setting in the UK (Robson, 1991), the dominance of quantification in accounting (Robson, 1992), the embedding of activity-based costing in practice (Jones and Dugdale, 2002) and the development of intellectual capital statements (Mouritsen, Larsen & Bukh, 2001) to name just a few.

In essence, it would seem that ANT is suitable as a theoretical framework within the accounting area where a group of actors, human and non-human, are seeking to collectively establish a “truth” which is yet to be widely accepted through the exploitation of accounting as a tool. ANT provides a framework for studying and understanding the fabrication of a specific phenomenon through a process of “debate, dialogue and struggle” (Mouritsen et al., 2001, p. 736). As noted by Lowe (2001b), “It is only after all these resources: the computer software; the accountants; the IT people; the computers, have been successfully brought to bear that controversies are settled and black boxes are produced” (p. 330).

This paper will now examine what insights have been provided by ANT within accounting studies to date. We will not refer to every study in the accounting literature utilising this theoretical framework but will focus our attention on the 13 studies highlighted in Table 1. We will demarcate the 13 studies into two sections. First, we will consider those studies that have applied ANT to controversies/phenomena in the accounting world that transcend a specific institutional setting. Second, we will evaluate those studies that focus on a specific organisational setting (or section of an organisation). The basis of this separation is that ANT has been criticised (see McLean & Hassard, 2004) for emphasising the micro over the macro. Yet, a reading of the accounting literature suggests that a number of researchers have employed ANT to study accounting phenomena across both specific organisations and broad institutional settings.

#### *Studies that Transcend a Specific Institutional Setting*

Robson (1991) examined the origins of accounting standard setting in the UK including the formation of the Accounting Standards Steering Committee. His work appears to be the first published study in accounting to specifically apply ANT. This paper made a major contribution by introducing the accounting literature to Latour’s work and by explaining how the concepts of translation and problemization could be applied to the discursive processes of accounting change. In examining accounting change, he contended that it is necessary to study how specific accounting statements, calculations

and techniques can be translated into broader “social, economic and political discourses not normally associated with the apparently neutral, technical discourse and practices of accounting” (p. 566). Robson (1991) also demonstrated how translation and problemization can be harnessed by actors to maintain the accounting profession’s relative autonomy from external regulation. A limitation of his study was that it comprised a post hoc analysis of the events being studied and so was not in the tradition of the ethnographic approach utilised in many of the well-known ANT studies such as Latour and Woolgar (1986). Moreover, in the author’s own words it served to introduce “concepts and ideas from writers within the sociology of science” (p. 550) and so did “not attempt to provide a comprehensive application of this body of research to accounting” (p. 550).

Shortly after Robson (1991), Miller (1991) employed ANT to investigate the rise of adoption of discounted cashflow techniques as a tool for making investment decisions in the 1960s. The main theme of his research was the roles that a group of diverse actors including government, academics and enterprises played in promoting these techniques. Like Robson (1991), Miller (1991) introduced key aspects of ANT including problemization and action at a distance. Limitations of the study including a primary focus on published materials of the era rather than participant observation or other field research techniques and that the researchers were not intimately involved in the evolving network.

Another paper by Robson (1992) theorised how the use of numbers in accounting practice enables the achievement of long-distance control, that is, influence over remote actors. The contribution of this paper was to critically examine how accounting inscriptions may serve not merely as rhetorical devices but possess great potential for “power” or action at a distance (p. 701). An example would be how governments might utilise accounting numbers or techniques as a mechanism to bring about reform of organisational structure and purpose. In essence, this paper emphasised the immense power of accounting to influence others at a distance and produce change. A limitation of this study is that it was essentially a theoretical piece and so did not provide empirical

evidence of the power of accounting inscriptions in action. To this end, Robson (1992) conceded that:

Others may challenge the translations that accounting records have accomplished, and the networks between the actor and the contexts he or she may wish to influence may be broken. Much depends on the legitimacy of accounting numbers, and quantification in general (p. 701).

Jones and Dugdale (2002) explored the rise of activity-based accounting (ABC) across the period 1984 to 1992 by following key actors in a network of allies that supported this innovation. They documented how the accounting academy only had a “peripheral role” in lending credibility to ABC and highlighted that “ABC was not authenticated through the peer refereeing processes of mainstream accounting journals until after its widespread dissemination and specific implementations” (p. 156). Similarly, the accounting profession itself was not a strong advocate, but instead it was the management consulting industry that was at the fore of establishing its acceptance. The major contribution of their study was to show how expertise, including accounting knowledge, is increasingly being bought and sold outside the traditional networks such as the professional arena and that adoption and success is largely determined by customers (p. 157). Jones and Dugdale (2002) emphasised the power of social networks in facilitating customer interest and finding advocates who actively participated in expanding interest in that innovation. However, their study was subject to the limitation that the authors were not direct participants in the network studied and were essentially looking back on its development. Consequently, they were primarily reliant on published sources for their investigation such as books, articles and proceedings from colloquia. Informal and undocumented machinations of the network were therefore not taken into account.

Gendron and Barrett (2004) represents one of the few studies emanating from North America to utilise ANT. These researchers studied efforts by two major North American professional bodies in accounting to establish a new market in e-commerce assurance through a product called, *Webtrust*. Essentially, this product involved auditor certification that a client’s website met certain “good practice” criteria (p. 569). Their work consisted of a longitudinal field study which attempted to identify and interview actors within the

network that promoted this tool. They found that the development of this network and product was fraught with numerous tests of claims and the product and market evolved through a trial-and-error process: [It's] "intrinsic features, promotional strategies, and targeted market were altered and redefined" (p. 594). Using Latour's framework, they concluded that professionals' claims to expertise derive from a translation process whereby each claim to expertise is transformed and adapted to enrol and maintain audiences. Their study, whilst providing interesting insights into a recent high-profile accounting "innovation", appeared to have an over-reliance on interview and organisational documents for data-gathering with no participant observation. It is also problematic that all actors were sufficiently represented in the analysis given that the actors within the network consisted of a diverse range of consumers, managers of on-line organisations and the accounting profession itself.

Preston, Cooper and Coombs (1992) investigated efforts to introduce accounting reforms to the British National Health System (NHS) in the 1980s. Their focus was on how technologies are fabricated and can become taken-for granted artefacts (p. 563-4). They established that vested interests may alter throughout the fabrication process. Arguably, their major contribution is to offer an explanation of the impact of external environment that goes beyond traditional contingency theory in accounting:

"... broad characterizations of environment offered in conventional contingency theory... cannot explain the particular form, or changing nature, of accounting systems" (Preston *et al.*, 1992, p. 590).

Preston *et al.* (1992), as one of the early studies in the accounting literature to employ actor-network theory, has several limitations including a post hoc focus on the innovation being studied and a heavy reliance on published materials. These issues will be discussed in more detail in the next section.

A final study that we will appraise that transcends a specific institutional setting is Mouritsen, Larsen and Bukh (2001). In that study, the researchers investigated the production of so-called "intellectual capital statements" which are statements prepared by managers of an organisation to explain the apparent differences between its market value



and its book value and hence demonstrate where its intellectual capital is “hidden” (p. 735). Their approach considered these statements which are not required to conform to specific rules and procedures as a form of knowledge in the making that is yet to be settled in a set of black-boxed relations. The contribution of their paper is to suggest that these statements are inscription devices that can be used by managers to control organisational arrangements. The categories within intellectual capital statements invented by managers also enable them to act at a distance as they can help demonstrate whether organisational activities are ‘right’, are ‘sensible’, are ‘on the correct track’, or merely ‘appropriate’ (p. 759). While the notion of accounting being used as a form of control is not new to the literature (e.g., a Foucaultian perspective was used by Knights & Collinson, 1987; Macintosh & Scapens, 1990), Mouritsen, Larsen and Bukh (2001) explored this theme in a private sector, cross-organisational setting that demonstrated the power of inscription, narrative and translation.

A limitation of their study is the issue of precisely which networks and actors might be activated by these new forms of statements. There are potentially a wide set of users of these statements (for example, stock analysts, banks, investors) and preparers (for example, accountants, auditors, management) with competing motives and perspectives. All of these, and others, may be considered potential actors within the network for analysis. Another limitation is that it can be argued that intellectual capital statements are far from an accepted part of accounting and therefore have not achieved the state of recognition that enables them to be considered a “black box” in the Latour conception.

#### *Studies that Focus on a Specific Organisational Settings*

Chua has been involved in employing ANT in a number of studies that have concentrated on either individual or a small number of case settings (see, for example, Chua, 1995; Briers & Chua, 2001; McNamara, Baxter & Chua, 2004). Chua (1995) provided an ethnography of three Australian hospitals that were considering the implementation of a new case mix accounting system which she defined as an attempt to measure a hospital’s output in terms of the number and type of cases treated (p. 117). A strength of this study that is not often found in many accounting studies using ANT is that the researcher was

truly embedded in the phenomena being studied as she was part of a team of four academics which became part of a consortium that included three hospitals and a state government department of health that co-ordinated all submissions on the area for a government development programme. Being so closely involved gave her the opportunity to be privy to and to observe the interplay that occurred at first hand and to thus explore "... the part played by experts, actor networks, computerised software and visual inscriptions in the struggle to change accounting representations" (p. 114-5).

The researchers in many other ANT studies in accounting have not been as intimately implanted within the controversy being studied as Chua (1995). For example, Jones & Dugdale (1992) in their analysis of the rising application of ABC were not themselves major actors within the network that supported its progress towards acceptance. Similarly, Preston *et al.* (1992) and Miller (1991) were not direct participants in the phenomena that they studied. While first-hand participation in the network itself creates a danger that the investigator may lose some degree of impartiality in their analysis this can be offset by the advantage of deep insights and privileged access to information gained from being an active part of the network. Moreover, it is more in keeping with the ethnographic approach of well-known ANT studies such as Callon's (1986) analysis of the French scallop fishing industry or Latour and Woolgar's (1986) examination of the Byzantine world within a scientific laboratory at the Salk Institute. However, it should be noted that Latour and Law did not always utilise ethnographic approaches when using ANT; witness Latour's (1988) "Pasteurisation of France" and Law's (1986) "Portuguese Navigators" which looked back on historic situations. Furthermore, Latour (2005) noted that even if one is embedded within a network this certainly does not guarantee that the researcher will observe every key incident that occurs within a network. It follows that researchers need to recognise the positives and negatives that flow from varying levels of emersion within a network in conducting their field research and recognise these when they report their findings.

One of the key contributions of Chua (1995) to the accounting literature is to provide insights into how cost allocations may be explained as the outcome of interests that are

tied together. In this way, it provides an excellent example of the classic Latour premise of translation, that is, innovators coming together in mutual interest to create a network that is worth building and defending. As Chua (1995) emphasised:

People persisted with the Model not because they knew with great certainty that, compared with rival technologies, it gave closer approximations to reality, but because they decided that the numbers generated were consistent/factual enough to hold together diverse purposes (p. 138).

Lowe (2001a; b; c) continued the hospital theme in ANT-inspired research in accounting. Like Chua (1995), he studied the introduction of a casemix accounting system although his focus was on a regional New Zealand health provider. In Lowe (2001a; b; c) he called for a faithful representation of Latour's theoretical framework. For example, in Lowe (2001b) he applied Latour's seven rules of method for studying "the fabrication of scientific facts and technical artifacts" as a distinct methodological framework for applying ANT in practice (Latour, 1987, p. 258). While other studies in accounting have analysed the fabrication process in some detail, the application of these rules has not obviously been at the forefront of their research approach. Moreover, Lowe (2001b) sought to provide a much greater weight on the non-human elements of a network on the basis that that "the emphasis of the existing accounting literature ... that has borrowed from ANT has tended to be on networks of human actors" (p. 347). It is interesting to contrast this viewpoint with that of Chua (1995) who unapologetically placed human actors at the forefront of her scrutiny:

... unlike the work of Latour and Callon, this paper does not present inanimate objects such as computer software or hardware as actors which are identical to human agents (compare Callon, 1986). To do so reifies machines and technologies in a way which detracts from the purposive activities of their designers. It is people who make up accounting numbers in specific ways to try and achieve certain objectives. Software, by contrast, has neither interest nor agency (p. 117).

Lowe (2001b), in citing Lee and Hassard (1999), contended that a faithful representation of Latour's work "rejects any sundering of human and non-human" (p. 392) and he therefore introduced an interesting philosophical debate to the accounting literature about how much liberty ANT researchers have to depart from the classic foundations of

Latour's work. Certainly, researchers are often tempted to focus on the human element given our natural fascination with political processes and human behaviour in general. The machinations of a computer seem altogether less interesting to many of us!

Briers and Chua (2001) studied the means by which the manufacturing strategic business unit of a major mining company proceeded to bring about innovation to the organisation's accounting system through developing a network of local and global actors. This paper made two major contributions to the accounting literature. First, it identified and emphasised the importance of boundaries in the process of stabilising and mediating diverse interests (Fujimura, 1992). Boundaries are objects that draw together actors with divergent goals. Boundaries identified by Briers and Chua (2001, p. 242) included data repositories such as cost driver matrices and customer databases and visionary objects such as precise costing systems. A second contribution of this study was that it highlighted the fragile nature of success and failure in introducing new technologies in an organisation:

Rather than argue that accounting systems that succeed are those that 'fit' the strategic imperatives of dominant stakeholders, this study argues that success and failure is a fragile construction that turns on the strength of diverse ties tying together many heterogeneous elements (p. 267).

This finding is consistent with Latour's notion that ongoing adoption and acceptance of an innovation is not guaranteed and is dependant on the support of subsequent actors. Limitations of Briers and Chua (2001) included that many actors were concerned with building more accurate costing information and so it was difficult for the researchers to be sure that all relevant actors were sufficiently covered in their analysis. Also, analysis of boundary objects is novel to accounting research therefore questions about definitions of whom or what constitute boundary objects and how these operate in different organisational settings remain.

Ahrens and Mollona (2007) conducted an ethnography of a Sheffield steel mill based on 11 months of participant observation of its shop floors. The major contribution of this

work to accounting research is to highlight the relationship between cultures, in particular sub-cultures within organisations, and organisational control.

The cultural practices underlying the different ways in which the workers ... conceived of and talked about their work and its control were structured by their membership of particular shop floor groups. The boundaries of those groups did not follow neatly from the managerial demarcations between organisational subunits ... They coincided with the distinctive subcultures that arose from the workers' tasks and shop floor practices, skills and occupational histories, the technologies they used, their broader outlooks on work and organisational membership, and, significantly, those aspects of their social backgrounds that clarified their reasons for seeking out, and acquiescing to, particular organisational subcultures (p. 328).

The notion of the use of financial information for management control purposes is not new to the accounting literature (see, for example, Mouritsen, Larsen & Bukh, 2001) but the application of it to a specific organisational setting with a focus on the aspect of culture is novel within the accounting literature. However, this study while predicated in part on ANT seems to only loosely apply Latour's framework to the case and again seems to de-emphasise the non-human aspect.

Our final study for discussion in this section is McNamara, Baxter and Chua (2004) who conducted a field study of a multinational, consumer goods company. They documented the diverse set of activities and actors that together helped it achieve its knowledge management objectives. The researchers identified four knowledge networks within the organisation: *knowledge as reassembling, repositing and reusing* which they described as learning from past experience; *knowledge as importing and standardising skills* which they categorised as where education and training beyond work experiences was needed; *knowledge as sharing, linking and acting from a distance* which they described as constructed knowledge about what the organisation does and how and why it does it; and, *knowledge as locating knowledge* which meant knowing the various pathways to obtaining knowledge (p. 59-66).

McNamara, Baxter and Chua (2004) provided two major contributions to the accounting literature. First, they looked at the holistic construction of knowledge across an

organisation rather than simply focusing on a single network or innovation (e.g., activity-based costing). Second, they emphasised the “heterogeneous nature of organisational knowledge networks” (p.58). By this they meant the networks comprised all sorts of different actors which included diverse technologies such as computer databases and people with differing roles. Through this analysis they showed that accounting knowledge needs to be evaluated as a component of a large assemblage of organisational knowledges (p. 66-67).

This study had two major limitations. First, knowledge was so broadly conceived and discussed in the paper that it was difficult to observe the development of specific new knowledges or “black boxes” from a conventional Latourian approach to field research. Second, the study relied on a series of interviews with actors. While the researchers did also participate in a conference and observe daily activities, the findings for the paper drew “heavily on the interview data” (p. 59). It follows that the bias of the interviewees may cloud understanding of the day to day realities of knowledge management within the organisation. However, it should be noted that Latour (2005) recognised that bias and noted that, in some cases, this may actually enable the researcher to better understand the unfolding events.

### **A Critique of Accounting Research to Date**

Now that we have provided an overview of the insights to accounting research to date from the application of Latour, we will examine the accounting studies in light of five critical notes on the production of actor-network accounts as identified in the management literature by McLean and Hassard (2004). These critical notes provide a constructive mechanism for evaluating the research to date as they are drawn from “the views of key ANT writers” such as Michel Callon, John Law and Latour himself (McLean & Hassard, 2004, p. 498). In this section we also draw on recent work by Latour (2005) that addresses some of the criticisms identified by McLean and Hassard (2004).

The five critical notes identified by McLean and Hassard (2004) are the: inclusion/exclusion of actors; treatment of humans and non-humans; nature of privileging and status; the handling of agency and structure; and, the process of heterogeneous engineering, notable in relation to concepts of power, ordering and distribution.

#### *Inclusion/Exclusion Issue*

This criticism (see, for example, Miller, 1996; Strathern, 1996; Bloomfield & Vurdubakis, 1999) relates to the decision about which actors to include and to exclude in ANT studies. An analysis of many accounting studies to date using ANT suggests that the process of identification of actors to be included or excluded in the process is not elucidated in any detail. The result is that this process may, perhaps unjustly, appear to be somewhat arbitrary. In many cases there is little discussion of the basis on which actors were included or excluded or even specific identification of who the key actors appear to be.

An example of this would be Robson (1991). While as noted earlier this paper made a major contribution by introducing the accounting literature to Latour's work, his analysis of the origins of the standard setting programme in the UK in the 1960s did not explain how actors were included or excluded in the network described.

Similarly, Preston, Cooper and Coombs (1992) in their fascinating account of reforms to the hospital budgeting systems of the British National Health Service provided little insight into their processes of actor identification other than to say "we mapped networks of resource, support and use, both historically and across conventional boundaries, in order to examine the multiplicity of people involved in the fabrication process" (p. 567). While the authors made a major contribution to the accounting literature through their account of fabrication and how interests may shift through this process, their conclusions are understandably limited by the difficulty in identifying and studying the numerous actors involved, "we can reasonably argue that many sceptics are won over" (p. 575) and "Despite all the elaborate fabrications, in this case management budgeting does not become an established fact" (p. 589).

A related issue from Preston, Cooper and Coombs (1992) is that their analysis is based on published materials from a previous time:

Our outline of the production of management budgeting covers a fairly distinct episode, and is for the most part restricted to debates, statements and specific initiatives within the NHS. The analysis begins with the publication of the Griffiths Report in 1983 which proposed the initiative, and ends with the publication of a Department of Health and Social Security (DHSS) Health Notice in November 1986 (DHSS HN(86) 34) (p. 564)

In such circumstances, how can one be confident that all actors and all influences have been considered when analysis is necessarily restricted to known and published sources?

Despite the tendency for studies in accounting to provide a cursory explanation of the actor selection process, there are some notable exceptions. For example, Briers and Chua (2001) directly identified in detail who the actors were in their case analysis of the implementation of activity based costing by the manufacturing strategic business unit of a large Australian mining company. They even demarcated between so-called cosmopolitan and local actors. Similarly, Lowe noted in his study of the application of a casemix accounting system in a large regional New Zealand health provider (2001b):

A critical aspect of the research process involved the imperative to follow the actors and identify the extent of the networks built up ... The researcher tried to carry this off by “making the list” of actors, however long and heterogeneous (p. 346).

The above analysis points to key application issues with ANT, namely, that the boundaries of the project are rarely given and knowable. It is thus left to the discretion of the researcher to select the paths he/she wishes to follow (including which actors) and to choose those that will be ignored. As an example of this dilemma in the accounting literature, Chua (1995) chose a specific date as the cut-off point for her hospital case study because this represented the point where a first run of the costing model had occurred while acknowledging that “...at this point, the results produced were still regarded as preliminary” (p. 118). The implication of this limitation is that it is possible (without casting any aspersions on the studies referred to above) that the investigator may



not succeed in comprehending the network and may thus produce "...an incomplete or misleading research story" (Lowe, 2001b, p. 346).

The above discussion also raises the question of how one selects objects, machines or artefacts to be included in the network. Bloomfield and Vurdubakis (1999, p. 7) suggested that while the researcher must attempt to remain impartial and to consider all possible actors, ultimately the process of selecting appropriate actors to study is dependant on suppositions about what actors exist and their relative positions within possible networks.

It follows from the above dialogue that future accounting studies applying ANT need to ensure that the boundaries are explicitly defined and justified and the actors identified and justified. However, it must be conceded that as one cannot follow actors everywhere (Latour, 2005), he/she ultimately engages in a "practice of ordering, sorting and selection" (McLean & Hassard, 2004, p. 500).

#### *Treatment of Humans and Non-Humans*

Perhaps the most controversial aspect of Latour's framework is the "symmetrical treatment of such seemingly dichotomous factors as humans and non-humans, society and nature, and the social and the technical" (McLean & Hassard, 2004, p. 502). Collins and Yearley (1992) were especially critical of this aspect of ANT and cited as an example, Callon's (1986) use of ANT to study scallop farming in France where the scallops are treated as equal actors with the fishermen and scientists:

Would not complete symmetry require an account from the point of view of the scallops? Would it be sensible to think of scallops enrolling the scallop researchers so as to give themselves a better home and to protect their species from the ravages of the fishermen? (Collins & Yearley, 1992, p. 313 as cited in McLean & Hassard, 2004, p. 502).

The point of this sarcastic observation is that Callon (1986) is viewed as providing a predominantly human-focused account of the scallop fishing case and that is can be a flaw with many ANT-inspired studies. As Lowe (2001b) cautioned:

A balance must be struck between the attention that is given to social interaction and behaviour (what we might call people's interests) and the part played by machines and systems to effect and channel the social (p. 341).

However, it should be noted that proponents of ANT such as Lee and Brown (1994) counter this perceived weakness by contending that ANT is centred on the way in which actors, machines etc. rely on spokespersons and "how the delegation of authority to speak on behalf of others is both an epistemological and political process" (McLean & Hassard, 2004, p. 503).

Many of the accounting studies to date using ANT appear to have emphasised the social over the machine in studying networks. Mouritsen, Larsen and Bukh (2001) in examining so-called Intellectual Capital Statements focused heavily on managers' manipulation of these statements for their personal gain: "...knowledge and power are related and the interest in knowledge derives from managers' interest in controlling organisational arrangements" (p. 759) and "the intellectual capital statement allows managers to ask such questions [as whether organisational activities are sensible or on the correct track etc.] about the resource base of the firm" (p. 759). Similarly, Ahrens and Mollona (2007) focused heavily on the sub-cultures found within various shop floors. The clear emphasis of their study on the human element was highlighted in their conclusion:

Organisational members can be shown to enact organisational subcultures through practices of control by combining heterogeneous materials and bodies of knowledge. Our account, whilst emphasizing the significance of spatial arrangements, technologies, material constraints, and other non-human elements, remained focused on the human actors and their symbolic systems and group identities (p. 328).

Chua (1995) as discussed earlier, made no apologies for the prominence of the human element in her study. However, not all accounting studies chose this path. A notable exception to this concentration on the human is Lowe (2001b) who as previously mentioned stressed the role of non-human actors: "What ANT offers is a different view of social reality in which nonhuman actants are of particular significance" (p. 344).

It follows from the above discussion that future accounting research needs to be careful not to devalue the non-human elements relative to the human. While the temptation for researchers is to highlight humans and their actions, society as it is today cannot exist without the non-human – all the technology, buildings, texts we use daily – and therefore the latter cannot be ignored. As Law (2003) succinctly stated: “If these materials were to disappear then so too would what we sometimes call the social order” (p. 3). Faithfulness to symmetry is arguably a central tenant to ANT and any possible departure from this requires a strong rationale but it is important to understand the concept of symmetry as conceived by Latour. In recent times, Latour (2005) has attempted to directly address the symmetry debate in ANT:

ANT is not, I repeat is not, the establishment of some absurd ‘symmetry between humans and non-humans’. To be symmetric, for us, simply means *not* to impose a priori some spurious *asymmetry* among human intentional action and a material world of causal relations. There are divisions one should never try to bypass, to go beyond, to try to overcome dialectically. They should rather be ignored and left to their own devices, like a once formidable castle now in ruins (p. 76) [emphasis in the original].

And

This is the reason why I have abandoned most of the geometrical metaphor about the principle of symmetry when I realized that readers concluded from it that nature and society had to be ‘maintained together’ so as to study ‘symmetrically’, ‘objects’ *and* subjects, ‘non-humans’ *and* ‘humans’. But what I had in mind was not *and*, but *neither*: a joint *dissolution of both collectors*. The last thing I wanted was to give nature and society a new lease on life through symmetry (p. 76) [emphasis in the original].

Latour (2005) cautions against endeavouring to create a picture that does not reflect the realities of nature by concentrating so heavily on non-humans that the study no longer reflects reality. It is due consideration and recognition of the non-human and human actors in networks and their inter-connectedness that he appears to be seeking in future ANT-inspired research. Callon (1986), in his work on scallops, indicated that the goal of the researcher is *methodological* symmetry, recommending that researchers acknowledge the uncertainties of the natural, technical and social world as actors deal with the building of knowledge. Researchers should allow the actors to explain their world and the identities that make up their networks, describing their relationships with both the natural

and the social world. The researcher can then identify those relationships, choices and negotiations and then describe both “the technical and the social aspects of the problem studied” (p. 4) using the same vocabulary, chosen by the researcher. It is the use of the vocabulary, the same words for both the human and the non-human that produces the methodological symmetry required (Callon, 1986, p.4)

### *Privileging and Status Issue*

Critics of ANT (see, for example, Collins & Yearley, 1992) suggested that on occasions ANT seems to provide objects, machines etc. with a higher status in terms of their relation to humans than may be warranted given the reality of the situation. Callon and Latour (1992) agreed that they had granted “to nature and to artefacts the same ontological status that realists and technical determinists are used to granting to them” (p. 347). Latour (2005) stated that he was not interested in status issues but rather the roles that given actors within the network play:

“If action is limited a priori to what ‘intentional’, meaningful’ humans do it is hard to see how a hammer... could act. They might exist in the domain of ‘material’, ‘causal’ relations but not in the ‘reflexive’ ‘symbolic’ domain of social relations. By contrast, if we stick to our decision to start from the controversies about actors and agencies then *any thing* that does modify a state of affairs by making a difference is an actor” (Latour, 2005, p 70, emphasis in the original)

and

“This of course does not mean that these participants ‘determine’ the action, that baskets ‘cause’ the fetching of provisions or what hammers ‘impose’ the hitting of the nail... ANT is not the empty claim that objects do things ‘instead’ of human actors: it simply says that no science of the social can ever begin if the question of who and what participates in the action is not first of all thoroughly explored” Latour, 2005; p 71-72)

Put another way, ANT traces the actors, both human and non-human within the network, without considering who or what they are in order to understand what is happening. Not surprisingly, this symmetry of status has been contested. For example, Pels (1995) argued for weaker asymmetries that enable one to maintain some of the crucial features of modernity such as political, social or cultural distinctions. A counter argument is that

these differences should be understood as effects or outcomes rather than as an accepted order of things (McLean & Hassard, 2004).

In the accounting literature, there seems to have been divergent emphases on the role of machines and other non-human actors. An example of a study that granted a high status to machines was Lowe (2001b):

The researcher examined reports; on nursing wards; the biochemistry laboratory and radiology as part of a research process designed to unravel the workings of these systems. Some of this meant *going beyond the reports by building spreadsheet models* of the costing and patient data in order to understand how the data were being manipulated to produce the inscriptions of patient costs (p. 343).

Similarly, Robson (1992) with his focus on accounting inscriptions as “writing, recording, drawing, tabulating” (p. 689) placed the non-human factor at the forefront. Cuganesan and Lee (2006) also stressed the technological aspects of a procurement network.

Conversely, Ahrens and Mollona (2007) focussed on culture and de-emphasised the role of machines. While this study did briefly discuss the role of technology in a broad sense in terms of the computer system’s capacity to produce efficiency and productivity measures that may influence the actions of various actors, it did not capture the intimate inter-relationship between the various technologies being used at the mill and its critical role in contributing directly to the developing network. Studies such as Chua (1995), as previously noted, also had a sociological emphasis.

Given the seemingly contrasting emphases evident in the accounting literature, a key consideration is whether we can assume a priori that the human drives the non-human to build society as it is today, or is it the non-human that drives and compiles society (Law, 2003, p. 3)? Has our social life been changed because we choose to use technology more, or has technology forced a change in the way we construct our social world? Law (2003) argued that “to say that there is no fundamental difference between people and objects is an analytical stance” (p. 4), not an ethical or moral stance. People are

influenced and shaped by their interaction with the non-human; their social world shaped by a heterogeneous network of tools and other materials. Latour (2005) provided an example of how the introduction of the television remote control fundamentally altered the viewing habits of consumers. Suddenly, they were far more likely to change channels than previously and advertisers and television networks had to change the way they scheduled programs and advertisements. An inanimate object drastically changed everything in the television world and its presence and impact could not be ignored. It follows that ANT should not grant privilege to either the human or the non-human, it requires an open mind and that no assumptions be made by the researcher regarding who or what is the driver, analysing the network as it exists. By admitting the non-human to the network as an actor, the researcher is able to expose the effect that each actor has on another, without making preconceived assumptions as to their relationship.

#### *The Agency/Structure Issue*

This criticism relates to the claim that ANT emphasises the micro over the macro and therefore does not consider the “broader social issues that influence the local” (McLean & Hassard, 2004, p. 507). Habers and Koenis (1996) commented that ANT focuses excessively on the input of non-human items to social processes. Similarly, Reed (1995) argued that ANT tends to:

concentrate on how things get done, to the virtual exclusion of the various ways in which institutionalized structures shape and modify the process of social interaction and the socio-material practices through which it is accomplished (p. 332, as cited in McLean & Hassard, 2004, p. 508).

Latour (1991, p. 118) countered this criticism by contending that the 'macro-structure' of society is made up of the same basic connections as the 'micro-structure', and thus can be examined in much the same way (Latour, 1991, p, 118):

It's not that there are a macro-sociology and a micro-sociology, but that there are two different ways of envisaging the macro-micro relationship: the first one builds a series of Russian Matryoshka dolls – the small is being enclosed, the big is enclosing; and the second deploys connections – the small is being unconnected, the big one is to be attached (Latour, 2005, p. 180).

Latour (2005) also contended that the 'macro-structure' is a larger network that can be connected to the actor in the same way as other networks and actors. He explained that this is why the term "actor-network" is hyphenated, actors are not only actors as individuals, but also represent the larger networks behind them.

Law (2003) also refused to make any distinction between the macro and the micro-social. If the wider networks of the macro-social are unproblematic at any time, they are perceived to be much simpler by actors outside that network. It is not obvious to those outside the network of the macro-social who or what constitutes that network, nor is it relevant at that time to the actor. Whilst in the longer term the larger network may be made visible by degeneration<sup>5</sup>, its stability renders it invisible.

Certainly in much of the accounting research to date there has been a heavy focus on the activities *within* an organisation (see, for example, McNamara, Baxter & Chua, 2004; Ahrens & Mollona, 2007). However, researchers have also often sought to contextualise the exogenous environment, when the wider network of the macro-social is perceived to be failing and, therefore, visible<sup>6</sup>. For example, Preston, Cooper and Coombs (1992) in their case study of potential accounting reforms to the British National Health System (NHS) stated.

There are a number of discursive conditions out of which emerged the possibility of management budgeting. Two sets of discourses seem to have been particularly significant. Firstly, beginning in the 1970s, and intensified after the election of the Thatcher government in 1979, influential diagnoses of the relative underperformance of the British economy were associated with a concern about the level of state expenditures and doubts about the feasibility and/or desirability of satisfying the demands for welfare (including health and education) through public funding ... The NHS was increasingly characterized as being a major contributor to this growing burden despite its "sacred cow" status. Secondly, there has been considerable debate, almost throughout the history of the NHS, about mechanisms to "improve efficiency" through reorganizations and changed managerial practices (p. 568).

In a similar vein, Chua (1995) discussed in some detail "the antecedent world of sick governments and hospitals" (p. 118). Briers and Chua (2001) focused on a range of actors in their study of a manufacturing strategic business unit including so-called cosmopolitan

actors which they defined as “global actors in the sense that they are adept at penetrating spatial and cultural boundaries” (p. 241). In placing a heavy emphasis on these global actors in their analysis, Briers and Chua (2001) not only extended the use of ANT within the accounting field but they considered the influence of the external environment to a much greater extent than had been achieved before.

As a final example, Jones and Dugdale (2002) went to considerable lengths to portray the dynamic international environment that resulted in the rising popularity of activity-based costing. They documented the Harvard list of allies that supported the new technology and the various companies globally (John Deere and Hewlett-Packard in the US, Siemens in Germany and Ericsson in Sweden to name a few) that helped champion its use. However, one needs to recognise that given the subject matter of Jones and Dugdale (2002) it would have been difficult if not impossible to have ignored the diverse forces contributing to the activity based accounting “bandwagon” (p. 121).

Overall, it would seem that due consideration of the exogenous environment and how it impacts on accounting controversies at an institutional level has been prevalent in some, but not all, studies to date. The lesson from this is that future researchers need to ensure that they appropriately contextualise their case studies so that the reader is in a better position to fully appreciate the overarching influences and countervailing forces behind the actions and processes being studied in a specific organisational situation.

#### *Heterogeneous Engineering and the Political Issue*

A final criticism put forward by McLean and Hassard (2004) was that ANT neglects to evaluate the political and moral issues behind the technologies studied. Sturman (2006) highlighted that ANT does not address social issues including gender and race. The theory does not take into account the society that exists separately to the individual. It is the assumption of a separate ‘society’, that enables the researcher to divide that society into strata such as ‘gender’ and ‘race’ according to previously established criteria, and then place members of society into one, or more, groupings, for instance an ‘indigenous, female accountant’: “[A]ctors are *made to fit* into a group – often more than one” (Latour,



2005, p 28, emphasis in the original). In other words, Latour (2005) is saying that actors or groups of actors can be pigeon-holed by the researcher:

Not that they are wrong since its perfectly true that older social relations have been packaged in such a way as to seem to provide a ready explanation for many puzzling subjects. But the time has come to have a much closer look at the type of aggregates thus assembled and at the ways they are connected to one another. (Latour, 2005, p. 22)

Using ANT as a framework, networks which form the social are only present as interaction takes place between actors. Put another way, it is the actors who form their own groups of heterogeneous elements, rather than the researcher. This approach contrasts with social scientists who place individuals into homogenous groupings based on some common characteristics as mentioned above. If there is no interaction, then there is no network in existence and no social context (Latour, 2005). It follows that this theory seeks to understand how or why these groups are formed and not to explore issues such as gender or race.

This absence of focus on homogeneity, helps explain why researchers such as Winner (1993, p. 370) stated, “they [ANT researchers] have little to say about the deep-seated political biases that can underlie the spectrum of choices that surface for relevant actors”. Fujimura (1992) put this assertion simply by posing that is important to endeavour to find the answer to such key questions as:

How and why some perspectives are more persuasive than others in the construction of truths? How and why some actors go along with the will of others? And how and why some resist being enrolled? (as cited in McLean & Hassard, 2004, p. 512).

In answer to these questions, the researcher should consider why actors enrol in networks. According to ANT, actors will become enrolled in the network because they perceive that their interests align with others within it, handing over the power to the principal actor to act, control and co-ordinate the actions of the network so that all may achieve their goals (Latour, 1987). Some actors may not join a network, or may not remain in one which they have initially joined, refusing to allow the principal actor to control affairs. This resistance to cooperate, when explored by the researcher, can lead to

an understanding of the issues of power and morality. Actors, in explaining their behaviour and resistance to the researcher, may voice concerns that indicate their problems in these areas.

Power, like society is the final result of a process and not a reservoir, a stock or a capital that will automatically provide an explanation. Power and domination have to be produced made up, composed. Asymmetries [such as hierarchies and inequalities] exist, yes, but where do they come from and what are they made out of? (Latour, 2005, p. 64).

While the accounting literature employing an ANT perspective does not appear to have pre-supposed any strata of the social world when conducting field studies, actors themselves may actually apply those strata when discussing their networks and the roles they play within them. For example, in Ahrens and Mollona (2007), the researchers did not pre-suppose a Marxist perspective of class struggles in discussing conflicts between management and mill employees that they observed and heard from interviews. However, when these disputes became apparent they reported them:

The labourers' resentment against the smelters takes a variety of forms. One evening in the break-room, Armstrong, one of the labourers, says, "the whole story of the danger of the furnace is an invention by Mr. Beat and the two melters to control the melting shop, raise their wage and exploit us. Who do they think they are?"

Office politics and the wider political environment have been common themes within the accounting literature employing ANT. Again returning to Ahrens and Mollona (2007), the following analysis was made of the office politics:

He does not want to get involved in organisational politics because he cannot see the point. The boys agree with the general manager production that "employees are creators of value" and "profit makers", and not just simple manual workers. They reject the hot workers' "philosophy of work" based on seniority and friendship, and their mixing of leisure and work on the shop floor (p. 324).

Chua (1995), in discussing the attitudes of two costing experts towards a proposed new case mix system for a hospital made the following observation:

As they saw it, present allocative mechanisms were overly influenced by interest group politics and in need of a rational, scientific basis. At the very

least, a more objective formula would help identify when, how and whose politics influenced particular outcomes (p. 122).

An observation of this type would seem to be an attempt to answer the key question put forward by Fujimura (1992) of: Why some actors go along with the will of others? In this case study, the experts were keen to champion the new system and other actors supported it, because they viewed it as a mechanism to overcome politically influenced costing that did not reflect reality as they saw it.

Preston, Cooper and Coombes (1992) in their critical interpretation of attempts made to introduce a radical new responsibility accounting system to the British National Health Service, were highly cognisant of political processes and engineering behind this set of events:

... we have been able to more clearly see the nature of scepticism to systems of financial calculation and an articulation by the sceptics of the possible effects of such systems on the mode of operation of the hospital. Rather than reflecting an organizational reality, these sceptics recognize that organizations may themselves be transformed by accounting systems (p. 589).

and

Despite all the elaborate fabrications, in this case management budgeting does not become an established fact. Networks are not fully set in place, doctors are not fully convinced of the arguments, managers are faced with alternative demands on their time and resources, information systems do not necessarily connect to the proposed designs of the systems. Thus our account of the fabrication of management budgeting is also an illustration of the problems of fabrication and the difficulty of making budgeting systems appear as unexceptional facts of organizational life. (p. 589)

Indeed, the central tenant of their study is to examine “the *struggle* to fabricate an adequate budgeting technology” (p. 563) implying the significance of recognising the agendas behind the decisions and rhetoric of specific actors and in doing so they sought to examine why some actors were able to exert their influence more effectively than others.

In sum, much of the accounting research appears to have been quite focussed on examining the agendas, the perspectives and the power plays behind the behaviours and the language of actors. While there does not seem to have been a focus on moral perspectives or on social groupings like gender or race, it would seem overall that the criticism that ANT neglects to evaluate the political issues behind the technologies studied is not prevalent within this body of literature.

### **Conclusion**

Our analysis of the accounting literature documents the significant number of studies (27 at least) since the early 1990's that have been motivated to use the lens of ANT. In doing so, it highlights the contribution of Latour's concepts of translation, intermediaries and mediators, and generalised symmetry amongst others which have been employed by accounting researchers. These concepts have been employed to explain a variety of accounting phenomena such as networks developed to: advocate new accounting systems (e.g., Chua, 1995; Lowe, 2001a; b; c); promote a novel approach to accounting (e.g., Jones & Dugdale, 2002); and, increase control (e.g., Robson, 1992; Ahrens & Mollona, 2007). This study sought to provide a critical appraisal of the accounting applications of Latour's ANT. While the subject matter studied has been rather diverse, some common themes emerge including: the potential for accounting to be an effective mechanism for achieving long-distance control (e.g., Robson, 1992; Mouritsen, Larsen & Bukh, 2001); the power of accounting to be used as a rationale for institutional or system change (e.g., Chua, 1995; Preston, Cooper & Coombs, 1992); the capacity of the accounting profession to adapt in ways that maintain both its legitimacy and relative levels of autonomy (e.g., Robson, 1991; Jones & Dugdale, 2002) and the inter-connectedness of a wide range of actors, human and nonhuman, in facilitating accounting reforms (e.g., Briers and Chua, 2001; Cuganesan & Lee, 2006).

This study also evaluated the accounting research to date in light of the five critical notes on ANT identified by McLean and Hassard (2004): inclusion/exclusion of actors; treatment of humans and non-humans; nature of privileging and status; the handling of agency and structure; and, the process of heterogeneous engineering, notable in relation

to concepts of power, ordering and distribution. This analysis was further informed by recent work by Latour (2005). Our investigation revealed a range of limitations in the accounting research from which we can deduce lessons for future studies in the discipline. Notably, there is a tendency for accounting studies (see, for example, Miller, 1991; Preston *et al.*, 1992; Gendron & Barrett, 2004) to be conducted as post-hoc analyses rather than for the researcher to be directly embedded in the network as it evolves. This lack of participation seems to be a common limitation although there have been some notable exceptions such as Chua (1995) and Lowe (2001a; b; c).

Latour has employed research approaches that involve high degrees of participant observation (e.g., Latour & Woolgar, 1986) as well as low levels (e.g., Latour, 1988). Deep immersion in a network has the advantage of a greater likelihood of the researcher understanding the evolution of that network and the critical issues involved. However, it also creates the potential for bias to intervene in a researcher's analysis. Also, it is often practically impossible for researchers to be expected to achieve long periods of entrenchment within organisations. Conversely, one needs to appreciate that not being fully embedded can result in an over-reliance by the investigator on published sources or what the actors want to tell them. On the basis of the above, it would seem prudent that future accounting research clearly explains the level of embeddedness achieved including how much participant observation occurred in practice, the possible impact of any researcher biases and the limitations that flow from the research approach adopted.

There has also been a tendency for some studies to overemphasise the human/social element and to downplay the role of nonhuman actors in the network. Due weight needs to be given to all actors and the inter-connectedness of each within networks needs to be recognised. An open mind is essential. The issue of symmetry has long been debated in the literature and is discussed in some detail in the present investigation.

There has also been a lack of detail provided in some studies about how actors were selected for the study or the basis on which they were omitted from it. Similarly, the rationale for the selection of commencement and finishing dates of case studies is often

inadequate. Finally, adequate consideration of the exogenous environment is necessary. Too often the researcher is fixated on the particular organisation or grouping within the organisation that he/she is studying. The external environment is largely ignored.

The present study contributes to the literature in four ways. First, it provides a list of key accounting articles published to date on ANT and documents their level of impact as measured by citations. Second, it provides a critical review of the most cited studies. Third, it analyses the application of ANT in accounting research through the five critical notes on ANT identified by McLean and Hassard (2004). We have also considered Latour's (2005) comments on common criticisms of his work in addressing this section. To our knowledge this has not been attempted before in the accounting area. Fourth, using the lessons from our critical analysis we provide some recommendations for designing future accounting studies based on this significant body of theory.

There are two limitations of the present study that need to be recognised. First, not all accounting studies were covered in detail and there may be some that we missed. However, it should be recognised that we attempted to cover all those that have been commonly cited. Second, some of the controversies in the ANT literature generally such as the symmetry of humans and nonhumans issue are yet to be resolved.

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## **Appendix 1: A brief biography of Latour and the development of ANT**

### **Bruno Latour**

*Much of the biography that follows is synthesised from Anon (2008), Lowood & Sussman, (2003) and Vidmar-McEwen (2008).*

Bruno Latour, born June 22, 1947 in Beaune, France where he first studied philosophy and theology at Dijon. In 1975 he was awarded his Doctorate of Philosophy from the University of Tours. During military service in Africa, he became interested in the use of social scientific methods whilst conducting field studies. This led to research conducted for l'Office de la Recherche Scientifique Coloniale, on industrial education in Abidjan on the Ivory Coast, which highlighted the difficulties of knowledge transfer between differing complex cultures and political realities. Upon receiving a Fulbright Fellowship (1975-1976) and a NATO Fellowship (1976-1977), he worked for nearly two years on an ethnographic project at the Salk Institute in California (Lowood & Sussman, 2003). This ethnographic research resulted in his pioneering work, "Laboratory Life" (1979) written in co-operation with Steve Woolgar. This text describes his study on the translation of scientific knowledge and the sociology of scientists and was based on his field research at the Salk Laboratory. This book was followed by "Science in Action" (1987) and "We Have Never Been Modern" (1991).

He has held a number of distinguished posts throughout his career including a professor at the *Centre de Sociologie de l'Innovation* at the Ecole Nationale Supérieure des Mines in Paris during the period 1982 to 2006. At various times he has been a visiting professor at the University of California San Diego, the London School of Economics and in the History of Science Department of Harvard University. In Spring 2005, he held the Spinoza Chair, a visiting professorship at the University of Amsterdam. He has Honorary Doctorates from the University of Lund (1996), Sweden, the University of Lausanne (2006), the University of Montreal and the University of Gothenburg. (2008). He was elected a Fellow of the American Academy of Arts and Sciences in Cambridge, Mass, received a Medal of Honour from the Institute of Advanced Studies, the University of Bologna and in 2008 he received the Sigfried Unseld Prize for his life achievements.

### **The development of Latour's work**

Latour's contribution to knowledge has resembled an evolutionary development of inquiry over the last 30 years. A notable example was when he moved from observing how science is practiced and he became interested in studying techno-scientific activity on a more philosophical basis.

A philosopher by education and anthropologist through experience he was invited to conduct an anthropological study of scientists at the Salk Institute for Biological Studies in San Diego, California from 1975 to 1977. His first book on his findings was written in conjunction with English sociologist, Steve Woolgar (Latour & Woolgar, 1979). The purpose of the study was to explore how scientists went about doing 'science' and constructing facts as a result of their activities. He proceeded to write "Science in Action" (Latour, 1987) where he studied what was observed and discussed in centres of calculation and how scientists translated previously known 'facts' and new data into new knowledge, in essence the social aspect of what scientists do. Subjects discussed included how scientists coped with controversies within science and between the scientists themselves, how chief scientists defended their findings, funding and laboratories. The scientists' social networks were traced from shorter to longer networks, within and without the laboratory as the scientists moved from weak points to strongholds. Combining this discussion with the Callon's (1986) investigation of the scallop industry in France and Law's (1986) discussion of how the Portuguese government exerted control over explorers from a distance, their sociology of translation became known as ANT. "The Pasteurization of France" (1988) explored how science and politics intertwined to successfully produce new knowledge, accepted by society as fact. The use of networks within and without the realm of the laboratory in the making of facts was a central concept.

Differing from previous social network analysis, ANT critically evaluates the construction of knowledge in general, and scientific knowledge in particular, when both human and non-human actors are taken into account. In his more recent publication

which synthesis his work, Latour (2005) acknowledged ANT as a theoretical framework, pointing to the Callon's work on scallops, Law's work on carracks and his own book "The Pasteurization of France<sup>1</sup>" (1988) as good examples of the use of ANT as a framework.

### **Actor-Network Theory**

Still sometimes referred to as the 'sociology of translation' because it investigates how previously accepted facts are translated into new knowledge, ANT is an analytical framework used to study the roles played by humans and non-humans (such as technology, science and nature) in the structuring of relationships that come together to form an apparently coherent whole (Callon, 1986; Latour, 1986; Law, 1986). It has earned the label 'translating knowledge' as it is presupposed that the network is transient and exists in its current form only to undergo further development (change) and take on a new reality (Latour, 2005).

Within the literature, ANT is often accredited exclusively to the work of Latour, however its development is more precisely a product of the collective works of the three science and technology studies scholars, namely Michael Callon, John Law and Bruno Latour. Though Callon, Law and Latour have published together (see, as examples, Callon & Latour, 1992; 1995; Callon & Law, 1982; 1997) there is little doubt that the most prominent writer and exponent of ANT is indeed Latour with over 30 authored publications so this perceptible relationship is understandable (Law, 2002).

Latour (1987; 2005) proposes that 'Society' is made up of associations between actors who combine primary and secondary information into new information which they then put forward as a knowledge claim. ANT considers the process undertaken where actors, both human and non-human, form a network to support a knowledge claim in order to increase their status and influence. It is referred to as a 'claim' because it may or may not be accepted by others external to the network as fact (Latour, 1987).

The theory assumes a particular view of society, actors and networks. Latour (2005) argued that society can be viewed in two different ways. The social scientist may take the stance that the social world exists externally from the individual. It is real and can be described, in the same way the natural world can be described. The social world is not created by the individual; the individual is born into it. Using the social world as reality, social scientists give certain traits to the phenomenon which they are investigating, and then go on to explain how this social world affects other domains of reality, such as law or economics (Latour, 2005).

According to Latour (2005), society does not exist as 'out there' with a precise domain and properties (including order and structure). The labels 'social' or 'society' cannot be attributed to any specific reality. There is no overarching social context in which actors can be framed or embedded. Instead, society is made up of ties, or associations, between actors. What is social is deemed to be the trail of associations between heterogeneous elements, not the elements themselves. The social is made up of the connections between actors. Research using this theory seeks to trace these associations without imposing a specific reality, devised by the researcher, upon the actors. The actors must be able to formulate their own theories regarding the structure of their social world (Latour, 1986; 2005). ANT adopts a constructionist approach to theoretical development which is in contrast with more traditional scientific approaches where the falsification of apparent facts is not a prerequisite to knowledge advancement (Popper, 1959). ANT further reflects a school of thought that is preoccupied with the French Post-structuralism as the modes operandi to explore multiple material semiotic relationships.

**Table 1: Citational Analysis**  
(*n* = 27)

No. of Citations		Authors' Names	Year/Journal	Analysed in
Google	Social Science			This Study
				Yes/No
150	15	Mouritsen, J.; Larsen, H. T. and Bukh, P. N. D.	2001 AOS	Yes
144	27	Chua, W. F.	1995 AOS	Yes
130 <sup>3</sup>	39	Preston, A. M.; Cooper, D. J. & Coombs, R.W.	1992 AOS	Yes
117	48	Robson, K	1992 AOS	Yes
93	34	Briers, M. and Chua, W.F.	2001 AOS	Yes
90	13	Baxter, J., & Chua, W. F <sup>1</sup>	2003 AOS	No
87	29	Robson, K	1991 AOS	Yes
77	18	Jones, C. and Dugdale, D.	2002 AOS	Yes
55	25	Miller	1991 AOS	Yes
27	5	Lowe, A	2001 MAR	Yes
25	7	Miller, P. <sup>2</sup>	1997 AOS	No
19	2	McNamara, C., Baxter, J. and Chua	2004 MAR	Yes
16	6	Cooper, D. J., & Robson, K <sup>4</sup>	2006 AOS	No
16	2	Gendron, Y., & Barrett, M	2004 CAR	Yes
15	1	Lowe, A	2001 AAAJ	Yes
10	1	Lowe, A <sup>5</sup>	2004 AAAJ	No
5	1	Ahrens, T. and Mollona, M <sup>6</sup>	2007 AOS	Yes
5	1	Cuganesan, S. and Lee, R	2006 MAR	No
4	0	Lounsbury, M.	2008 AOS	No
4	1	Lowe, A	2001 JOCM	No
3	0	Alcouffe, S. and Berland, N. and Levant, Y.	2008 MAR	No
0	0	Bukh, N and Jensen, I.K.	2008 HRCA	No
0	0	Cuganesan, S.	2008 AAAJ	No
0	0	Emsley, D.	2008 AAAJ	No
0	0	Hopper, T. and Major, M	2007 EAR	No
0	0	Hyvönen, T. and Järvinen, J and Pellinen, J.	2008 MAR	No
0	0	Quattrone, P	2009 AOS	No

See Notes to this table on Next Page.

## Table Notes:

- The bolded articles are discussed in the present investigation.
- Studies below the line were not cited due to lack of citations. In many cases this is due to their recent publication date.
- The full citations for each study are included in the Reference list.
- The above citation scores were obtained on January 12, 2009.

AOS = Accounting Organisations and Society

MAR = Management Accounting Research

CAR = Contemporary Accounting Research

AAAJ = Accounting Auditing and Accountability Journal

JOCM = Journal of Organizational Change Management

EAR = European Accounting Review

1. Baxter and Chua (2003) was not covered in detail as ANT is not the only focus of this paper which puts forward a number of alternative theories.
2. Miller (1997) was not covered in detail as this paper was primarily a review of one of Latour's books.
3. This figure includes citations for a related book.
4. Cooper and Robson (2006) was not included as ANT was only a small part of their discussion.
5. Lowe (2004) was not included as ANT was one of several theories used and it did not empirically test ANT.
6. Ahrens and Mollona (2007) were included as while there number of cites is quite low, it is a high figure given the recent date of publication of the article.

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<sup>1</sup> It should be noted that his colleague at the Centre de sociologie de l'Innovation at the Ecole nationale supérieure des mines in Paris, Michael Callon, and the British sociologist John Law were also early influences on the development of this theory (Vidmar-McEwen, 2008).

<sup>2</sup> The popularity and influence of ANT around the world may well be a product of the appeal and quality of its attributes (for example, the inclusion of broad networks in an attempt to explain transformation in society) but also a willingness by the co-founders to publish their findings widely including in various languages. These attributes combined with a willingness to conduct diverse field studies around the world (especially the U.S.) all have served to increase the legitimacy of ANT as a plausible conceptual framework for studying diverse phenomena (Law, 2002).

<sup>4</sup> Some researchers such as McLean and Hassard (2004) and even Latour (1999) himself had argued that ANT is not a theory of the social, subject or nature but a "very crude method to learn from the actors without imposing on them an a priori definition of their world building capacities (Latour, 1999: 20). More recently, Latour (2005) acknowledged ANT as a theoretical framework (Latour, 2005).

<sup>5</sup> The term was used by Law (2003) to describe how networks are not always stable, and over time can fall apart, the separate elements, previously taken for granted, becoming separate and visible to the observer. Law uses the example of a television – if it is in working order one sees simply a television. If it ceases to work one becomes aware of television repair men, circuits, spare parts and aerials; all of which make up a working television.

<sup>6</sup> See previous note.