The role of actor-networks and boundary objects in management accounting change: a field study of an implementation of activity-based costing

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Abstract

This field study seeks to illustrate how an organisation’s accounting system can be changed by a heterogeneous actor-network of local and global actors and actants. In particular, it focuses on the role of boundary that were able to stabilise and mediate diverse interests. Five types of boundary objects were identified — data repositories, visionary objects ideal type objects, coincident boundaries and standardized protocols. Here, accounting change was anti-herculean — the effort of many as opposed to a powerful few had to be corralled. Also, change was cyclical, as new accounting technologies were adopted on faith, made to ‘work/succeed’ temporarily, and then abandoned. © 2001 Elsevier Science Ltd. All rights reserved.

1. The problems

“See this ... see this”, exclaimed Kerry, an industrial engineer at Alroll, pointing to some small pieces of glistening metal in amongst the oil covering a large piece of machinery, “this is part of the cost I’ve been on about!”. Wearing protective ear muffs, spectacles, hard hats, boots and coats, the industrial engineer had led us down three flights of oil-clogged metal steps beneath the giant hot mill as part of a tour of the hot line to “see for ourselves” the problems caused by rolling plate on this equipment. At an earlier meeting of the newly formed “costing task group”, Kerry had energetically explained that due to plate’s metal-lurgical properties it became brittle along the edges while being hot rolled. Sometimes pieces of metal would break off and fall down onto the machine’s gearing, thus causing delays in production while the metal was being removed. Later during the same tour we watched as a piece of flat aluminium plate was precariously taken off the “run-out table” by an overhead crane. “There”, Kerry said, “that’s one of the reasons why our scrap and rework rate is so high for plate — the present cost system just does not take that into account”.

More generally, the company’s management information system was seen by organisational actors as possessing numerous, “serious” deficiencies with respect to rapid monthly reporting, product costing, performance measurement and strategic product mix decision-making.

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2. The rational solutions

Various solutions were instituted by the company over a period of 3 years. These included:

(a) project to identify and gain consensus on key success factors;
(b) Project to develop lower level performance indicators for each functional responsibility area within the business unit;
(c) Development of an activity-based costing (ABC) model;
(d) Decommissioning of an existing standard cost information system;
(e) Development of an integrated financial management information system.

An ABC model was developed. It eventually ‘worked’ and was pronounced a ‘success’. Its output persuaded management to discontinue the production of plate.

3. Soon afterward

The ABC model was not further developed after the plate decision was made. Eventually, it too, was superseded by another system innovation. According to one of the model’s earliest and strongest sponsors, he and his accountants later had their “hands full” implementing an integrated “financial management information system” that was tied to “activity-based-management”. Also, “people had lost interest and, anyway, since (the consulting firm) left, nobody can really understands the software”.

4. Rationale

The aim of this paper is to use actor-network theory to illustrate how networks of heterogeneous machines, boundary objects, local actors and cosmopolitans can change an organisation’s accounting and productive activities. Of particular interest is the two-way connections between local and global, for example, the ways in which local organisational discourses and action are influenced by and influence the putative actions of unseen others. In addition, we focus on the role of different types of boundary objects, that is, devices that are able to mediate different actor-worlds. The larger research questions which the current project addresses is — how does accounting change occur, or more precisely, how is change enacted? These questions are interesting for the following reasons.

In the last decade, firms have been exposed to a significant number of ‘new’ managerial technologies. All of these could be said to have ‘management accounting’/management control implications — activity-based costing (ABC), ‘balanced scorecards’, target costing, and enterprise resource planning systems such as SAP and Oracle Financials. Reports of accounting change are widespread in the financial mass media. Recent research lends some support to these reports. Libby and Waterhouse (1996) found that 31% of their sample of 24 medium-sized Canadian manufacturing firms reported changing their management accounting systems in the period 1991–1993.

While change may be material, it has also been uneven. Firms have not embraced all that is claimed to be innovative and beneficial. Among the list of ‘innovations’, ABC appears to have had a low implementation rate despite strong advocacy from well-known sponsors (Cooper, 1988; Cooper & Kaplan, 1988a,b). In Britain, Innes and Mitchell (1991) report a low adoption rate of 15% in their survey of 187 management accountants (see also Innes & Mitchell, 1995) and surveys elsewhere in the United States (US) (National Association of Accountants, 1991; Shields, 1995) and Europe (Lukka, 1994) give a similar account. In addition, it appears that of the firms that do adopt ABC, a number decide to abandon it (Cobb, Mitchell & Innes, 1992; Gosselin, 1997; Innes & Mitchell, 1991), resulting in conflicting reports of its efficacy (Shields).

Taken together — the materiality and the unevenness of accounting change — these two aspects prompt the following questions. What are the precondition and processes of change? Given that some firms adopt an innovation only to abandon it at some later stage, how may we characterise ‘successful’ and ‘not-successful’ accounting change?

Over the last decade, we have gained but a modest understanding of answers to such questions. In 1987 (p. 207), Hopwood wrote:
Unfortunately, however, very little is known of the processes of accounting change. As of now we have only a limited understanding of the conditions which provide the possibility for particular conceptions of the accounting craft, the forces that put accounting into motion, the processes accompanying accounting elaboration and diffusion, and the varied human, organisational and social consequences that can stem from changing accounting regimes.

Almost a decade later, we find similar sentiments being echoed by writers on the other side of the Atlantic. Libby and Waterhouse (1996, p. 137) write that “surprisingly little is known about the actual rate of adoption of changes to accounting systems” and “even less is known about the forces that induce or act to impede change in accounting systems”. Speaking specifically of ABC systems, Shields (1995) conducted an “exploratory” study into the implementation experiences of firms, examined no less than seventeen different variables (ranging from organizational culture and strategy to top management support) and concluded by calling for additional research.

These calls arise partly because several studies in the 1990s have pointed to the complex nature of accounting change. Innes and Mitchell (1990), for example, produce a large list of potential change agents that they classify as motivators, catalysts, and facilitators. An even greater sense of complexity and contingency is introduced by Hopwood’s “archaeology” of change (Hopwood, 1987, p. 227) which concluded that:

The emergence of a particular account has been shown to be neither an unproblematic reflection of a more abstract intent nor a sudden discovery or transformation. Rather the cases have illustrated the more positive ways in which specific local origins moderated the path of accounting development and the multiple and even conflicting conditions of possibility that gave rise to particular manifestations of the accounting craft. ...... In none of the cases was any imperative driving a particular outcome.

This line of reasoning is echoed by Bhimani (1993) who also concludes that accounting change is determined by circumstance as opposed to essence. His historical analysis of change at Renault over the period 1898–1938 especially highlights the impact of diverse, independent, “extraorganisational” factors — wider discourses among the community, warfare, government policies, the preferences of Renault’s founder, Louis Renault, French translations of Taylor’s work on scientific management, etc. These studies mesh with two other histories of accounting innovation in the United Kingdom — Miller’s (1991) account of the popularity of discounted cash flow in the 1960s and the study by Burchell, Clubb and Hopwood (1985) on the emergence of value added accounting.

Collectively, these studies point to the danger of constructing overly rational efficiency explanations (cf. Chandler & Daems, 1979) and of being content with noting empirical regularities constructed through distant sampling procedures (Gosselin, 1997; Shields, 1995). Accounting change, these studies suggest, is particularized by context and may not be driven by predictable, universal imperatives. Not even economic crises, it seems, necessarily induce accounting change of a particular type (see Abernethy & Chua, 1996; Ezzamel & Bourn, 1990). This line of work also reminds us of a need to investigate the impact of both extra-organisational and organisational factors on accounting change. Distant (in both spatial and temporal dimensions) discourses and autonomous, unconnected factors may and can penetrate the enterprise and thus have a substantive and lingering impact on organisational accounting.

This paper concurs that change is influenced by diverse confluences of organisational and extra-organisational factors. It complements, but also differs from extant work. We do not focus solely on the beliefs and desires of key stakeholder groups1 (cf. Palepu, 1987) or assume the power of economic imperatives (cf. Chandler & Daems, 1979). Neither do we narrate the emergence of

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1 The desires, beliefs and values of the powerful clearly play a role in accounting change (see Ezzamel & Bourn, 1990, and Dent, 1991) but these are just one element in a landscape peopled by myriad actors and machines.
particular accounting ‘constellations’ (cf. Burchell et al., 1985) or of ‘non-subjective discursive regimes (cf. Miller & O’Leary, 1987). We also do not emphasize the circumstantial and serendipitous dimensions of change.\(^2\) Instead, we follow networks of actors, actants and allies; investigating the active choices of unequal, heterogeneous actors and the role of boundary objects embedded within temporarily stabilized, transorganisational networks.

This focus on the agency of heterogeneous elements arises because of a wariness of diffusion theories of innovation that are overly socially determined (see Latour, 1987, pp. 142–143). Such theories suggest that new technologies (such as activity-based-costing), once shown to be efficient ‘best practice’, or aligned with the aims of powerful groups, will tend to spread through a population of organisations. Latour suggests, however, that the success/failure of a machine or technology cannot be predicted by correlating with a list of ‘social factors’ (for example, alliance between state agencies and industrial capital; collusion between accounting firms and accounting standard-setters, etc). Instead, the fate of a technology is more fraught. It lies in the hands of those who come after the ‘inventor’ and success/failure is a social accomplishment by many different human and non-human elements. Further, diffusion implies that identical clones are reproduced in subsequent adoptions when the specificity of context often results in major translations and modifications. Firms A and B may both believe they operate an activity-based-costing system but the machines are quite different and they do different calculations in different ways.

Our narrative, thus, is distinctively premised on a concept of agency. But it is not an unreflective heroic notion of agency and change. As Laws (1991) writes, highlighting the role of heterogeneous actors and actants helps avoid the presumption that the powerful are somehow very different from the weak and always powerful. In our story, powerful heros or machines are built out of fragile, heterogeneous networks, and a triumphant technology might only be king for a relatively short time. In addition, the concept of ‘networks’ emphasizes how borderless organisational life is; and we particularly study how local action and aims are wired to legitimate, extra-, ‘global’ discourses through knowledge experts and boundary objects (see also Chua, 1995). While other researchers (such as Bhimani, 1993) have pointed out how ‘internal’ accounting change may be materially influenced by extraorganisational factors, we wish to extend this by distinguishing between local actors bound by place and context and more cosmopolitan actors who traverse space easily.

Finally, more so than other frameworks, we research the creation and maintenance of boundary objects. That is, objects that are able to mediate diverse actor worlds. Some of these objects have a corporeal form, residing as lines of code in the operating units of computers. They form parts of larger machines/systems that are centres of calculation, producing reams of papers entitled ‘Standard Costs of Product Lines’. Other boundary objects do not have a physical form — objects such as ‘value generation’, ‘empowerment’, ‘world best practice’ are brought to life only through social interaction. In this paper, we put forward a typology of such boundary objects and illustrate the operation of these objects.

5. Background literature

Actor network theory derives from the work of Latour and Callon (see Callon, 1980, 1986; Callon, Law & Rip, 1986; Law & Callon, 1992; Latour, 1983, 1987, 1988, 1992, 1993; Latour & Woolgar, 1979). It has already been adapted to a study of accounting change (see Chua, 1995; Miller, 1991; Preston, Cooper & Coombs, 1992; Robson, 1991, 1992). In this paper, we wish to focus on the actions of cosmopolitans and locals that are tied together in intersecting, interorganisational networks. As Hannerz (1990) points out, the cosmopolitan-local distinction has been part of the sociological vocabulary since Merton (1957) developed it in his study of a small town in the eastern US. Then, the distinctions were set in a national setting. Today, cosmopolitans are theorised as global travellers.
whether one uses Hannerz’s definition of ‘cultural openness and competence’ or that of the ‘world class practitioner’ of Kanter’s:

The perspective of the cosmopolitan must entail relationships to a plurality of cultures understood as distinctive entities.....A more genuine cosmopolitan is first of all an orientation, a willingness to engage with the Other. It is an intellectual and aesthetic stance of openness toward divergent cultural experiences, a search for contrasts rather than uniformity (Hannerz, 1990, p. 239).

Cosmopolitans are rich in three intangible assets, three C’s that translate into pre-eminence and power in a global economy: concepts — the best and latest knowledge and ideas; competence — the ability to operate at the highest standards of any place anywhere and the connections — the best relationships, which provide access to the resources of other people and organizations around the world. ...Cosmopolitans carry these three C’s with them to all the places in which they operate. As they do so, they create and become part of a more universal culture that transcends the particularities of place — and, in the eyes of some locals, threatens the distinctive identity of groups and communities (Kanter, 1995, p. 23).

These two views are clearly different, emphasising as they do cultural openness versus globally-connected expertise and power. Nevertheless, both highlight that cosmopolitans are global actors in the sense that they are adept at penetrating spatial and cultural boundaries; they possess this particular competence and orientation. We would emphasise that cosmopolitans are global in two additional senses.

First, as Kanter (1995) points out, they either work for global chains or for organisations that are linked to global chains. Consulting organisations like Andersen Consulting, McKinseys, and the large accounting firms, for example, have offices throughout the world. Their global human resources may be called upon to work on projects far from their ‘home’ office. A healthcare consulting project located in Jakarta could, for instance, comprise of staff sourced from offices in Australia, the US, Malaysia, the United Kingdom, etc. Such boundary-crossing, multinational teams enable technologies originating from one space to be made known very quickly to actors physically located in other spaces. As a result, these technologies (such as SAP, MRPII, ABC, etc.) relatively quickly come to be perceived as transnational; they travel effortlessly across man-made boundaries and fast lose the history of their spatial and temporal origin, thus reflecting the compression of space-time in the present world (Harvey, 1989). Few actors in today’s global commercial networks would fail to decipher the acronyms — ABC, JIT or TQM; indeed, failure could easily be equated with lack of ability, and with being ‘out-of-date’ and ‘out-of-touch’.

Second, cosmopolitans have in their possession a range of what Star and Griesemer (1989) and Fujimura (1992) call boundary objects. These objects:

both inhabit several intersecting social worlds ... and satisfy the informational requirements of each of them. Boundary objects are objects which are both plastic enough to adapt to local needs and the constraints of the several parties employing them, yet robust enough to maintain a common identity across sites. They are weakly structured in common use, and become strongly structured in local use. These objects may be abstract or concrete. They have different meanings in different social worlds but their structure is common enough to more than one world to make them recognizable, a means of translation. The creation and management of boundary objects is a key process in developing and maintaining coherence across intersecting social worlds. (Star & Griesemer, 1989, p. 393).

... are simultaneously concrete and abstract, specific and general, conventionalized and customized (Star & Griesemer, 1989, p. 408).

A boundary object ties together actors with diverse goals because it is common to multiple groups but is capable of taking on different
meanings within each of them. Star and Griesemer identify four types of boundary objects that have the ability to mediate different actor-worlds — repositories of things, ideal types, coincident boundaries and standardized forms/work methods. In the accounting context, data repositories such as cost driver matrices, customer/supplier databases, general and subsidiary ledgers are boundary objects. They store data in such a way as to enable different groups to use and reconfigure the information differently. Modularised financial packages are another. People from different worlds can buy different modules for their own purpose without having directly to negotiate their differences in purpose. Ideal type objects include costing systems, performance management systems, etc. These are objects that are reasonably well-understood by different groups. Engineers, accountants and operational managers all know in some general sense what a standard costing or an ABC costing system does. All these different functional specialists from different organisations can talk about ‘ABC’. They share a certain knowledge about that object. But the ABC system in Firm A could differ in important respects from that in Firm B. Ideal boundary objects have this distinctive characteristic — a hard ‘outside’ and a plastic ‘inside’ that can be moulded to suit different requirements. Organisations also have common objects that have the same boundaries but different ‘internal’ contents. The physical contours of a product, for example, are common whether it is seen as a cost object by accountants or a sales/revenue item by marketers. Similarly, the physical set-up of a division is the same whether it is seen as a ‘downstream’ operation by production personnel or a cost centre. These common objects enable functional specialists to use their different perspectives relatively autonomously and for cooperating parties to share a common referent. And finally, standardized methods of collecting, aggregating and transforming data are also boundary objects that mediate different sites and times. Note how an off-the-shelf, stand-alone accounting software package comes with a user manual, certain technical specifications and general instructions on appropriate ‘roll-out’ throughout the organisation. These objects discipline ‘invalid’ usage by unknown users and help reduce diversity to that permitted by the package.

To the list already identified by Star and Griesemer, we would like to add a fifth form of boundary object — visionary objects. These are conceptual objects that have high levels of legitimacy within a particular community. They can evoke similar emotive and affective responses from a wide spectrum of people; possessing a sacred quality that makes it difficult for a ‘rational’ person to be against them. Every manager, for example, desires ‘deep knowledge of their business’, ‘efficient work practices’, ‘precise costing systems’, ‘accountable management’, and ‘world best practice’. But the precise identity of these objects is unknown until it is customized and tailored to specific settings. In one firm, ‘efficiency’ might mean the establishment of a balanced scorecard, in another it might translate into the buying of an enterprise resource planning system.

In order to use the ideas detailed above, we deliberately arrived at the start of an accounting controversy and studied an eventual accounting change by following an actor network of cosmopolitans, locals, and boundary objects. The empirics is based on an ethnography of a manufacturing strategic business unit of a major Australian mining company. Active fieldwork was conducted over the period October 1988–July 1991 in the company’s Sydney plant. During this time, as one of several organisational initiatives, the company wrestled with its accounting system, being concerned about the quality of its cost information. Entry to the organisation was obtained via the accounting function. Data were collected from personal and group interviews, observation, internal documents and public archives. In total, 91 formal interviews were conducted, 43 formal meetings were attended and 137 days of informal participant observations were recorded. Table 1 records the list of key informants followed, their pseudonyms and their functional responsibility area. Events at the company are divided into four distinct temporal phases, which represent four distinctive ‘trials of strength/authority’. The depth and nature of researcher involvement during those trials is shown in Table 2, which also details the main types of data collected during each trial.
While accountants figured prominently in the early trials, a broader cross-section of participants informed the latter trials. In each of the trials, the authority of an existing costing system/machine was questioned and renewed efforts to develop a new form of product costing were apparent. Greater detail on data sources can be obtained from Briers (1997).

It should be noted that the paper has been deliberately constructed as a theorised account so as to avoid as much as possible a distinction between ‘description’ and ‘explanation’ (although a series of reflective comments conclude the paper). Latour (1991, p. 129) argues that separating description and explanation is unnecessary:

[i]f we display a socio-technical network — defining trajectories by actants’ association and substitution, defining actants by all the trajectories in which they enter, by following translations and, finally, by varying the observer’s point of view — we have no need to look for any additional causes. The explanation emerges once the description is saturated.

### Table 1
Key actors followed

<table>
<thead>
<tr>
<th>Actor</th>
<th>Position at Alroll</th>
<th>Disciplinary specialisation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ken</td>
<td>Manager — systems</td>
<td>Accounting</td>
</tr>
<tr>
<td>Harry</td>
<td>General manager — services</td>
<td>Accounting</td>
</tr>
<tr>
<td>Bruce</td>
<td>General manager — foil and GS&amp;P</td>
<td>Production</td>
</tr>
<tr>
<td>Kerry</td>
<td>Manager — BIP</td>
<td>Industrial engineering</td>
</tr>
<tr>
<td>Mark</td>
<td>External consulting partner</td>
<td>Accounting/engineering</td>
</tr>
<tr>
<td>Paul</td>
<td>External consultant</td>
<td>Accounting</td>
</tr>
<tr>
<td>Glen</td>
<td>Business analyst</td>
<td>Business administration</td>
</tr>
</tbody>
</table>

### Table 2
Extent and nature of involvement by research phase

<table>
<thead>
<tr>
<th>Research characteristic/phase</th>
<th>Antecedent world</th>
<th>I</th>
<th>II</th>
<th>III</th>
<th>IV</th>
<th>Totals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Length of time</td>
<td>44 years</td>
<td>7 months</td>
<td>7 months</td>
<td>9 months</td>
<td>10 months</td>
<td>Management information project team</td>
</tr>
<tr>
<td>Primary fact-building actors followed</td>
<td>Historical</td>
<td>Various formal interviews</td>
<td>Accounting group</td>
<td>Costing task group</td>
<td>33 months</td>
<td></td>
</tr>
</tbody>
</table>

**Primary technology focus**
- Standard cost system
- Business model
- Activity based costing
- Just-in-time
- Supervisory system
- Financial management
- Information system
- Activity based management

**Primary sources of data**
- Documentation
  - #Formal interviews: 16
  - #Formal meetings: 1
  - In situ observations and opportunistic interviews (days): 1/2 day
- Transcription devices
  - Field notes
  - Audio tape
  - Video tape
6. The organisation — Alroll

Alroll, a manufacturer of rolled aluminium products, is a downstream operation of Alco, a vertically integrated aluminium company. Alco, in turn, is majority (67%) owned by a large Australian mining corporation, Minecorp (see Fig. 1). Since its inception in 1960, Alco has developed an international network of processing facilities and at the time of study comprised eight of Minecorp’s nineteen operating business units. Its structure reflects the main stages of aluminium production as shown in Fig. 2. It is a significant supplier of bauxite (the ore of aluminium), alumina, primary aluminium and various manufactured aluminium products to domestic markets and is one of Australia’s leading exporters.

The outputs of each production stage are either sold externally or transferred (at market prices) to other business units within the Alco group for further (downstream) processing. The largest proportion of Alco’s revenues comes from the production and sale of rolled aluminium in Australia and the US, followed by primary aluminium sold to third parties, then mineral products.

Alroll produces and markets approximately 4,000 different rolled aluminium products and recycles used beverage cans (UBC) as well as other ‘in-house’ scrap. The three major product categories are Canstock, Foil and General Sheet and Plate (GS&P) (see Fig. 2) which contribute approximately 65, 10 and 25% respectively, to Alroll’s total annual sales of about 80,000 tonnes (refer to Table 3 for other key product features). Recycled scrap metal (including UBCs) contributes about 50% to the business unit’s production requirements with the remainder, in the form of rolling blocks and ingots, obtained (at market price) from Alco smelters. Alroll’s manufacturing facility is located in Sydney, Australia.

7. Overview of events at Alroll

Recall that the study is divided into four distinct phases/trials of strength. The first trial centres on the authority of Alroll’s standard cost system. The second trial deals with the accounting group’s first

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Fig. 1. Overview of minecorp structure.

Fig. 2. Alco structure.
attempt to construct an ABC model to challenge both the standard cost system and, more particularly, the business model created by the business analyst group. It begins with connections being made by key locals with cosmopolitan experts advocating ABC. The third trial focuses on a second attempt to construct an ABC model through the mobilisation of cross-functional specialists in the context of a radically altered organisational structure and a pressing “product mix” decision. The fourth trial concerns a broader and higher status project (again instigated by the accountants), which sought to mobilise various “high level” functional specialists and cosmopolitan management consultants to construct a comprehensive “information system”, which included a third ABC product costing model and an “integrated” performance measurement system.

An overview of the four trials is depicted in Fig. 3. Each of the four trials traces the translation of interests broadly concerned with the construction of ‘better’ product cost information and control technologies at Alroll. The trials are organised around significant organisational events/restructurings and major changes in the ownership/sponsorship of the technologies in question.

8. Stepping back in time

Before embarking on an analysis of each of the four trials, it is instructive to set out the historical development of the relationships among Minecorp, Alco and Alroll. The aim here is to construct a ‘backcloth’ of actors and actants/inscription devices from which to begin the more detailed analysis of the costing controversy.

8.1. Alroll — the metal tap and product proliferation

Alroll management viewed their company as Minecorp’s “metal tap”. That is, Minecorp’s mining operations were seen as core and the production of semi-fabricated aluminium products a supporting, peripheral function. The main thrust of this strategy was to ensure existing aluminium products maintained or increased their market share and new products were constantly developed. A continual increase in the sales volume expressed in tonnes of semi-fabricated metal over the period 1960–1986 reflected this strategy as did the ever widening range of rolled products (nearly 5000 in 1986).

8.2. Industrial engineering expertise and the PISCES

Industrial engineering (IE) expertise was institutionalised early at Alroll. The early plant general managers had IE qualifications and they set up a centralised IE function. This group controlled a key inscription device and boundary object — the ‘plant integrated standard cost system’ (PISCES), which began operation in 1966. The heart of the PISCES consisted of thousands of engineering standards representing diverse elements across the plant relating to human, machine or process performance as well as material consumption and primary metal usage. These standards were a very large boundary object — enabling general managers, production managers, sales managers, product designers, accountants, etc. to discuss the profitability or otherwise of a complicated suite of products. Computerising and hence stabilising (by reducing organisational memory loss, error, etc) these standards enabled Alroll’s cost engineers to quickly recombine data so as to compare the world of new products not yet made with the current world. Provided standards were accurate, the PISCES effectively speeded the time to market for new products without losing cost control. This
meant the system and its designers were able to align themselves with the twin concerns of management — to expand product range without sacrificing cost control. Such alignment gave the IEs authority and legitimacy within the organisation to the extent that although the PISCs embodied both industrial engineering and cost accounting expertise, the latter was subordinated to the former. The IEs were recognised as the system owners and cost accountants played a secondary role in providing inputs to the system and assisting with the interpretation of cost reports. Furthermore, changes could not be made to the PISCs without approval from the IEs, the machine was very clearly theirs.

The system, however, relied on the efforts of many other actors to maintain its ‘representational faithfulness’. For it to be Alroll’s product costs made durable and visible, this centre of calculation had to be kept informed of all relevant price and process changes. Standards had to be continuously updated. Moreover, the power of the system came to be identified with the “metal tap” strategy such that when major structural and strategic change came in the early 1980s, the PISCs began to lose allies. It no longer held all the necessary answers to the questions that managers from different functional divisions and levels of the organisation were asking.

9. The four trials of strength

9.1. Trial one: re-constructing the enterprise and inventing the business model

During the 1980’s, rapid changes occurred in the Australian economy. The progressive reduction of tariff barriers increasingly exposed the domestic economy to the pressures of international competition and facilitated a mass discourse that challenged

![Diagram]

<table>
<thead>
<tr>
<th>Technologies</th>
<th>Trial One</th>
<th>Trial Two</th>
<th>Trial Three</th>
<th>Trial Four</th>
</tr>
</thead>
<tbody>
<tr>
<td>PISCs (IE)</td>
<td>ABC (ACC)</td>
<td>PISCs (ACC) (Turned Off)</td>
<td>ABC (ACC)</td>
<td>ABC/SS/FMIS (ACC/CFPT)</td>
</tr>
<tr>
<td>JIT (IE)</td>
<td>JI (IE)</td>
<td>JI (IE)</td>
<td>ABC (ACC/CFG)</td>
<td>ABM/TBM (EMC)</td>
</tr>
<tr>
<td>BM (BA)</td>
<td>BM (BA)</td>
<td>BM (BA)</td>
<td>BIP (IE/EMC)</td>
<td>SS/BIP (IE)</td>
</tr>
<tr>
<td>EMC - Eikon</td>
<td>Restructured</td>
<td>Restructured</td>
<td>ABC (BA - Idle)</td>
<td>ABC (BA)</td>
</tr>
</tbody>
</table>


Technologies: PISCs - Plant Integrated Standard Cost System (Product Costing/Control) (Control)
JIT - Just In Time (Control)
BM - Business Model (Product Costing)
BIP - Business Improvement Project (Product Costing)
ABC - Activity Based Costing (Control)
SS - Supervisory System (Control)
FMIS - Financial Management Information System (Control)
ABM - Activity Based Management (Control)
TBM - Time Based Management (Control)

Actor Groups: ACC - Accountants IE - Industrial Engineers BA - Business Analysts EMC - External Management Consultants CFG - Cross-Functional Group (including EMC) CFP - Cross-Functional Project Team (Higher Status - including EMCS)

Events: OD - Organisation Development (Restructure) BIP - Business Improvement Project (Parallel Org. Structure - On-going)

Fig. 3. Overview of change process.
corporations to become ‘world class’, a visionary boundary object/concept that meant quite different things to different organisations.

At Minecorp and Alco, the following sequence of translations of this boundary object took place. Alco’s rolling and extruding operations at the Sydney site had previously been accounted for as cost centres. In 1979, these operations were designated as a profit centre and in 1985, Alroll was born and redefined as a strategic business unit within the Mill Products Division of Minecorp. A new Managing Director (MD) was appointed in 1986. He came from Minecorp’s mining operations, reported directly to Minecorp’s corporate headquarters and was responsible for achieving ‘stand-alone profitability’, a satisfactory return on funds and strategy development.

In addition, during the early 1980s Minecorp had begun a program of organisational restructuring [or organisation development (OD) as it became known] in each of its operations. This initiative had been influenced by the work of a cosmopolitan — Elliot Jaques (Jaques, 1989) and was an attempt to fully implement his stratified systems theory. The program involved setting up an OD team in each of the operating units. This team would undertake an extensive unit-wide interviewing program. The information collected in this manner would then be used to “build the structure from the bottom up” by identifying “output teams” (Jaques). The executive general manager of the Mill Products Division commissioned such an OD study in late 1984 to review the rolled products section of the division (which eventually became Alroll).

9.2. From ‘stand-alone profitability’ to ‘product profitability’ via the business model

The OD study resulted in two important structural and spatial changes. First, Alroll now recognised the three broad product groups: Canstock, General Sheet and Plate, and Foil, as separate areas of responsibility at the general manager level. Previously the major areas of responsibility had been along functional lines. Now, product groups were much more visible. Second, business analysis and planning was established as a new staff function. Within a few months of the new MD’s appointment at Alroll, he had begun to build a new group of experts — business analysts. He first recruited from his previous Minecorp operating unit and within a year had appointed a General Manager — Business Analysis. This specialist group had been created to “turn the business around”, to achieve ‘stand-alone profitability’ and a better return on core funds. But how was this to be done?

To help answer this question, the business analysts collected “facts” about Alroll. One of the most influential facts was the conclusion that Alroll’s competitors had a “better”, more focused product strategy and recommended that the product proliferation encouraged by the traditional “metal proliferation” strategy should give way to product rationalisation based on determining “the most profitable product mix”. Achieving ‘stand-alone profitability’ required knowing ‘product profitability’. This translation of product groups into cost and profit objects had fundamental effects on Alroll. How was ‘product profitability’ to be known?

According to the report prepared by the business analysts, “existing (information) systems cast little light” on the issue of product profitability. They pointed to the conclusions reached by the OD study that was begun in 1984. During the extensive interviewing phase of the study, the OD team had documented widespread concern regarding not only the poor quality of business information but also the proliferation of isolated information systems. In particular, concerns were raised about the adequacy of the PISCs with respect to the growing complexity of the system, the inadequacy of maintenance procedures and problems with the integrity of cost inputs from source documentation. Production managers had complained that the daily and monthly cost system reports were too voluminous and difficult to interpret. This was apparently compounded by a suspicion that standards were often not updated in line with new work practices and that there was a “lack of discipline” in coding source documentation for actual cost classification against standard. The OD team had identified a revitalised cost system as “a major future project”. The business
analysts agreed and argued that Alroll needed a system that disaggregated overhead or indirect costs and allocated them on a more "meaningful" basis to broad product categories. In essence, the authority of the PISCs was under threat. It was no longer seen as a stable, accurate calculating machine because its varied and many associations with 'economic reality' were now seen as tenuous rather than strong.

The business analysts built a new machine — the business model. Like the PISCs, this centre of calculation had to be laboriously constructed as it sought to tie together many aspects of the business unit that had hitherto been fragmented. 'Facts' had to be made up and stabilised, complexity had to be reduced, dissimilar objects had to be made identical and compromises made in order that information overload did not occur. As one of the business analysts later stated:

Determining profitability by product appeared an impossible task to [the principal analyst] at first. It required the allocation of full costs, both direct and indirect, to all products. At the time there were up to 4000 active product specifications — each flowing, with different configurations, through up to 100 traditional cost centres...To overcome the problem of dealing with large numbers of products, the existing product range was subdivided into fourteen major product categories, representing either major customer groups or product ranges which exhibited a high degree of similarity and hence cost structure.

Many actors became involved in this exercise of building more "precise" cost information. The marketing department, for example, allocated direct and indirect marketing costs; and "managers with most knowledge of the various operations" had to define the indirect costs of each cost centre and allocate these to product categories.

The most powerful text produced by the business model was the profit and loss statement by product group. This identified the "winners and losers", those products which "generated value" and those which "reduced value". And, by reorganising the fixed and variable costs, this new machine also identified each product's breakeven level of production. The business model was seen as the new 'Hero'. In reality, its strength rested heavily on information provided by its predecessor — the PISCs. In particular, product specification standards were used to determine a key allocation basis/cost driver — machine hours by product group. Also, the credibility of the business model was due, in part, to the alignment of some of its data to numbers already produced by existing cost systems. The aggregate profit performance of each product group, for example, reconciled closely with extant results and this enhanced its credibility in a somewhat sceptical environment. People knew the model was still in the development stage but because it yielded numbers that were 'similar', that inhabited the same numerical space as existing numbers, that had coincident boundaries, the business model was perceived as 'better'. It provided "information never before available on product profitability, it had already cast significant light on the unit's economics" (Internal Report, 1987). Yet, we would argue that this hero’s success depended crucially on the success of the machine it sought to defeat.

Of course, in the same way that the PISCs facilitated product proliferation, the business model embodied managerial desire for 'knowledgeable' product rationalisation. Given any particular proposed combination (mix) of products, the business model could apparently tell management how profitable the business 'really' was. It could rank products according to profitability and identify particular categories of products for further cost analysis. Action was taken in order to achieve this better future — products were dropped, machinery was decommissioned and sold, and employees were re-assigned to other work or sacked. The business analysts’ model thus simultaneously challenged PISCs's methodology for costing products and the image of Alroll as a metal tap. But a new strategic vision was only one element in the success of the business model. The machine also needed the existence of a new group of local experts — the business analysts, the new MD who brought them into the organisations, the cosmopolitan, Elliot Jacques, the discredited PISCs, other costing systems, etc.
9.3. Challenging and 'handing over' the PISCS

“The basic philosophy of the system is sound in principle”, began a report investigating the problems with Alroll’s standard costing system. The report, prepared by the IE department in response to the OD team’s concerns, therefore recommended retaining the system but using accountants, not IEs, to administer the PISCS:

The administration of the system and updating of the expense standards should be carried out by the cost accounting section. Qualified and experienced personnel are not required for such a function. A basic knowledge and a little training would enable any person to perform this task. Moreover, most of the paperwork of the system is handled by the Accounts. It will be convenient if administration is also managed by the Cost Accountants.

The cost system was formally “handed over” to the accountants in the following year (1987), however, most of the other IE recommendations for new hardware and software, and changed recording procedures were not implemented. Thus, while the accountants were left to administer a machine that was increasingly starved of resources and viewed as problematic, industrial engineering expertise was more “effectively utilised” elsewhere as Alroll embraced a kaizen or continuous improvement philosophy (Imai, 1991).

9.4. From ‘cost control’ to ‘process control’

Throughout the 1980s, the ‘innovativeness’ of Japanese managerial techniques caught the imagination of the West. Ideal boundary objects such as kaizen, JIT and TQM travelled far and fast, being transmitted both by the electronic and print media and humans. They arrived at Alroll while the OD study was still in progress. In late 1985, the new MD arranged for six people from the Canstock area of the operation (including two industrial engineers) to attend a series of JIT/TQM seminars conducted by the Australian Technology Transfer Council (TTC). During the mid-1980s the TTC had attempted to stimulate local manufacturers into adopting these new ‘performance enhancing’ techniques by sponsoring a series of pilot implementations. Alroll’s, and more specifically Canstock’s participation in this program, according to one industrial engineer:

planted the seed and got us thinking as a management group about reducing inventory and improving quality ... We made plenty of mistakes but learnt a lot from this [pilot study] about what [quality] measures are important ... process stability is important, [statistical] process control, days in inventory are all important ... but the real driver was cycle time.

Through Alroll’s link with this government-sponsored institution and its exposure to traveling TQM ideas, QUID (quality up, inventory down) teams were formed at Alroll. Dispersed IEs played a key advisory role in these teams, especially on the issue of process measurement. During the OD study, the new Alroll MD had apparently questioned the need for a centralised IE group and the OD team finally recommended that the IE function be decentralised. IEs were reassigned across the new organisational structure, became attached to QUIDs and became accountable to the various operations managers. They thus, simultaneously, shed off an increasingly burdensome PISCS and became involved with implementing a new managerial technology in the organisation.

Prior to trial two then, we had the following scenario. New strategic visions ruled at Alroll — product proliferation belonged to the past, product rationalisation, product profitability and JIT/ TQM now ruled the present and promised a better future. Competing groups of functional specialists contested the domain of ‘business knowledge’. The three main contestants — IEs, cost accountants and business analysts, brought different areas of expertise to the struggle, each seeking to be obligatory passage points through which management must pass in order to deliver a better future. There were now multiple centres of calculation owned by each — the IEs owned process control via JIT/ TQM, the business analysts focussed on product costing via the business model and the accountants had inherited an increasingly discredited
PISCES. Trial two represented an accounting attempt to fashion a new boundary object — an ABC system, and through this object to achieve a better future for their leader, the accounting group, and (perhaps) the organisation.

9.5. Trial two: fabricating ABC (version 1) and shutting down standard costing

Ken, the systems manager, representing Alroll at a strategic cost management seminar, sat and listened intently to the American academic presenter. It was late in 1988 and the seminar was being held in a conference room located in a plush hotel in downtown Sydney, Australia. The seminar was co-sponsored by a large accounting firm and a major university with participants who included both accounting practitioners and academics. The manager, along with two other senior accounting representatives from Alroll, had heard over the past two days how innovative approaches to the design of strategic cost management systems such as target, life cycle, activity, value added and quality based cost accounting had assisted some US firms in gaining a strategic advantage in an increasingly deregulated and competitive global economy. Ken could relate to the talk. Alroll faced increased competition from both local and overseas competitors. Also, Ken had first hand experience of Alroll’s attempts to implement JIT/TQM. Of particular interest to him was the realisation that the deficiencies in traditional product costing systems being identified at the seminar seemed to echo complaints that he and an external consultant had recently been documenting regarding the Business Unit’s existing standard costing system. Would ABC provide a solution to Alroll’s problems?

This seminar provides a snapshot of the route accountants would take in the battle for increased credibility at Alroll. For Ken’s accounting general manager, Harry, it represented a heterogeneous mix of elements (both human and non-human) at the intersection of powerful networks of association with which possible alliances could be forged. Potential allies included influential American academics/consultants, the technologies they spoke for, the local University and the accounting profession (as joint sponsors of the seminar), Alroll’s ‘new competitive and operating environment’, the perceived inadequacies of the existing cost system and the ‘undeniable logic’ of the ABC alternative. For some time, Harry had been concerned that his group had not only been seen as keepers of the much maligned PISCES but had also played a “back room” role in developing Alroll’s new strategic direction. Other groups in the organisation were, by contrast, enhancing their organisational status. The potential allies assembled at the seminar provided an opportunity for Harry to shake off his accountants’ “bean counter” image.

The persuasive potential of the American academic’s presentation rested importantly on his ability to ‘let the numbers tell the story’ and to link these numbers with ‘success stories’. Facts about the adverse consequences of relying on “flawed” cost information were forcefully presented through case studies of unseen, prominent US firms. There was no denying the arithmetic; low volume products were systematically undercosted on a per unit basis using aggregated volume based allocation methods relative to the more refined activity based costing methods. The reverse occurred for high volume products. With the presenter acting as a spokesperson for ABC, it was as if the companies were there speaking for themselves across time and space; “if you just do these calculations you will see what all these other successful companies have seen”. In addition, tying this technology to an even more powerful network of association, “JIT/TQM”, about which many participants at the conference were already convinced, aided this translation process; “if you believe in JIT/TQM you will also need ABC”. Judging from the questions asked by the participants, there appeared to be many converts to this new system of product costing in the audience.

This seminar also represented a growing awareness among some of the practitioners and academics.

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3 Neither of the two authors was involved in organising this seminar. Both were observers at this event.
present that both groups could mutually benefit from greater interaction. Management accounting practice, education and research were being widely criticised for having lost touch with contemporary organisational realities (Johnson and Kaplan, 1987). The explicit interests of the two groups began to merge. Practitioners could enrol academics as experts in their quest to develop convincing cost systems since the ABC ‘movement’ was widely believed to have originated from US academics. Academics could enrol practitioners to improve their understanding of contemporary business practice and hence gain credibility in research and education.

In the case of Alroll, the alignment followed this route. Senior organisational actors had begun to question the adequacy of the business unit’s existing method of product costing. The seminar presenter, acting as a spokesperson for all those firms which had successfully implemented ABC, represented a potentially powerful ally in persuading Alroll management of the need for an alternative. In this way the American presenter came to be part of a larger and stronger global network concerned, among other things, with constructing harder facts about ABC. Statements such as “product costs should reflect resource consumption” and “ABC product costs more accurately reflect underlying resource consumption patterns” were being translated into harder ‘facts’ such as “ABC costs are true” and “true and accurate costs are needed for strategic decision making”. In addition, ABC was being tied to other ‘trusted’ innovations — JIT and TQM.

Armed with a perceived array of allies, Harry, as the new Alroll spokesperson for ABC, set out to persuade his peers (and subordinates) of the need to develop an ABC system. He had read Johnson and Kaplan’s “Management Accounting: Relevance Lost” book and had also recently attended a workshop in Sydney conducted by one of these authors. Sending some of his accountants to the seminar referred to above was an initial move to enrol them in his project. But there would be unforeseen trials, unexpected new allies would need to be forged and older allies dropped on the uncertain path to an “accurate” product costing model and accounting credibility at Alroll.

9.6. “Knowing the business” and turning off the PISCS

As the door of the training room closed gently behind us the acrid smell of burning oil had already begun to leave our nostrils. The overwhelming boom and hiss of the hot rolling mill located less than 50 m away was reduced to a background noise as a steaming hot 10 tonne block of primary aluminium continued to be directed back and forth between its huge rollers. It was July, 1989 and the presenter at the front of the room tapped the side of the overhead projector to draw the groups attention to his first slide titled “Know Your Business”.

This “Know Your Business” training session was the first of a series organised by Harry to update his staff on various aspects of Alroll’s business operations. The general manager had been particularly concerned to make sure all his accounting staff were in attendance — too often his “bean counters” had been criticised for a lack of understanding of key business processes and strategy. A “sound knowledge of the business”, he had told them, would underpin their efforts to mobilise as a group to play a more active role in Alroll’s future direction.

“Know your business” was a visionary boundary object at Alroll. No one could argue against it. It was a truism — everyone had to ‘know the business’ in order to ‘value add’ (yet another visionary boundary object). But how would this object unravel?

Harry had planned a two-day off-site “Accounting Conference” for all Alco’s Sydney-based accountants. Quite by chance, he found the theme of the conference. “I’ve got the perfect case study for our accounting conference!” Harry exclaimed during a regular plant visit, “Plate is on the agenda again”, he continued. At a recent meeting of senior Alroll management, Harry explained, the issue of whether Alroll should continue to produce Plate had been discussed. This

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4 The product in question was actually a number of different products grouped into a “product family”, the definition of which remained the subject of debate and confusion throughout the study.
had apparently been a controversial issue for some time and had more recently been debated, without resolution, among Alroll’s senior management.

Plate was a troublesome, recalcitrant actant. All Alroll’s products had to pass through the hot mill. Plate, however, is the only product family that is not coiled on the second warm mill. Scheduling the production of plate, therefore, inevitably disrupted the stability of the hot rolling process. Also, its brittleness often meant that bits broke off during production, thus jamming machinery, increasing maintenance costs and machinery downtime. Further, Alroll produced only 1000 tonnes of plate per annum and this represented less than 1% of the hot line output. Despite these difficulties, plate was a high margin product and marketing had consistently argued that it was a valuable, complementary product to other GS&P products. This raised the concern that should plate be discontinued, sales in other areas would be lost and, since many GS&P products were sold through Alco’s distribution division, the problem would cross business unit boundaries. But of late, Alroll’s competitors had rationalised their product offerings and begun to set up dedicated rolling facilities that were consistently stable.

From Harry’s point of view the “plate problem” (as it became known) had all the ingredients to “challenge the accountants” as well as providing an opportunity to mobilise his accounting group to ‘know the business’. Now, this meant ‘know plate’. Also, the business model had consistently shown this product to be profitable. But what if the accountants showed that plate ‘really’ was unprofitable? Harry’s hopes that his conference would establish credibility for the accountants failed. Participants could not agree on the ‘proper’ sequencing of production or the preventive maintenance program. Also not one participant was able to describe, even broadly, how the business model allocated costs to products. This particularly frustrated Harry since Alroll’s MD was present during these presentations. The MD sat silently throughout most of the discussion and finally remarked that “you need to go forward on the basis of fact and come to some consensus on these issues”; he would need more convincing that the accountants could “add value”. The credibility of the accountants was again under threat. Concluding the conference Harry remarked that “more questions had been raised than answers!” and that “we should continue with this case study starting next week”.

In the week that followed, Harry decided to be more directive. The plate case study was to become the focus of a series of meetings involving all of the Alroll accountants in an “information gathering, analysing and interpreting” exercise:

What I would like to do is to see us have a series of meetings, the last one of which would be a presentation to the Managing Director and appropriate general managers on our findings. … [the first] meeting would focus on the information needed to reach a conclusion. The second and third meetings will be about working through the information gathered as a result of the first meeting and putting together a presentation for discussion. It would be necessary, of course, to assign people certain tasks to do.

Harry warned that this process would not be easy as the accountants would need to talk to a range of functional specialists who would probably not have the answers:

And your gonna get some production guys and you gonna get some engineers and so on … and lets not kid ourselves they’re not going to have all the answers either. You’re probably going to have to ask the same question to a couple of different people and then make a subjective judgement.

Indeed, the accountants might even need to check out the chief business analyst’s calculations:

… and you might need to select some of those products and look at the costing and see what the difference is; what makes one product different from another. Then we probably have to be able to look outside the accounting function and I think we have to go as far as [the chief business analyst’s] model. I think we have to look at those costings and try to
work out in our own minds whether some of them are fixed or variable both in the production process and the model. And then we can say well umm you know how [the chief business analyst] is allocating it and is that a reasonable sort of umm way of looking at it.

Despite Harry’s wishes, a recommendation regarding the plate issue was never made by this accounting group. The second meeting went ahead as scheduled and a senior accountant reported that:

It appeared that not all members of each group had been involved at all levels of the data gathering process. Steps need to be taken by each leader to ensure that each member of his group is involved to ensure that presentations to the next meeting have addressed the topic as completely as possible. In reviewing each presentation, quite a few questions were identified as still having to be addressed by each of the task groups.

A list of 35 additional unanswered questions were drawn up at the meeting and disputes continued to arise with respect to “soft” facts about the Alroll business. “Knowing your business” had been translated into “know plate”; but even this was becoming a real challenge, it seemed, particularly under circumstances characterised by quite rapid change and high employee turnover. Subsequent meetings were postponed indefinitely and the impetus that Harry had earlier been keen to generate seemed to have been lost altogether. His attempt to mobilise his accountants around plate had failed.

Trial two was essentially an attempt by Harry to mobilise the accounting group around the construction of another product costing technology to challenge both PISCs and the business model. Having been left with an increasingly discredited standard cost system, Harry had sought to improve the credibility of his accountants by attempting to simultaneously enrol them in his project and convince senior Alroll management that they could “add value” to the business. A stronger and global “ABC” network had provided a vehicle for this translation process as did an unexpected ally in the controversial “Plate problem”. As Harry began to strengthen the ties between his accounting group and these elements, however, “knowing the business” became problematic for the accountants who had begun to lose interest; the information gathering exercise had opened a Pandora’s box of questions to which there were few unambiguous or consistent answers and the problems of plate appeared immune to penetration. The final translation of “making sound recommendations based on fact” was never achieved. Senior management remained unconvinced that the accountants understood the business. The fact building process had stalled and, for the time being, Harry’s project had failed.

Through all this, the PISCs became increasingly neglected. The IEs had ‘given it away’ earlier. But since its handover, no resources had been devoted to maintaining or “upgrading” it (as recommended by the 1986 IE report). Harry remembered a time when cost analysis meetings were held regularly and taken seriously by the various plant managers. The current MD had discontinued the cost meetings and cost reports were now simply delivered to the relevant manager. These managers were now “struggling to understand them ... and so cost discipline has gone out the door!” Reflecting on the early 1980’s, Harry explained that “there were two guys who were financial accountants ... they put financial accountants in cost accounting roles ... there was a lack of training and they didn’t understand the system ... they couldn’t interpret the cost book ... at the same time the cost system went from handling 800 to 3500 product specifications ... too much time was spent preparing the cost book which left much less time for reviewing and analysing”. For a while at least, Harry believed that the concerns expressed about the adequacy of the cost reports produced by PISCs was, at least partly, related to a lack of knowledge of the system on the part of both operations managers and the accountants.

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5 The Cost Book was a monthly report prepared by the accountants. It summarised the standard cost variance analysis produced by the PISCs and was distributed to the appropriate managers to assist with cost control in their areas.
Over time, however, even Harry became less convinced of the worth of standard cost data as he became more familiar with the arguments of ABC proponents.

Bereft of allies, the PISCS was eventually “turned off” in January 1990. The rationale for “turning off” the standard cost system was explained primarily in terms of its “irrelevance” in changed competitive circumstances. A general manager who attended the meeting where the decision was made said:

[The senior partner for the consulting firm] and [the MD] seemed to be in agreement that it had run its time ... and nobody could really argue that it hadn’t. There was some argument about whether we needed [the new parallel organisational structure based on business improvement teams] but nobody could really argue why we need [PISCS] ... especially when we are trying to direct everybody’s attention towards quality improvement and cycle time ... if we get these things right, costs will look after themselves.

Another manager was more critical:

Just look at this (holding a thick folder of computer output labeled “Cost Report”) ... can you tell me how this will help me manage my department? You need to be a nuclear scientist to understand it and even then I have no confidence in the numbers. Focusing on these cost reports is wrong for the business ... it’s been a long time since I’ve even looked at them ... cycle time and throughput and staff morale and training is more important to me. ... Turning [PISCS] off was inevitable and long overdue.

The MD was also confident of this decision:

[PISCS] is not good for the business, I am convinced of that. Working with [the consulting firm] and our new business focus makes this very clear. [Cost reduction] is still important but I have learnt that there are more effective ways of achieving this. And don’t forget the resources we had tied up in there — these will be better used elsewhere in the business. BIP is a significant ... major step in the right direction for us.

But Harry had some misgivings still of a lack of “cost discipline”:

I think we have made the right decision given the resources available but it is not going to help us with a more fundamental problem ... a lack of cost discipline around here. Focusing on cycle time etc. will help us drive costs down but are we putting all of our eggs in the one basket? This still worries me.

It is important to note that the locals had not come to this (decommissioning) decision unaided. External cosmopolitans also played a role. In the late 1980s, Alroll had been through a major retrenchment program “brought on by falling profitability”. Consultants had been engaged by the MD and they too no longer believed in standard costing. In addition, they recommended setting up a parallel organisational structure comprised of cross-functional “business improvement teams”. This was the business improvement project (BIP).

The demise of the PISCS had two unintended consequences. First, the business model lost its feeder system for a large part of its input data. It therefore had to be significantly simplified. This simplification eventually was unable to handle questions about the profitability of plate. The issue of plate had refused to die. As the next two trials show, a number of key personnel continued to question whether plate was undercosted. Without the supposedly unnecessary PISCS, the business model became vulnerable to attack as it struggled to accurately cost plate. Second, the accountants were no longer saddled with an unpopular and ‘unfashionable’ centre of calculation. And they remained committed to ‘reviewing’ Alroll’s costing system.

9.7. Trial three: ABC (Version 2) and the costing task group

The BIP began in early 1990 based on a “change management methodology” developed by a major
management consulting firm commissioned by Alroll’s MD. The main thrust of this methodology was to have a central Managing Director’s Steering Committee (MDSC), consisting of the MD, the general managers (GMs), a full-time BIP manager and a partner from the consulting firm, that would oversee a number of cross-functional (and cross-hierarchical) project teams focused on “critical business improvement opportunities”. Harry had been appointed leader of the “business measurement” project team. Project teams could also, with the MDSC’s permission, appoint “task groups” to pursue once-off special projects. Harry was instrumental in setting up the “costing task group” as part of the “business measurement” project team. These cross-functional and cross-hierarchical task groups and on-going project teams were to operate in parallel to the normal organisation structure with its functional responsibilities.

Having had little success mobilising his accounting group, the newly formed BIP structure provided Harry with a potential ally in his efforts to improve their organisational status. While the accountants were unable to resolve the plate issue, one outcome of trials one and two had been the important connection made with a visionary boundary object called “better” costing technologies. None of the locals could speak against a search for “better” cost numbers. Also, the global network supporting ABC had provided a basis for the accountants to ask questions such as: does your method of costing reflect the way in which products cause resource consuming activities? Have you got the right set of cost drivers? It also made statements like: if you have a volume-based allocation system then low volume products are likely to be under-costed. Such questions and statements were combined with other local information elements. Plate was known to be a low volume product (less that 1% of production), the business model utilised mostly volume-based allocation rates and there was ongoing suspicion that producing plate incurred “hidden costs”. Together, this information complex formed the basis of Harry’s submission to the MDSC. This submission raised “serious questions about the adequacy of existing costing methods”. It found support among both locals and cosmopolitans within the newly configured space of the BIP. In particular, the external consultant (Mark) on the MDSC was a strong advocate of ABC and the manager responsible for administering BIP (Kerry, an industrial engineer) had been a vocal critic of plate.

The focus of Harry’s project to “review” product costing procedures was to be narrowed, however, to meet the interests of yet another unexpected ally. Just prior to the formation of the BIP, Alroll’s retrenchment program had resulted in the retirement of the GM responsible for the GS&P product group (of which plate was one) and the assumption of these responsibilities by Bruce, the GM previously only responsible for foil products. Bruce was keen to rationalise and stabilise GS&P products — they were the most diverse product group at Alroll and this diversity came at an unknown cost. In order to rationalise, however, Bruce needed a “cost system that truly reflect[ed] actual costs involved in manufacturing each product category”. Bruce held a meeting with Harry to discuss his requirements of the costing task group. During this meeting, the MD briefly entered and made a crucial intervention. He, too, said that “costing and GS&P needs more attention” and that he “is sure there is something wrong with costing; why is that we can still put the price of [GS&P products] up and our customers do not complain? This suggests to me that these products are undercosted”. Given this observation from a powerful actor, Harry decided that the Costing group should not review product costing in general. Instead, it should focus on “accurately costing GS&P products”. Through this somewhat circuitous route, plate eventually was resurrected as a trial of strength for the accountants.

The costing task group, was headed by Harry and consisted of two other accountants, the BIP manager (Kerry), a second industrial engineer, a business analyst (Glen), an external consultant (Paul) and two production supervisors from the GS&P area. Group members were individually set “information gathering” tasks that were reviewed as the regular weekly meetings progressed. Despite

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6 Importantly, an Alroll industrial engineer was appointed to this position. He had been heavily involved with the implementation of JIT at Alroll.
drawing on the expertise of a broader cross-section of functional specialists, the team encountered similar information deficiency problems to the previous accounting group project depicted in trial one. For much of the time, the task group meetings debated, without resolution, “basic facts” about the Alroll business including the nature of plate’s production process, the delineation between the various product families and the timing of preventative maintenance on the hot line. This process continued for several months until the group was reminded of the growing urgency for a more accurate costing of GS&P product families. In particular, Bruce needed information for an imminent product mix decision regarding an opportunity to sell significantly more plate at the expense of a Canstock product, export lid. He wanted the “true cost of plate”.

To answer Bruce’s question, it became clear that weekly meetings would not suffice and the team nominated four members (Harry, Kerry and two accountants) to work more intensively over the ensuing week on a more or less full time basis. The next day, however, the business analyst on the team, without prior warning, presented to the team a costing comparison of plate versus export lid produced by the business model showing that plate was more profitable. For the accountants (especially Harry) and Kerry, this show of strength was unexpected. Given the previous concerns about the “hidden” costs of plate, especially on the hot mill, and with strong support from Harry and Kerry, the meeting decided that the sub-group would now focus on tracing only hot mill costs to plate. This number, it was argued, would act as a check against the corresponding number produced by the business model. Thus, a project that had started out broad had now been much more narrowly defined through subsequent translations — from reviewing all product costs to the costs of GS&P products to costing plate to costing the hot mill costs of plate.

Ironically, this narrow focus led to the generation of “very soft” data as a series of cost estimations, extrapolations, and assumptions had to be made. For example, because plate did not pass onto the warm mill but cost data was collected on both the hot and warm mills (which make up the hot line), subjective estimates had to be made as to the product’s consumption of the hot mill resource. Best guesses also had to be made with respect to plate’s consumption of set-up, material handling, preventative maintenance services, etc. What was the result of this laborious, focused fact construction exercise?

A number that did not differ from that provided by the business model.

Harry warned that many “soft” assumptions had gone into the making up of this number and it could be quite wrong. But Bruce was content. He was pleased that he could now formally write a memo saying “something like, six good men are X percent confident in this number”. As the GM for GS&P and foil, Bruce had been convinced by his marketing staff that plate was a “good” product and these latest findings added weight to this claim. He went ahead with the order (more plate at the expense of export lid), knowing it had been legitimized.

At this point in time, the business model seemed invincible. Having resisted a determined effort by Harry and (most of) his team to pull it apart, the model had given management the ‘right’ answer. By resisting attack, the model strengthened its position as an obligatory passage point for all those who sought ‘accurate product cost information’. But the dissenters refused to surrender. The costing task group continued to meet to determine “future product costing needs”. Harry convened yet another accounting conference on ABC, ostensibly to communicate the lessons learnt by the costing task group to all accountants at Alroll, and again used the plate issue as a case-study. Kerry also continued to share Harry’s concerns about plate and both knew how many “soft” numbers had been entered into their ABC model. Further, both knew that Bruce’s decision was not universally welcomed. Production personnel, for example, remained convinced that plate was undercosted. For example, a senior accountant, who had recently joined the costing task group, recounted how he had been “grilled” by the hot line production GM about why “the accounting wankers were saying that plate was OK” and how this would “adversely impact on their plan for next year”. Not being part of the original costing
team this accountant had been unable to adequately respond to the questioning. Harry and the task group agreed that more work needed to be done “since we keep hearing things that do not reconcile with the numbers”. This resulted in yet another project seeking “better” costing technologies — the Management Information Project (MIP).

9.8. Trial four: ABC (version 3) and the Management Information Project (MIP)

At yesterday’s (25.9.90) MDSC meeting [Harry] presented a [project proposal] which focused on the need for the business unit to clearly understand its “business information needs”. A copy of this [project proposal] is attached for your information. I realise that there is considerable debate around the Business Unit about what information and what systems we need to run the Business. I am, therefore, concerned that unless we take an integrated approach, we run the risk of heading in different directions at different levels and across functional levels within the business unit.

I have accepted [Harry’s project proposal] in principle (and I understand that all the general managers are in agreement with it, or at least [Harry] has received no adverse comments to his proposal) and have assigned him the task of delivering the outputs of this project by 31st December, 1990.

It is obvious that this is an important, if not critical, project if we are to continue our improvement drive and it is therefore important that we assign the right mode of person to the project. Such people will need to understand the importance of the project and its strict timetable. It may well involve them in delegating considerable portions of their day to day work to their subordinates. Your support, encouragement and advice will be important ingredients in ensuring that we get the “right people” and the “right answers”.

I am, therefore, asking you to release [the Manager in question] as required to this project to work with [Harry] and the other members of the team so we get not only the right answer but a quality answer. [Harry] will be publishing a timetable within the next few days but I suggest that you should expect to lose [the Manager in question] for periods of up to three days at a time on numerous occasions between now and the end of the year. (Internal memorandum from Alroll’s MD to various GMs seeking the release of their subordinates — all of which were Managers)

Through the BIP structure, Harry had begun to mobilise several resources around his new venture [the Management Information Project (MIP)], which is the focus of the fourth and final trial of strength of this study. The MD’s memorandum recognised the “critical” nature of the project and demonstrated Harry’s achievement in successfully linking “soft data” with Alroll’s future success. His project was once again tied to a visionary boundary object called “better”, “harder” business information systems. Continuing controversy surrounding the plate decision and “soft data” had enabled Harry to gain the support of most of the GMs for this new project. Harry had also managed to secure two important new allies, the BIP manager and the managing partner of the consulting firm that had set up the BIP. Both had an interest in solving Alroll’s “soft data” problem. The BIP manager, Kerry, had continued to express his concerns about plate; his “gut feel” was that Alroll should not be producing a low-volume product that thwarted his efforts to reduce cycle time by de-stabilising the production process. The consulting partner, Mark, who was a firm advocate of ABC and had written several articles in practitioner journals on the subject, was interested in developing “better” accounting information systems. With their help, “soft data” which had earlier frustrated Harry’s attempts to mobilise the accountants and create an obligatory passage point, had now also been firmly enlisted as an ally. While management argued about many things, there was no denying the “fact” that Alroll had “data availability and integrity” problems.
The project proposal that began this trial was different to the project featured in the previous trial in a number of respects. Like trials two and three, it was initiated by Harry but it also received strong encouragement from locals (Kerry, production personnel) and cosmopolitans alike (Mark, Paul). Kerry had authority because he was Alroll’s most senior industrial engineer. Mark had legitimacy and human resources. His firm’s well-received implementation of the BIP stood him in good stead. He was seen as an ABC expert and had assisted Harry with the development of the project proposal. He also seconded a full-time consultant to Harry’s project team and consequently his management consulting firm was to have a much greater influence on how the project proceeded. Further, the MIP had broader scope and higher status organisationally; it was a primary on-going project reporting directly to the MDSC. Finally, while it again involved a cross-functional team, there was, in general, more involvement by members on a day-to-day basis.

Although plate was a subtext, a look at the proposal for the MIP shows how it was tied to larger questions about Alroll’s need for a “sound database of fact” for investment and product-mix decisions (see Fig. 4). The proposal asked a crucial “focusing question”, does the company have a “comprehensive set of key business statistics which are generally accepted to measure the current and future health of the Business Unit?”

Not unsurprisingly, the answer to this last rhetorical question was a no and the project sought the following deliverables:

(a) key business measures for all levels in the business unit;
(b) the principles and rules to be applied to compile the measures, e.g. principle of cost allocation, operational definition of processes;
(c) underlying transaction systems needed to provide the measures; and
(d) plan of work necessary to implement this system of measurement.

Delivering these, however, would require an information gathering exercise the likes of which had not been seen at Alroll since the OD study.

An eight member cross-functional team representing the accounting, industrial engineering, production and marketing functions (all at the manager level except Harry who was a general manager) as well as an external consultant (Paul) would be involved. They would conduct a series of intensive interviews, which would begin with the MD and include all GMs, all managers and a majority of superintendents available during the interview period. In order that such interviewing might be disciplined and standardised, Mark conducted training sessions on the proposed interviewing methodology. A number of articles on various topics considered relevant to the project such as “Corporate decision-making”, “is your cost accounting up to date?” and “measuring manufacturing performance” were also distributed to team members to standardise expectations.

Standard interview sheets were provided by the consultants; these would “form the nucleus of questions asked by the team”.7

Despite the use of these standardising/boundary objects to deliver disciplined data and to cross different functional boundaries within Alroll, it proved very difficult to hold the MIP together. Of the eight member group, only three remained after the initial 6 week intensive interviewing phase: the project leader, Harry, the outside consultant (Paul) and Kerry. Harry continued to be involved on a day-to-day basis, general manager responsibilities permitting. Paul was the only real full-time member of the team. In many ways he became the focus of MIP and ABC activities particularly in the later stages of the project. He became the primary fact stabiliser, standardizing and ‘massaging’ much of the data he received. Paul was also supported by Mark, who from time to time had direct input into the project, particularly in the planning phases. Additionally, in his role as BIP co-ordinator, Kerry had ongoing involvement with most of the Business Unit’s major project teams. The remaining five team members were managers with experience in production and marketing. Their involvement was, to Harry’s disappointment, intermittent and mostly limited to the earlier interviewing stage of the project. In

7 MIP Status Report 17/12/90.
The motivations for the Project were:

1. The perceived need to disseminate [Minercorp's] measures down the Organisation to gain accountability.
2. The perceived need to improve our method of Product Costing as identified by our attempts to cost Plate products and compare their profitability viz a viz Export Ltd.
3. The problems of identifying the real impact of Capital Investment on the Business Unit's Profitability.
4. The August Result - this showed we were not measuring all the indicators.

More specifically, the project sought:

PROJECT PROPOSAL

To specify what information we need to make business decisions - about performance, product or investment - based on a sound database of fact.

And to:

- TALK WITH INFORMATION -

What Critical Success Area (CSA) will be affected by the Project?
CSA: Understanding our Processes: Good Systems
How Affected: This project will help focus the Business Unit on the things that matter by identifying and relating the key information, at all levels in the Business Unit, thus enabling Managers to optimise the allocation of resources.

Roles (Who's Who?)
Client: MDSC.
Leader: GM-Services [Harry].
Interested parties: All task groups.
Customers of the project: All levels of Management.

The Need and the Vision
Where are we now?
While we have taken initiatives to improve the Business Unit's performance by focusing on Product Cycle Time, we have not put in place measurements other than at the MDSC level to ensure; (a) these improvements will be sustained and (b) that future areas of improvement can and will be identified.

Where do we want to be?
We need a System of Measurement which will provide related information to all levels of the B.U. to ensure consistent Financial Management, Performance Measurement and Business Planning. Such a System of Measurement must have a high credibility to be effective.

What is the Best Question to focus the Project?

Situation: Questions are being raised at all levels of the organisation about the validity of available information for sound decision-making and performance measurement.

Complication: We do not have all the necessary transaction based systems in place to underpin the reporting of the key business statistics, even if they were known and accepted.

Focusing Question: Do we have a comprehensive set of key business statistics which are generally accepted to measure the current and future health of the Business Unit?

Fig. 4. The scope of the management information project (MIP).
general, the perception was that the less than expected involvement of these managers was due to other “more urgent tasks” commensurate with their “high profile” and, in some cases, an unexpected change in responsibility area requiring much more of their managerial attention than originally anticipated. Thus, apart from the first 6 week interviewing phase, on-going full-time involvement with the project was essentially limited to the cosmopolitan, Paul and, to a far lesser extent, Harry, Kerry and Mark (the consulting firm partner).

Nonetheless, the interview program had generated sufficient data for the MIP to develop a momentum of its own. It revealed certain ‘facts’ about the “information deficiencies” at Alroll. In particular, the following needs were highlighted:

(a) the need to be able to cost products in different ways for different purposes viz., strategic decision making upon product mix, stock valuation and monthly performance reporting;
(b) the need to obtain more relevant financial information by restructuring and simplifying the current financial coding structure and providing on-line access to financial modules at the detailed transaction level;
(c) the need to identify the key success factors for an organisation unit to allow focused performance measurement viz., some units have adopted a “measure it if it moves” philosophy resulting in time consuming data collection for no benefit;
(d) the need for reliable technical databases providing information on product failure rates and product quality;
(e) the need for prompt and reliable people related information pertaining to training undertaken, overtime performed, safety and incidence of sick leave;
(f) the need for a comprehensive database upon plant maintenance history.

To remedy some of these deficiencies, a series of process/activity maps were generated and presented. These delivered the following outputs:

(a) an agreed list of business processes undertaken within the Business Unit;
(b) an agreed list of high level corporate performance measures which support the improvement projects of the Business Unit;
(c) development of a comprehensive listing of Activities undertaken by the Business Unit identified within:
   (i) each business process; and
   (ii) each functional responsibility area.

Through such mapping, Alroll slowly began to emerge as a potentially controllable entity. These maps were also important to Harry’s final attempt to cost plate ‘correctly’. For they in turn generated new searches for “better” knowledge bases. Following the interview phase, the MIP ‘team’ initiated four related yet distinct subprojects that would yield “better” business information. These projects would (1) identify and gain consensus on the “key success factors” for reporting both to the MDSC and Corporate Headquarters, (2) develop lower level “performance indicators” for each of the functional responsibility areas within the business Unit, (3) develop an ABC model and (4) an integrated financial management system.

Both the first and second sub-projects had good starts. Substantive work on the third, however, was delayed until the acquisition of a “bespoke” PC (personal computer)-based ABC costing model by the consulting firm from its overseas office. By this time much of the data analysis had been completed and subprojects one and two were well under way. Some of the information generated from these earlier efforts became inputs into the ABC model. But much more new information had to be crafted. Cost driver information, for example, was “highly inadequate”. In addition, there was a perceived lack of standardisation. And Paul, the cosmopolitan, was continually frustrated by the “lack of information discipline in this place”. Though more “refined” than that which was available to the earlier costing task group, the data still needed to be “massaged” and continually revised as new information came to hand. Ironically, Paul’s problems were exacerbated by the unavailability of needed data previously systematically accumulated by the PISCS that had been turned off long ago.

The choice of product categories to be costed by the ABC model was not only constrained by the
unavailability of disaggregated product-related data but by perceptions of problem products and undisciplined actors. The original plan was to cost eight broad product categories but this was later reduced to six. The GS&P area, in particular, was a constant source of frustration for Paul with respect to data collection:

The guys down there in [GS&P] just lack basic data discipline. Some of them are still collecting data used by [PSCS] which is no good to us [in fact, not all data previously provided by PSCS was ‘no good’]... some are not bothering to check their coding against [the updated coding schedule] ... there is no way of separating out information down there pertaining to the five product groups we first planned. The right hand doesn’t know what the left hand is doing! It’s no wonder [the MD] has targeted their area for change .... We’re just going to have to collapse some of the product groups ... there is a limit to how much finger-in-the-air stuff we can do and still be credible.

Data discipline problems aside, the cosmopolitan nature of the ABC software had to be moulded by local, present constraints. To run the model, a decision had been made earlier in the MIP for the proposed model to assign the “actual” costs relating to the year 1990 to products. The disaggregation and assignment of these costs into cost pools, like previous attempts, proved to be problematic since Alroll would need to be spatially reconfigured in the name of activity costing and the constraints imposed by the consultant’s “bespoke” ABC software. “Best guesses” and extrapolations again abounded in a recombination of Alroll’s accounting space. For example, the “roll grinding” activity performed in one area of the plant was combined with the “roll chroming” activity undertaken by outside contractors and the “Hot Mill set-up” activity to form a new entity called “hot mill roll changing”. But this activity cost pool would also require a “backing out” of a proportion of the material handling cost pool (which included the costs associated with all the fork-lift trucks that roamed the entire plant).

Time was also significantly warped during this process and exacerbated by the unavailability of “relevant” data required by the consulting firm’s “bespoke” ABC model. Recall that MIP was only one of a number of major projects developed since the commencement of BIP in January 1990. Other projects dealt with areas such as “materials and logistics”, “equipment and effectiveness”, “customer service”, “measurement” and “visibility”. Many “dramatic process improvements” had been made to Alroll’s operations as a consequence of the work performed by these various project teams over the ensuing 15 months or so. This included the elimination of some “non-value added activities”, a five fold reduction in the time required for a roll change on the hot mill and the halving of the production cycle time of many products. Substantive developmental work on MIP’s ABC subproject was, however, delayed until March 1991 awaiting the arrival of the software. In order to keep the model “up-to-date” and since “activity cost driver” data associated with many of the model’s “activity cost pools” had not been previously recorded in a systematic way, some of this information was estimated based on current (1991) levels of performance. This meant that “cost facts” relating to 1990 were folded with 1991 “activity driver facts”. As an example, production cycle time data, a major “cost driver”, relating to May 1991 was used to allocate a significant proportion of the 1990 costs to the six products being costed. Importantly, the plate product group’s cycle time had not significantly altered since the commencement of BIP while that of other groups had been reduced substantially — this meant that relatively more costs were shifted to plate. Another example included the extrapolation of product scrap rates attributable to each product based on observations made during one week of production in March 1991. Also, the dramatically reduced hot mill roll change time was used to allocate “hot mill roll changing” costs to products. In short, many compromises were made in order that more “precise” cost data was manufactured. But these were reasoned to be “acceptable” and “justified in the circumstances”. Importantly also, many of these compromises had to pass through one common obligatory point —
Paul. This helped to standardise and stabilise the many rules that had to be followed for ‘proper’ encoding and the making of consistent compromises.

Ironically, and with little reference to the third subproject, the fourth subproject attempted to deal more directly with Alroll’s “soft” data problems. It was begun in the later stages of this study (May 1991). By now the other three subprojects were well advanced and Harry, in consultation with Mark, the external consulting partner, had been reflecting on the “woeful state of our information systems”. He had experienced the frustrations of three attempts to construct an ABC model over several years (the accounting group study, the costing task group study and now the MIP project) with an inadequate underlying database of ‘facts’. Harry’s latest project would promise to deliver an integrated and activity-based approach to Alroll’s transactions systems. His conceptual design for a “Financial Management Information System” (FMIS) would consider, inter alia, account structure and coding conventions. This design would involve developing and revising all of Alroll’s financial systems to support and improve, for example, management reporting, project accounting, product costing and work in progress accounting. The FMIS project was to involve some of the MIP members to the extent that input was required regarding the specifications for the new/developing cost model but was later taken over completely by the accounting group. Later to be referred to as an Activity Based Management (ABM) system, this technology promised not only to be the underlying database of ‘facts’ upon which many other systems would rely, but would also re-integrate which had been decoupled from the PISCs. It would provide both “accurate” product cost data and an alternative “activity-based” cost control mechanism.

Having travelled so far over so many months — did the ABC model finally work?

Yes, in that the final results produced by this latest product costing technology confirmed the suspicions of Kerry and other actors suspicious of plate; the product was at last shown to be unprofitable. Prior to the crucial MDSC meeting, the ABC results were tested and adjusted by the team (Mark, Paul, Harry, and Kerry) to reflect their ‘best judgement’. When finally presented to the MDSC, the model was able to resist attempts by several managers to discredit it. For each question raised, the team/technology (Mark, Paul, Harry, Kerry and the model) had good answers — a set of “reasonable” numbers made by expert, trustworthy, “good men” in the face of great difficulty had yielded a directive to scrap plate. And to a question regarding the amount of scrap charged to plate, the enquirer was directed to “just go out and see for yourself”, go to the hot line and observe. For the time being then, the ABC team had triumphed. The gut feel of numerous actors had been confirmed. The MD was convinced. Later, and some months after the field study was completed, plate was dropped from production. The “facts” produced by the model had become irresistible for those long troubled by the continued production of plate.

But what had happened to the business model through the MIP? It had sat idle — paralysed by the lack of source data previously supplied by the PISCs. As a result, it was unable to produce a convincing alternative to the numbers created by the ABC model. Also, it was losing friends. A few weeks prior to the end of trial four the highest ranking business analyst resigned. A Manager from the Canstock area who had been a firm advocate of the ABC model was appointed as a replacement. This new GM for business analysis had earlier been a member of the MIP team and, coming from the Canstock area, believed plate should have been dropped long ago.

How long did the ABC model survive at Alroll? In late 1991, a new MD for Alroll was appointed and he gave the new GM for Business Analysis direct responsibility for the ABC model. Harry was content with this. He later explained that his accountants had their “hands full” dealing with the implementation of their FMIS/ABM system — his attention had been directed toward a potentially more powerful ally. Still later he stated that the ABC model had not been further developed.

8 One year later, Kerry, the BIP manager with industrial engineering qualifications, took over this position as GM for business analysis.
since the “plate decision” because people “had lost interest and, anyway, since [the consulting firm] left nobody can really understand the software”. The IEs, too, had a new system to develop — they were charged with developing an “integrated performance measurement system”. And without allies, like the PISCS and the business model before it, the ABC model now lay idle.

10. Epilogue — local becomes global

Some time after the field study, Harry presented Alroll’s de-establishment of PISCS at a conference. The forty or so accounting practitioners in attendance had come to hear representatives from three Australian firms address the question: “Are standard cost systems obsolete?” In his presentation, Harry concluded with a resounding “yes” — standard cost systems are “not consistent with a continuous improvement philosophy”. He had no doubt of that position. He had had first hand experience of the value of ABC. Similarly, Mark, the external consulting partner, was later to publish an article in an international practitioner journal which discussed the “ABM” experiences of three Australian firms, one being Alroll. The article suggested that “ABC” was part of the broader “ABM” concept and argued that such systems “determine the true costs and profitability of products”. At the conclusion of the section dealing with Alroll’s experience, the consultant stated that:

One of the major benefits that ABM has achieved at [Alroll] is the elimination of the troublesome product group that initiated the exercise in the first place. This occurred because financial data from the new ABM system — which no one questioned — showed conclusively that the product group was unprofitable.

In a broader arena, the external management consulting partner, now acting as spokesperson for Alroll’s “successful” ABC/ABM implementations, had linked local outcomes with global networks through subsequent publication. The “facts” presented in these examples were clear in hindsight, but as this case illustrates, they were never quite so certain in the making. But retelling or more precisely re-presentation obscured the local softness of the data, the many compromises that had to be made and the numerous battles that were fought and lost. Neither did the telling speak of the subsequent abandonment of the model. In the end, only hard ‘facts’ remained and these were circulated through global discourses that made ABC appear as a unitary, unproblematic object that easily crossed spatial boundaries. All organisations that had uneven batch production runs or that used traditional cost allocation methods, it seemed could usefully consider adopting the technology.

11. Reflections and conclusion

What of accounting change, more generally? At one level, this field study is unremarkable. Like other change studies (see Chua, 1995; Dent, 1990), it has negated a simple, ‘rational’ account of change; showing that the cyclical adoption and abandonment of different costing technologies was not the linear outcome of a careful cost-benefit evaluation exercise. At another level, however, we have offered an analytical device that focusses on the following neglected dimensions of accounting change.

11.1. On heterogeneous networks of actors and actants

This field study has illustrated that change is the outcome of many, varied and fluid interconnections between local and cosmopolitan networks of actors and actants. Alroll had connected with the writings of Eliot Jacques and in the name of his Stratified Systems Theory begun a large programme of organisational development. Harry had initially connected with a global “ABC” network through conferences and books and, later, through academics and consultants in his efforts to tie in local allies. The industrial engineers had became enthused by the notions of just-in-time management and quality assurance concepts originating from Japanese manufacturers.
Local allies variously included his accounting group, a neglected standard costing system, the “plate problem”, the BIP manager and the “soft data problem”. Some of these local allies were not always willing participants in his project (his accountants) and others were unanticipated (the urgency of the plate order; and the appointment of Bruce upon the resignation of the GM of GS&P). They were also unequal in terms of their authority and command over resources. The accountants had to struggle long and hard to improve their low status. The ABC model finally succeeded largely because the MD and the consulting firm both committed resources to the enterprise.

In addition, locals were not always locals. At times, they crossed organisational boundaries and helped constitute cosmopolitan discourses (Harry speaking at various public forums about ABC and standard costing). Similarly, cosmopolitans can function as ‘temporary locals’. At Alroll, the successive implementation of ABC depended crucially not only on ‘top management support’ but on the dedicated work of Paul and Mark (the external consultants). They worked for many months to ‘make it work’. Indeed, one could argue these temporary locals owned it too much for when they left, the model ‘died’.

Actants — both local and cosmopolitan, were clearly crucial at Alroll. And it is here that actor network theory is distinctive — by enabling us to focus on the role of technological, non-human actors in change processes. In our narrative, there was computer hardware and software that was no longer able to cope with the size of information databases and the complexity of the manipulations required. The PISCS needed to be ‘upgraded’ in order to be useful. To finally arrive at a successful ABC model, the consultants needed a piece of bespoke ABC software that was easily and cheaply transportable from the US to a PC in Australia. This software had to be ‘flexible’; it did not mind being ‘massaged’ to suit local conditions. It also had to retain some degree of simplicity. Because the final ABC model was not self-evident to novices, it too died. Apart from computerised actants, there were the giant hot mill and plate itself — neither liked the other. Hot rolling plate caused it to become too brittle at the edges. Bits broke off and jammed a part of the hot mill. Were it not for the specific behaviours of these actants, the path to accounting change would have been quite different at Alroll.

Finally, a model of change built on heterogeneous networks of actors and actants has several implications for the concept of agency. First, like the study by Bhimani (1993), ours shows the extraorganisational origins of internal accounting change. In our story, there were cosmopolitan consultants and travelling ideal boundary objects such as ABC, JIT, etc. There were public spectacles (seminars) that enabled these boundary objects to be shown and discussed. As a result, in today’s time-and-space-compressed postmodern world, change at a specific site may be influenced not just by the actions of local managers but by factors far away. Second, change (as depicted) was not a particularly heroic affair. Past research has constantly emphasized the importance of ‘top management support’ for change (see Shields, 1995). We concur and certainly Alroll’s new Managing Director was an important element in the change process. But, while this element may be necessary, it is not sufficient for change to occur. There need to be other actors/sponsors/allies that are located within the lower reaches of the firms (Harry and his accountants, Kerry, etc); cooperative software, committed cosmopolitans, recalcitrant machines, etc. In short, although the story follows Harry to some degree, ours is an anti-heroic account of change. Harry, on his own, did not achieve much. Indeed, initially, he could not even mobilise his team of accountants. But the network, in the end, did much — new accounting technologies were adopted while old ones were shut down and an entire product line was removed.

11.2. On boundary objects that hold ‘actor-worlds’ together

The criss-crossing of the inside/outside divide as well as the boundaries that separate different actor-worlds is greatly aided by different types of boundary objects. Data repositories that contain cost, sales, customer, supplier, or inventory information in easily accessible format hold managers
from different functional specialities together; enabling them to download information that is recombined for their particular purpose. All the systems (PISCS, business model, and ABC model) at Alroll had such repositories that helped account for the temporary ‘success’ of each of these systems.

Of much more prominence in the case, however, were ideal and visionary boundary objects. Objects such as “better” costing technologies and “world best practice” cannot be argued against. Others such as ABC have at once a core which is hard enough to draw diverse parties together and a periphery which is plastic enough to adapt to local circumstances and facilitate flow across actor-world boundaries. Take ABC, its concrete core consisted of interconnected statements such as; “activities consume resources”, “products trigger activities”, “product costs should reflect all resource consumption”, “volume-based allocation methods potentially mislead product related decision making”. The soft periphery allowed the flexible construction of “activity cost pools”, “cost drivers”, “activity levels” and “cost objects” that catered for local circumstances. This plasticity also allowed diverse translations of ‘the’ ABC project.

As the narrative shows, there were three attempts at constructing a ‘comprehensive’ model but eventually Alroll never costed more than one product group — plate. Projects that began with broad aims inevitably were translated into much narrower activity costing tasks. Standardised, and standardising work methods and formulae were yet another important boundary object. These bind together information collected in different spaces and times and make it comparable and credible. For the business model to work with 4,000 product categories, the designers had to rub out product differences in a particular way. Products A and B were merged to form Z, and Products C and D were merged to form E, on the argument that they had “similar cost structures or identical cost drivers”. Once this rule was established, it had to be followed by all users of the system. Indeed, Paul, the external consultant responsible for setting up the ABC model, was especially concerned when actors in different operational units apparently did not follow his coding instructions. Rule-following was crucial if ‘hard’, and ‘consistent’ data were to be obtained. In addition, actor discipline has to extend across time. As Latour points out, the success of a centre of calculation lies not in the hands of designers but in the hands of those who come after. The standards in the PISCS had to be updated continuously by ‘followers’, the business model had to be fed information that was collected in a ‘systematic, standardised’ manner, and Paul’s coding instructions had to be followed by locals after he had left. When these activities did not occur, the machines eventually failed to work properly. And finally, coincident boundaries help to bind together different actor-worlds. The business model was accepted initially because some of its answers ‘gelled’ with answers provided by the PISCS. The final plate costs generated by the ABC model gelled with ‘gut feel’ on the part of (industrial engineers and operational personnel) that plate was not “really profitable” and “disrupted process stability”.

Analysing the role of boundary objects in the manner above suggests a certain explanation of the success and failure of certain accounting technologies.

11.3. On success and failure

For more than two decades, the PISCS was Alroll made durable. It captured the business like no other technology of its time and was a centre of calculation par excellence. What were it strengths? And, how then did it fail?

PISCS was powerful because it summarised the business’s diverse and complex operational environment into an “integrated” whole. It also embodied and reinforced the twin managerial concerns of cost control and product proliferation. The system was able to cost a very large range of products in a standardised manner and controlled costs through detailed cost variance reporting. Gradually, however, it lost friends. As the strategic vision of management changed, the business analysts constructed an alternative that was tied to Alroll’s new “product rationalisation strategy”; the industrial engineers positioned themselves closer to the emergent “continuous improvement
strategy”; and, the accountants, lacking a detailed understanding of the internal workings of PISC, attempted to disassociate themselves from the PISC by linking their credibility to the construction of an ABC system. Only a few scattered and isolated industrial engineers and accountants continued to believe that the system could be saved by merely enhancing the hardware and parts of the software.

PISC eventually failed not so much because it was a poor strategic fit or bad (inefficient) but because it was not made to be good (efficient). In the context of changing organisational circumstances over an extended period of time where actors came and went (some taking facts about the technology with them), the technology became less well known. As an immutable mobile it needed mobility and combinability as well as stability (faithfulness). PISC, however, became increasingly unstable as it failed to discipline other important elements in the network. Standards were not updated as often as they should and cost coding lacked discipline. New managers (users) were unable to understand the system, follow the code book or interpret its outputs and their confidence in the system was undermined by continual reference to data integrity problems and unexplained variances. New functional specialists sought to gain credibility and ‘add value’ by designing their solutions to perceived problems. Through all this, we could conclude that the system failed to adapt to new organisational circumstances but alternatively we could also say that it was not made to adapt. Despite repeated proposals to update the hardware and software and put in place better maintenance procedures for the system, they were never implemented; they simply remained proposals. In the end, a new MD with a background in mining operations and no connections with manufacturing cost control networks turned the system off (with some advice from consultants who had a different agenda). In this way PISC had failed to enrol and control those who would use and maintain it. Or more precisely, PISC was allowed to fail. And, the de-establishment of PISC thus turned on the acts of commission and omission of many, heterogeneous fact builders, both local and global.

Turning to ABC, why was it adopted and proclaimed a success? ABC was adopted not because there was universal consensus as to its ‘good strategic fit’ or its utility. It was not bought because people knew for certain that it would deliver the answers they sought. Neither was change a result of ideas and concepts from wider discursive regimes that were somehow diffused into the heads of local participants. These explanations are at once too rational and too non-subjective. By contrast, this study has shown that the answer to this ‘why’ question decentres the knowledgeable, heroic actor and is more mundane. Change was brought about by a diverse variety of actors (both local and cosmopolitan, human and non-human), each struggling to build stronger actor-networks of association which strengthened their claims/beliefs of the nature of reality. Also, there is far more faith than certain knowledge in this struggle. In trial four, the cosmopolitan consultants, keen to sell “value-adding services”, had faith in the bespoke ABC model delivered to them by their American colleagues; Harry, seeking greater legitimacy for his group and “value-adding” accounting information, had faith in ABC and the consultants’ model despite “not understanding it”. The new business analyst (end of trial four) did not know for certain that ABC would find plate unprofitable but he also had faith in the model despite not being involved in its construction — it “interested” him because it confirmed his belief (hunch, “gut feeling”) that plate was unprofitable. The MIP team, reaching for a “source of facts”, had faith in ABC despite none of them ever having experienced it elsewhere (including the “expert” consultant). This network of interests and faith was strong enough for them all to continue with their technology construction efforts despite the many “soft data” problems they encountered along the way. Finally, the MD had faith that all these “experts” involved in the construction process could deliver on their promise to help with his “product rationalisation” problem and, hence, realize a better future for Aroll in the here and now. The ABC model that finally worked, like the technologies before it, was a “monster”; a hybrid of human and non-human elements, and it was made to succeed.
An important contribution of this study, we feel, has been an attempt to treat symmetrically, the constructed nature of technological success and failure. 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. “We are never confronted with science, technology and society, but with a gamut of weaker and stronger associations” (Latour, 1987, p. 259). Further, the “history of technoscience” is in a large part the history of resources scattered along networks to accelerate the mobility, faithfulness, combination and cohesion of traces that make action at distance possible (Latour, 1987, p. 259). To the extent that new accounting technologies can be made to hold together traces that make managerial action from a distance possible, it would be seen to work.

11.4. On soft and hard numbers

This conceptualisation of technological success and failure leads to the argument that successful accountings are not ‘simply’ those that are right, that have higher levels of representational ‘faithfulness’. We do not say that new cost management technologies work because they more provide closer approximations to true cost, or that they are built on the right facts. Instead, following Latour (1987), we would argue that it is when new accounting technologies can hold diverse ‘facts’ and interests together, stabilise them (temporarily), that these ‘facts’ will start to become ‘true’. Hard and stable facts are not known in advance of the adoption of a technology. Adoption begins with soft numbers that then become hard.

Note how the actors began constructing an ABC model and persisted in this endeavour despite not having the ‘facts’. The actors expended considerable effort over many months. Despite this, “unanimous” agreement was never found to questions such as the following: how much damage was caused by rolling plate on the hot mill; what activities constituted “roll changing”; what was the average number of production moves made by each product; how much time did the laboratory spend testing each product; and how much hot line cleaning was attributable to foil? These data deficiencies were further aggravated by changes that were made by other organisational actors in the name of “continuous improvement”. For example, as process improvements were made engineered production standards became out-of-date, product cycle times were reduced, production routings were changed and heat treatment for some products was eliminated. Capturing ‘facts-in-flight’ thus became a perpetual challenge for the Alroll technology-builders.

And, there was always a data/information gap. Dealing with “too much data”, “useless data” and “no data” constantly frustrated many of the organisational actors followed in this ethnography. Partly, this was because in seeking to bring the future into the present, the actors had to deal with the residues of the past in the present. “Too much” and “useless” data was often attributed to data recording and reporting mechanisms that continued under their own momentum, thereby producing ‘facts’ that were either no longer required for anything (i.e. “too much data”) or not in a form that reflected how the business “ought to be seen” (i.e. “useless data”). For example, although the PISCES was “decommissioned” in early 1990, several of its data capture procedures, which were dispersed across the organisation, continued to operate. Machines, for instance, continued to be recorded for the hot line in total and not for the individual machines that make up the hot line (as required by the ABC model). Also scrap metal data continued to be accumulated at the “cost centre” level and not at the product level, again as required by ABC. Disciplining these recalcitrant inscription devices (both human and non-human) proved difficult. But so too did the “lack of data”. Certain data required by the ABC model was not available — this data had not been kept simply because there was no previous need. There was no systematic record kept, for example, of the number of production moves made by each product — nobody was ‘interested’ in this ‘representation’ before ABC entered the fact building process. Nobody was sure what activities properly constituted “the rolling activity” cost pool because nobody had “seen” the pool until Harry’s group articulated it. Capturing facts-in-
flight, therefore, of necessity meant an ever-present information gap. There was always “room for continuous improvement” and space for another accounting technology.

But why were “soft numbers” tolerated for well over a year? We believe that this was because the interested groups were holding together. They were persuaded that constructing the technology was in their interests. Over time, the accountants were gaining credibility, the engineers were solving their “production stability” problem, the MD was solving his product rationalisation and business unit profitability problem, the consultants were keeping their client happy and attesting to the worth of their new ABC software. And, the software was delivering interim numbers that “made sense”. Plus there had always been “gut feel” that plate was not right for the company. And, there was faith in the wisdom of experts, both consultant and academic, both local and global. There was just too much at stake to worry about “soft data” problems. Unless, of course, worrying about it would bring in new allies with which to further the actor’s fact-building efforts (see Trial 4).

Note that later, soft data, however, can become hard facts in different times and spaces. While local actors struggled with unstable processes and shifting enrolment and ownership patterns, Harry and the consultants constructed hardness in the public domain. In acting as spokespersons for the success of their boundary objects, they constructed facts through their publications and presentations at conferences and to potential clients in need of solutions.

In conclusion, it is clear that we have only begun to analyse how organisational accountings succeed and fail. The concept of boundary objects intrigues and points to the need for future work. What kinds of boundary objects operate in collaborative alliances, such as strategic supply chains? Could integrated enterprise resource planning systems, for example, be similarly theorised as boundary objects? How do these systems ‘integrate’ and thereby erase intra-organisational boundaries? Do they merely passively erase boundaries or do they actively reshape organisational space? We trust such questions will motivate other researchers as they do us in seeking to understand the operation of organisational accounting systems.

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