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Peter Miller, Liisa Kurunmäki and Ted O’Leary¹

Abstract

This essay addresses the implications of accounting and hybrids for the management of risk. It suggests that the management of organizations is rapidly being transformed into and formalized around the management of risk, while much of the real management of risks occurs elsewhere. We argue firstly and most generally that hybrids in all their varied forms are one of the key sites where uncertainty is managed beyond the formalized practices of risk management. Secondly, we argue that the management literature on hybrids has been too focused on organizational forms, and has neglected the hybrid practices, processes and expertises that make possible lateral information flows and cooperation across the boundaries of organizations and firms. Thirdly, we argue that accounting practices are central to these issues, yet these practices are often neglected by the wider management and organizational literatures. Accounting, we suggest, is constantly engaged in a dual hybridization process: seeking to make visible and calculable the hybrids that it encounters, while at the same time hybridizing itself through encounters with a range of other disciplines. We address these issues in three stages. In the first section, we draw attention to the key disciplines that have ‘discovered’ hybrids, albeit at different times and in differing ways. In the second section, some selected examples of hybrid practices, processes and expertises are identified and briefly discussed. In the third section, and in conclusion, the implications of accounting and hybrids for the management of risk are considered.

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Introduction

The management of organizations is rapidly being transformed into and formalized around the management of risk, while much of the real management of risks occurs elsewhere. From COSO and Cadbury, through Turnbull and more recently Sarbanes-Oxley, regulatory pressures implicitly treat isomorphism as a desirable end in itself.² It seems as if almost anything today can be defined as a potential risk, and managed in accordance with newly established regulatory norms.³ In a short space of time, risk committees, risk officers and risk maps have become obligatory elements of formalized governance mechanisms, and accorded their appropriate place in managerial hierarchies. Faith in the manageability of risks appears to go hand in hand with a growing 'risk appetite' on the part of organizations, as the category of risk is itself differentiated and multiplied into operational risk, strategic risk, reputational risk and so forth. Risk management as an idea and a routinized set of practices is now central to both private sector companies and public sector organizations, and indeed is an important boundary-spanning activity that is becoming a model of organization in its own right.

Hybrids are similarly ubiquitous, and vary considerably in type. They can take the form of organizational arrangements that do not readily fit traditional models of hierarchies or markets. Or they can take the form of hybrid processes, practices or expertises produced out of two or more elements normally found separately.⁴ Yet, while these two phenomena are already almost taken for granted by researchers and practitioners, the implications of hybrids for the management of risk are insufficiently addressed. As risk management comes to be defined increasingly as formal *process*, the dynamics of organisational life, the permeability and fuzzy nature of organizational boundaries, and the varied hybrid practices through which uncertainty is actually managed within and across organizations tend to be confined to the penumbra. Standardization and compliance tend to take precedence over the management of the real risks that organizations face. And the vocabulary of risk management, with its hierarchical emphasis, remains largely antithetical to the hybrid nature of an increasing number of organizational and inter-organizational practices.

Firstly and most generally, this essay argues that hybrids in all their varied forms are one of the key sites where uncertainty is managed beyond the formalized practices of risk management. Management of the actual risks that organizations face does not only happen, we argue, through the now obligatory and increasingly complex apparatus of risk management systems. Indeed, as compliance with more or less standardized governance models comes to dominate increasingly the design of risk management systems, it may well be that such systems lose their ability to manage the real risks that organizations face. Secondly, we argue that the management literature on hybrids has been too focused on organizational forms, and has neglected the hybrid practices, processes and expertises that make possible lateral information flows and

² See: Committee on the Financial Aspects of Corporate Governance, 1992 (Cadbury Report); Committee of Sponsoring Organizations of the Treadway Commission (COSO), 1992; ICAEW, 1999 (Turnbull Report); Sarbanes-Oxley Act 2002.

³ See Power (2004) for a review and challenging critique of this aspiration to engage in the 'risk management of everything'.

⁴ Hybrids, according to this view, have distinctive attributes and characteristics, and are not merely intermediary forms.

cooperation across the boundaries of organizations and firms. The diversity of hybrids has been given insufficient attention, and we argue that this needs to be redressed if we are to understand better how organizations manage the range of risks they face. Thirdly, we argue that accounting practices are central to these issues, yet these practices are often neglected by the wider management and organizational literatures. Historically, accounting is itself a hybrid that was formed at the margins of other disciplines such as engineering and economics (Miller, 1998). One might say that accounting has always been concerned in large part with managing uncertainty and risk, even if the language of risk has only relatively recently entered the accounting lexicon.

This suggests an important lesson about hybrids: that the process of hybridization is continuing and dynamic, even if its rate varies across time. Whether it is a matter of the emergence of new organizational forms, processes, practices or expertises, typically the newly formed hybrid stabilizes for a while and may even become institutionalized.⁵ We are seeing this now with formalized risk management and governance systems that are specified with increasing detail. Equally typically, the process is likely then to recommence as a more or less stabilized and institutionalized arrangement is disturbed as it comes into contact with a new set of demands, issues or events.⁶ The roles of accounting in this process are emblematic. For accounting is not only itself a hybrid to its core, but it is constantly seeking to make manageable other newly formed hybrids. Whether in the form of triple bottom-line reporting, value reporting, inter-organizational cost management, target costing, open book accounting, pooled budgets, or whatever, accounting is constantly engaged in a dual hybridization process: seeking to make visible and calculable the hybrids that it encounters, while at the same time hybridizing itself through encounters with those who claim expertise in marketing, strategy, design, medicine and so forth.

This essay addresses these issues in three stages. In the first section, it draws attention to the key disciplines – accounting, economics, law, organisation theory and sociology – that have ‘discovered’ hybrids, albeit at different times and in differing ways. In the second section, some selected examples of hybrid practices, processes and expertises are identified and briefly discussed. In the third section, and in conclusion, the implications of hybrids for the management of risk are considered.

The Discovery of Hybrids

Without hybridization, accounting would lack much of its core calculative content. Management accounting was formed and re-formed largely at the ‘margins’, and out of a range of calculative practices drawn from other disciplines such as engineering and economics (Miller, 1998). Practices such as standard costing, discounted cash flow, the distinction between fixed and variable costs, break-even analysis, and much

⁵ To bring together the somewhat distinct language of actor-network theory and institutional theory, one might say that, as networks or assemblages come to be stabilized for reasonable periods, they take on the characteristics of institutions (Miller, 1997).

⁶ This process has similarities to the process of hybridization and purification that Latour (1993) describes. Whereas Latour is concerned primarily with the hybridization of nature and culture, of science and society, the concern in this essay is with the hybridization (and stabilization) of organizational forms, as well as the hybridization of practices, processes and expertise.

more have been drawn from elsewhere and constituted as the core of accounting. If we want to understand better the dynamics of hybridization processes, how hybrids form out of elements typically found separately, and how they then become stabilized and institutionalized before the hybridization process begins anew, accounting offers an ideal-typical illustration. Practices that once were at the margins seem now to be intrinsic and fundamental to the self-identity of accounting, even as they are beginning to be questioned, challenged and re-shaped. Earlier battles and skirmishes over the boundaries of accounting are soon effaced from the collective memory, as the discipline moves on to worry about a new set of issues regarding the integrity of its self-image.

Yet there is another side to the hybridization of accounting – the more or less constant attempts on the part of accounting to recognize and account for other hybrids. Even if accounting has been relatively slow to achieve this, no doubt due in part to its deep commitment to entity assumptions, we now see accounting seeking to catch up with the phenomenon of inter-organizational relationships. Nearly a decade ago, Hopwood (1996) argued that management processes frequently transcend legal organizational boundaries, yet most accounting practices continue to focus on hierarchical relationships and information flows. Lateral information flows are typically neglected, and budgeting, planning and performance evaluation are largely seen in vertical terms. Even the so-called new management accountings tend to maintain this hierarchical orientation. To counter this, Hopwood called for greater attention to be paid to the lateral processing of information, and for more explicit consideration to be accorded to the integration of actions within networks of organizations. In so far as planning, budgeting and control processes flow from one organization into others and create an interdependence of action, he argued that a more explicit awareness of such processes is needed to facilitate the role of joint action in organizational success. Building on these arguments, a body of work has begun to form that provides substantive empirical analysis of the diverse ways in which accounting adapts to and facilitates inter-organizational cooperation. Cost management across organizations, supply chains and supplier selection practices, open-book forms of accounting, strategic alliances, budgeting, and investment appraisal have all begun to receive attention in terms of the lateral information flows they entail, and in terms of the ways in which accounting practices today extend beyond the boundaries of organizations (Baxter and Chua, 2003; Cooper and Slagmulder, 2004; Dekker, 2004; Håkansson and Lind, 2004; Ittner et al, 1999; Kurunmäki and Miller, 2004; Llewellyn, 1991, 1994; Miller and O’Leary, 2005b, 2005c; Mouritsen, 1999; Mouritsen, et al., 2001; Seal et al, 2004; Tomkins, 2001; Van der Meer-Kooistra and Vosselman, 2000).

If accounting has, until recently, remained largely fixated on the traditional hierarchical organization, economics has been similarly focused on the distinction between markets and hierarchies, despite the early treatment of ‘hybrids’ by writers such as Williamson. Over 25 years ago, Williamson argued that much economic activity takes place via governance structures that are intermediate between markets and hierarchies (Williamson, 1979). He argued then that, if it remains interesting to ask why so much vertical integration occurs, it is equally interesting to ask why so many transactions occur in markets and quasi-markets. While markets and hierarchies represent two of the principal governance structures for organizing transactions, Williamson argued that a third type that he called ‘semi-specific’ also existed (Williamson, 1979: 247). Semi-specific governance structures, he argued, were

tailored to transactions that were neither highly standardized nor highly specific. Several years later, he commented that transactions in the ‘middle range’ were much more common than he had thought a decade earlier (Williamson, 1985: 83).⁷ By the early 1990s, he identified hybrids explicitly as one of three alternative modes of governance (Williamson, 1991). The aim here was to put hybrids on a similar footing to markets and hierarchies, and to characterize the abstract attributes that define them as an alternative mode of governance rather than a loose amalgam of market and hierarchy. The firm, Williamson argued, is usefully thought of as the organizational form or governance structure ‘of last resort’ (Williamson, 2002: 183), driven largely by increasing asset specificity. Hybrids, although representing a distinctive and generic mode of governance, are conceived as ‘market-preserving credible contracting modes that possess adaptive attributes located between classical markets and hierarchies’ (Williamson, 2002: 181).

Similar arguments have been advanced recently by Holmström and Roberts (1998) in a paper that re-visits the classic questions in the economics of organizations of why firms exist, and what determines their scope. If, as Coase (1937) argued, firm boundaries and integration can be explained by efficiency considerations, Holmström and Roberts ask why so much economic activity takes place outside the umbrella of the organization? While noting the lack of solid theoretical foundations, and the anecdotal nature of the evidence, Holmström and Roberts suggest that a much broader view of the firm and the determination of its boundaries is needed than is offered by transaction cost economics and property rights theory.⁸ The theory of the firm, they argue, has become too narrowly focused on the hold-up problem and the role of asset specificity. Citing a trend they discern towards disintegration, outsourcing, contracting out, and dealing through the market rather than integration within the firm, they argue that firms have to deal with a rich variety of problems. Only a small part of the organizational change taking place today, they suggest, can be readily understood in terms of traditional transaction cost theory in which hold-up problems are resolved by integration. Many of the hybrid organizations that are emerging, they argue, are characterized by high degrees of uncertainty, frequency of transaction and asset specificity, yet they do not result in integration. Indeed, they suggest, mutual dependency seems to support rather than hinder ongoing cooperation across firm boundaries. This parallels the arguments made by accounting researchers, that new hybrid practices are emerging as ways of making manageable and calculable lateral and cross-organizational relationships that cannot be readily understood and captured by existing modes of accounting. While Holmström and Roberts do not advance a specific or singular explanation for the phenomena they identify, it is clear that they regard organizational knowledge and information transfer as key. Leading economic theories of firm boundaries have, they argue, paid almost no attention to the role of organizational knowledge. Moreover, information and knowledge are at the heart of

⁷ Williamson somewhat undercut this observation by adding that ‘the tails of the distribution are thick’ (Williamson, 1985: 84).

⁸ Williamson (2002) responds to Holmström and Roberts (1998). He endorses the general arguments they advance for taking a broader view of the firm and the determination of its boundaries. He also supports their plea for avoiding a narrow focus on the hold-up problem and the role of asset specificity, while defending asset specificity as an operational concept that ‘serves to breathe content into the idea of transactional ‘complexity’ (Williamson, 2002: 189). Our interest in these debates is in terms of their general endorsement of the importance of examining and conceptualizing organizational forms that are neither classical markets or hierarchies, rather than in terms of the extent to which either party adequately characterizes or addresses the attributes of ‘hybrids’.

organizational design, because they lead to contractual and incentive problems that challenge both markets and firms.

More recently, Roberts (2004) has argued in similar terms, describing the changes in the organization of the firm during the past two decades as comparable to the invention of the M-form structure early in the last century. The refocusing on core businesses and the outsourcing of many activities previously regarded as central has, Roberts argues, led to a shift in the nature of relationships between firms and their customers and suppliers, with simple arms length relationships being replaced by long-term partnerships. Layers of management have been eliminated, functional units have been dispersed to business units, and the authority and accountability of line managers has been increased. To facilitate coordination and learning in this novel organizational form, Roberts argues, firms have experimented with ways of linking people through horizontal rather than hierarchical communication. These organizational innovations, he suggests, are ongoing and offer the opportunity for improved economic performance. They alter the way work is done, and change people's lives in fundamental ways.

Legal theorists who have addressed the nature of the firm and its boundaries have confronted a similar set of issues, albeit in a distinctive manner. Not surprisingly, the issue of responsibility is a central preoccupation in the legal domain. For Collins (1990), the main issue is the principle of group responsibility under common law.⁹ This entails the recognition of a legal person or entity as a representative of the group, with the group in turn being held liable potentially for the acts of its members. This is currently possible where the productive relations are controlled and directed within one capital unit, that is to say a firm in the legal form of a partnership or company. Collins argues that this principle of collective responsibility should be extended more widely, to take account of group responsibility across different capital units or firms. Collins refers here to what he terms 'complex economic organisations', that is a set of economic organizations that do not constitute a single firm or a single legal entity, yet none the less are integrated and may be treated as comprising a single set of productive relations. For instance, Collins argues that for the purposes of ascribing legal responsibility one might treat a set of subcontractors (for example in the construction industry, or car manufacturing) as a united group. Responsibility here, he argues, should be viewed as a matter of group rather than purely personal responsibility. While acknowledging the difficulties of re-conceptualizing general principles of legal responsibility, Collins argues for the importance of finding ways to identify integrated, yet legally separate, economic units for the purpose of attaching obligations. Teubner and Hutter (Teubner, 1993; Hutter and Teubner, 1993) have argued in similar terms, although couched more in the language of social systems theory. They start from the premise that hybrids are fundamentally different from market contract and hierarchical organization, by virtue of their coordination and control mechanisms. They are referring here to just-in-time organizations, franchising systems, money transfer networks and other networks in such sectors as energy, transportation and telecommunications. These concerns on the part of some legal theorists echo those of accounting researchers and practitioners. For in so far as all

⁹ See also Collins (2006) on the legal implications of the network architecture of supply chains. See also Buxbaum (1993) who argues pithily and normatively that network is not a legal concept.

legal entity companies must prepare annual accounts, the legal entity principle strongly reinforces the accounting preoccupation with the bounded nature of the firm.

Whereas accountants, economists and lawyers are relative newcomers to the debate about hybrids, management and organization researchers, together with sociologists, have long recognized and studied empirically the wide variety of organizational arrangements that structure and facilitate economic life.¹⁰ Over two decades ago, Ouchi (1979) considered the mechanisms through which organizations are managed, and used the label 'clan' to designate the informal social structures and processes that characterize some organizations. Although Ouchi's concern was with intra-organizational control mechanisms, his work none the less directed attention to a mode of control that did not readily fit into the traditional binary classification of markets and hierarchies. Rather than view the clan mode of control as an anomaly or epiphenomenon, he argued that it should be regarded as a subject of analysis in its own right.

In the 1980s, a number of writers on management took these arguments a step further, and pointed to the changing nature of industrial economies and the increasing importance of cooperative organizational forms that do not fit the traditional antinomy of markets and hierarchies. Factors such as the increasing globalization of the world economy, shorter product life-cycles, the emergence of new hi-technology industries, the increasing customization of demand, the emergence of flexible specialization, and changing competitive conditions all helped create unprecedented demands on traditional modes of organizing production. The 'quasi-firm' was identified as a distinctive governance structure in the particular context of the construction industry (Eccles, 1981). This referred to an organizational form with characteristics of both markets and hierarchies, based on 'relational contracting' in which both parties can benefit from the somewhat idiosyncratic investment of learning to work together (Eccles, 1981: 340).¹¹ In the very different context of academic publishing, hybrid forms of organization based on a dense network of personal ties were identified as critical to the fortunes of publishers (Coser et al., 1982; Powell, 1985). In the context of traditional 'craft production' in the German textile industry, a production system was observed and analysed that linked small and medium-sized firms in an extensive subcontracting system. Within it, key technologies were developed in collaboration, and in conjunction with overlapping inter-industry supplier networks (Piore and Sabel, 1984). And, in the context of the commercial aircraft industry, as well as in oil extraction, chemical and pharmaceutical research, microelectronics, telecommunications, and biotechnology, management researchers provided increasing evidence of modes of organizing economic activity that did not fit the conventional categories of markets and hierarchies.¹²

By the late 1980s, a substantial body of research on hybrid organizational arrangements already existed in the management literature. Powell (1987) reflected on this literature, asking whether hybrid organizational forms are a new and distinctive feature of the socio-economic landscape, or whether they are simply a transitional

¹⁰ Classification by discipline is always problematic, and particularly in this instance. The work of Oliver Williamson, for example, draws on and contributes to economics, organization theory and law.

¹¹ In this context, 'somewhat idiosyncratic' is distinguished, following Williamson, from 'highly idiosyncratic', with the latter likely to lead to full integration.

¹² See Powell (1987) for an overview of some of these studies.

development. He argued that analytical concepts such as markets and hierarchies may provide us with distorted lenses through which to analyse economic change. By viewing economic organization as a choice between markets and contractual relations on the one hand, and conscious planning within a firm on the other, Powell argued that we fail to see the rich variety that forms of cooperative arrangements can take. He spoke of a ‘stampede’ into various alliance-type combinations, linking large generalist firms and specialized entrepreneurial start-ups. Borys and Jemison (1989) addressed the specific issue of strategic alliances, defining hybrids as organizational arrangements that use resources and/or governance structures from more than one existing organization. According to this view, hybrids are still the product of sovereign organizations, yet they allow individual firms to draw upon the capabilities of multiple, independent organization, whether via mergers, acquisitions, joint ventures, license agreements or supplier arrangements. Granovetter (1985) went further, and suggested a more general argument concerning economic behaviour. He argued that all economic behaviour, whether it takes place within markets or hierarchies, is ‘embedded’ in interpersonal and social networks. Extensive and sustained subcontracting relationships based on interpersonal relations and shared norms, according to such a diagnosis, are not empirically intermediate organizational forms but indicative of the fundamental ‘embeddedness’ of economic transactions in social life (Granovetter, 1985).¹³

In the 1990s, the management and organizational literature on hybrids burgeoned theoretically and empirically. There was increasing emphasis on networks, with Powell (1990) arguing now that the term hybrid was an inappropriate and inaccurate way of characterizing the diverse forms of collaboration that have existed historically.¹⁴ Rather than presuming markets as the starting point, and viewing other forms of exchange as arrayed on a continuum with hierarchies as the end point, Powell called for attention to be directed at networks as a distinctive mode of coordinating economic activity. In network forms of exchange, individuals engage in reciprocal and mutually supportive actions, and effectively forego the right to pursue their own interests at the expense of others. In the case of biotechnology, he suggested, sources of innovation do not reside exclusively within firms, but are commonly found in the interstices between firms, universities, research laboratories, suppliers and customers (Powell et al., 1996). The general argument here is that, when knowledge is broadly distributed and brings a competitive advantage, innovation is likely to be located in a network of inter-organizational relationships.

Others argued in similar terms, focusing on the social networks that enable and shape strategic alliances (Barley et al., 1992; Gulati, 1995a, 1995b, 1998; Gulati and Singh, 1998; Kogut et al., 1992; Nohria and Eccles, 1992). Noting the growth of interorganizational cooperation, and of interfirm strategic alliances, Gulati (1995a) argued that empirical studies in the transaction cost tradition have typically treated each alliance as independent, and considered the activities it includes as singularly reflecting only the transaction costs associated with it. This ignores the possibility of

¹³ On subsequent use of the notion of ‘structural embeddedness’, see for instance Simsek et. al. (2003) and Gnyawali and Madhavan (2001).

¹⁴ See: Callon (1998) for a distinct approach to the construction of markets and the role of networks; Nohria (1992) for a review of the network perspective among scholars of management and organization; and Thompson et al. (1991) for a useful collection of material on markets, hierarchies and networks that spans a number of decades and disciplines.

repeated alliances that may alter the calculations of the partners when they are choosing contracts in alliances. The social context of alliances, according to this view, emerges over time and can only be observed by examining the relationships between firms across time (Gulati, 1995a, 1995b; Gulati et al., 2000). Uzzi (1997) argued in similar terms, although he drew upon the notion of ‘embeddedness’ and argued that a more precise formulation of the effect of social relations on economic action was needed. Zaheer and Venkatraman (1995) argued for a focus on both the structure and process of ‘relational governance’, on the grounds that factors such as trust complement economic factors in the governance of exchange relations. Teece (1996) argued that hybrid organizational forms, such as inter-firm agreements linking firms with complementary capabilities and capacities, represent a significant organizational innovation.¹⁵ Teece et al. (1997)¹⁶ built on these proposals, and outlined the ‘dynamic capabilities’ approach that sought to explain how and why certain firms build competitive advantage in regimes of rapid change. Dynamic capabilities are defined here as the ability of a firm to integrate, build and reconfigure internal and external competence to address rapidly changing environments (Teece et al., 1997: 516). Other key contributions to the strategic management field argued that competitive advantage may be based on a high degree of inter-firm specialization (Dyer, 1996). Or, more generally, a firm’s critical resources may extend beyond boundaries of the firm (Dyer and Singh, 1998).

By the end of the 1990s, and leaving aside differences of emphasis and terminology, as well as theoretical preferences for building on or superseding transaction cost modes of analysis, scholars in management and organizational analysis had accumulated a very substantial body of empirical research on hybrid organizational forms. Special issues of the *Academy of Management Journal* in 1995, the *Academy of Management Review* in 1998, and the *Journal of Management Studies* in the same year are testimony to the extent of the interest in these issues among management researchers. The volume and scope of this literature is quite remarkable, as is its continuing extension. Some writers have focused recently on the ‘processual’ aspects of inter-organizational relationships (Das and Teng, 1998, 2002; Zajac and Olsen, 1993). Others have reaffirmed the importance of ‘trust’ (Adler, 2001; Carney, 1998). The issue of recurrent and relational contracting has been addressed further (Ring and Van de Ven, 1992), as has the role of technological knowledge (Brusoni et al., 2001), the role of information practices (Sampler and Short, 1998), and the role of control mechanisms (Birnberg, 1998). The detailed structure of alliances has been examined (Sobrero and Schrader, 1998), the issue of cooperation has been considered (Smith et al., 1995), and the wide variety of coordination mechanisms has been emphasized (Grandori, 1997). Meanwhile, a range of hitherto neglected topics and issues have been shown to be worthy of attention. This includes the role of inter-organizational relations in the context of patient care (Gittell and Weiss, 2004), the role of institutions such as trade associations in shaping inter-organisational relations (Marchington and Vincent, 2004), and the issue of syndication in the venture capital industry (Wright and Lockett, 2003).¹⁷ Whether one uses the label ‘hybrids’, ‘networks’, or simply ‘new organizational forms’, it is clear that the appetite of management and organizational scholars for researching and analysing this set of

¹⁵ See also Pisano et al. (1988) and Teece (1992).

¹⁶ See also Araujo et al. (2003), who more recently have proposed the notion of ‘indirect capabilities’.

¹⁷ The implications of hybrids and network organizational forms for business history is also currently receiving renewed attention. See for instance Lamoureaux et al. (2004) and Sabel and Zeitlin (2004).

phenomena is undiminished even after more than a quarter of a century of intense activity.

In a different context, and at the intersection of academic and political debate, the so-called ‘third way’ political thinking also sought to pluralize organizational forms. Giddens (1998) depicted markets as merely one possible modality of governance. Much of the debate here centred on the quality of public services, and whether markets offered alternatives to state provision. The proponents of the third way argued that government should act in partnership with the agencies of civil society and business. Such arguments built on an earlier literature that represented the traditional antinomy between state and market as insufficiently complex for analytical and practical purposes (Streeck and Schmitter, 1985). In addition to modes of organizing social and economic life through markets, states and communities, they proposed the notion of ‘associations’. The guiding principle of such organizational arrangements is ‘organizational concertation’ or negotiation within and among a limited and fixed set of interest organizations that recognize each other’s status and entitlements, and are capable of reaching and implementing relatively stable compromises in the pursuit of their interests. A decade or so later Hirst (1994) argued in similar terms, calling for ‘associationalism’ as a principle of administrative renewal in the face of bureaucratic failures. State provision, he contended, should be made more accountable to citizens, and market provision should be embedded in a social network of coordinative and regulatory institutions. Market principles and mechanisms should be combined with non-market calculations and forms of resource allocation. Hybrid organizational forms, which are better able to manage uncertainty, once again appear to be the rule rather than the exception (Hirst and Zeitlin, 1991).

While organization theorists do not point to a single factor explaining the proliferation of hybrid organizational forms, one thing they are clear about is that there is no tendency for them to disappear or diminish in significance. Adaptability to changing market conditions, the limits of large-scale organization, access to specialist know-how which is often located outside the boundaries of the large corporation, and generalized reciprocity and reputation are among the factors that have been identified as important in the growth of hybrid organizational forms. Most recently, innovative forms of organizing have been addressed from a broadened version of complementarities thinking in which complementarities are viewed as nets of inter-relationships (Milgrom and Roberts, 1995; Pettigrew et al., 2003). Building on established traditions in organization theory, such as contingency theory and the notion of ‘fit’, complementarities thinking lends itself to explanations of inter-firm cooperation as much as to synergies among activities within firms (Miller and O’Leary, 2005a, 2005b). And in doing so it encourages researchers to extend their focus in two respects: firstly, to consider multilateral and complex interdependencies rather than unilateral or one-to-one issues of ‘fit’; secondly, to attend to innovations in process and systems, as well as in organization forms and structures (Pettigrew et al., 2003). It is to these latter issues that we now turn in the following section.

Hybrid Practices, Processes and Expertises

A wide range of disciplines has thus acknowledged the existence of hybrids, and their importance to the socio-economic landscape. Yet, taken as a whole, the literature on

hybrids that has emerged across the past two decades or so suffers from two key limitations that are of particular relevance to the management of uncertainty and risk. Firstly, the literature on hybrids has been largely preoccupied with organizational forms despite recent suggestions to broaden the focus. An unfortunate side-effect of this focus on organizational forms has been the relative neglect of the hybrid practices, processes and expertises that make possible lateral information flows and cooperation across the boundaries of organizations and firms. Information sharing across organizational boundaries, and the intrinsically hybrid nature of much of the information and expertise that facilitates it, have yet to receive the attention they merit.

Accounting is central here, as are the interactions between accounting information and other types of expertise, whether in the form of engineering, marketing, design, medicine, etc. For, irrespective of the ongoing critique and self-critique of accounting as a limited mode of representation, the repeatedly hybridized calculative practices of accounting remain one of the most influential ways of rendering uncertainty and risk visible. We need to know more about the ways in which accounting interacts with, and at times hybridizes, as a result of encounters with other types of expertise. Even competing firms engage in continuous and frequent information exchange on a much larger scale than commonly acknowledged, and information transfers of varying types may work well without vertical integration. Much of this information is accounting-based, albeit modified to deal with the often localized nature of the information transfers. Moreover, some firms see the opportunity to learn and share information effectively as the key to their competitive advantage. Yet, despite this increasing emphasis on information and knowledge transfer and sharing, there is little attention paid to the intrinsically hybrid nature of much of the practices, processes and expertises that play such a role. We argue for increasing attention to these mechanisms, as it is through them that uncertainty is actually managed rather than formally represented as manageable. We need to know more about the industry- and firm-specific practices that facilitate information flows and communication across the boundaries of firms, organizations and groups of experts or professionals. We need to know more about the varied and often localized metrics and languages that facilitate interactions that do not respect organizational boundaries, whether in the private or not-for-profit sector. We need to know more about the locales, institutions and conduits through which such metrics circulate, and in which they are embedded. And we need to pay attention to the multiple and diverse constituents of such practices, which often do not fit the neat categories according to which we typically order the world.

Secondly, the literature on hybrids has been overly concerned with the question of whether hybrids are intermediate or transitional economic forms. Put differently, the debate continues to be suffused by a residual antinomy of markets and hierarchies, as if the loss or attenuation of such parsimony might lead to intellectual disarray. Those who emphasize the stability and diversity of hybrid organizational forms seem, however, to be willing to accept the empirical and theoretical challenge they present if we are to improve our understanding of organizational change. That is the approach favoured here.

To illustrate the importance of hybrid processes, practices and expertises, and their significance for the management of risk, we offer a number of examples. Clearly

these can only be vignettes in the context of this essay. None the less, it is hoped that they indicate the range of issues that we argue need further attention when considering the ways in which cooperative action across boundaries is facilitated. For it is through such hybridized mechanisms that formally distinct bodies of experts, entities and endeavours are brought together to manage the primary risks that arise otherwise in the interstices between them. The examples are chosen to illustrate the different modalities of hybridization of accounting and financial expertise, and the implications for the management of risk. In the first example – of Moore’s Law and technology road-mapping in the microprocessor industry – we examine the hybridization of financial and technological expertise. In the second example – of investment ‘bundling’ at Caterpillar Inc. – we examine the hybridization of financial and engineering expertise. In the third example, we consider the hybridization of financial and medical expertise in the setting of health care reforms in Finland and the UK.

Consider first the practice of ‘technology roadmapping’ as used to inform investment appraisal and coordination in the semiconductor industry (Miller and O’Leary, 2005a, 2005b). Technology roadmapping refers to an information-sharing framework that operates internationally across very different kinds of organizations, including large-scale semiconductor firms, suppliers, consortia, start-up firms, government agencies, and university laboratories. Roadmaps are used to form shared expectations across such diverse entities, for periods of 10 to 15 years ahead, as to when innovations by each of the entities must come to fruition, and how they should inter-operate, to enable the production of new and more powerful semiconductor and microprocessor devices. Technology roadmaps are information-sharing arrangements that are both hybrids themselves, and devices that help to create hybrid organizational forms. In the case of a microprocessor firm like Intel, roadmaps are crucial to the strategic investment decisions made at the most senior levels of the corporation (Miller and O’Leary, 2005a, 2005b). It is by means of roadmaps that the firm’s executives seek to coordinate their investments with those of a host of other firms and organizations world-wide, thus managing the risks of widely distributed sets of interrelated innovations.

If technology roadmapping is critical to the lateral flow of information and the management of risks among firms manufacturing microprocessors, among sub-units of individual firms, and among complementors, then the so-called ‘Moore’s Law’ is perhaps one of the clearest examples of a hybrid practice that combines technological and financial components. Moore’s Law dates back to 1965, when Gordon Moore set out his predictions as to what would happen to the semiconductor components industry over the next ten years. On the basis of three data points, which he extrapolated from in a straight line for the next ten years, Moore predicted that the density of components on an integrated circuit would continue to double on an annual basis. These predictions were startling in themselves. Equally astounding were his predictions about the economic aspects of the future of integrated circuits. For the predicted improvements in speed and complexity, and the expected reductions in the size of integrated circuits, were seen to be matched by comparable reductions in cost. By 1975, these combined predictions of rapidly increasing complexity, with more or less equivalent reductions in cost, had come to be termed Moore’s Law and accepted as a fact across the industry. Since then, Moore’s Law has become not only a way of setting the pace of technological innovation, but also a way of defining the rules under

which competition occurs in the semiconductor industry. Only by constantly innovating technologically, it seems, could one achieve an apparently limitless reduction in cost per component. Moore's Law is not only a hybrid practice at its core, combining as it does technological and financial projections. It also manages uncertainty in the most immediate and direct manner, by providing a set of shared expectations for all the firms and industries that are involved in the production and consumption of microprocessors.

Consider another example that concerns investment evaluation and the coordination of a system of diverse assets. The practice in question is termed 'investment bundling', and was used by Caterpillar Inc. to frame their US\$2.7 billion world-wide factory modernization project termed 'Plant With a Future' launched in the mid-1980s (Miller and O'Leary, 1994a). Investment bundles were defined as physical areas on the factory floor that had common elements relative to processing, material handling, tool management, systems and so forth. Investment bundling as a practice was itself a hybrid, formed out of engineering and financial expertise. The practice was developed as executives within Caterpillar Inc. borrowed practices termed 'IDEF Zero' from software design, and ideas of 'group technology' from mechanical engineering, to create novel ways of modelling and intervening upon investments in manufacturing (Miller and O'Leary, 1994b). The overall 'Plant With a Future' project world-wide was divided into 77 'bundles'. Plant operations were to be consolidated, simplified, automated and integrated via closely coordinated investment in new manufacturing technologies, new factory layouts and new information systems.

For capital investment evaluation purposes, the most notable feature of the investment bundling process was that the focus was shifted from discrete stand-alone items to integrated 'systems of assets' that were viewed as synergistically related. Investment proposals and investment monitoring thus had not only to demonstrate a return on investment calculated in traditional accounting terms as an Internal Rate of Return. They had to show how product cost reductions computed in relation to competitor benchmarks, combined with process improvements such as assembly time reduction, work in process reduction in terms of numbers of physical units, space reduction framed in square feet, and reductions in unit travel distance, would result in overall desired rates of financial return. The so-called 'bundle monitors' were thus intrinsically hybrid calculative practices, for they brought together in a single format both financial and engineering metrics. And in doing so for a complex system of assets, rather than a stand-alone investment, they facilitated the management of the risks that could otherwise have arisen if one or more components of the overall system of assets had not performed as expected.

Hybrids are also found in very different contexts. Consider for example one particular encounter between medical and financial expertise. The issue here centres on whether senior clinicians in a hospital setting, and in relation to the 'New Public Management' reforms, are willing to acquire financial expertise in areas such as budgeting, costing and pricing. In the UK, at least initially, medics seemed to wish to preserve intact the boundaries of the medical enclosure and thereby inhibit or prevent the forming of hybrids (Rose and Miller, 1992). In Finland, in contrast, senior clinicians seemed willing to acquire financial expertise and in the process to hybridize their existing skills (Kurunmäki, 2004). The process began in the late 1980s when medical professionals were made financially responsible through delegated budgets in the

localized settings of individual institutions. These initial experiments, in which consultants, physicians, nurses and administrative personnel participated, took place on a voluntary basis. Networks of calculation, in which medical experts were central, emerged gradually as key actors came to endorse the ideas, and the number of participants multiplied. Once budgeting skills had been acquired by medical experts, and the process embedded at ward level, it was only a relatively small step to make medical professionals responsible to municipalities and hospital management for keeping within their budgets. As the ideas of markets, customers and contracts became prevalent in Finland in the early 1990s, and with their recently acquired financial expertise, clinicians took readily to the detailed tasks of calculating costs, allocating overheads and constructing prices. Chief physicians spoke proudly of the price lists they had prepared, and the average costs they had calculated for different operations. They spoke equally proudly of the fact that they prepared costing and pricing information with no help at all from the finance unit in the hospital. The acquisition of financial expertise was considered to be relatively straightforward and unchallenging, when set alongside the acquisition of clinical skills and expertise. Calculative expertise thus became part of the repertoire of practices that medical professionals in Finland could deploy. Instead of inter-professional competition and jurisdictional disputes, a hybridization of expertise occurred. A new assemblage was formed among medical professionals, medical expertise, and the calculative practices of accounting. In terms of risk management, and whether deliberate or not, this hybridization acted as a form of uncertainty reduction for the medical system in the context of the 'New Public Management' reforms.

In the UK context, a further and related example illustrates how a range of groups can work across existing professional boundaries and thereby facilitate the emergence of a new set of hybrid processes and practices. The context is the 'modernising government' programme introduced in the late 1990s by the Labour government as an attempt to promote 'partnership' working among a range of service providers (Kurunmäki and Miller, 2004). Instead of coercion by the state or the untrammelled workings of the market, a generalized injunction to cooperate, and to enter into partnerships, was placed upon a range of agencies. The Health Act 1999 gave form to this incitation to cooperate, and brought health care and social services in particular into close contact. Following previous initiatives designed to encourage cross-sectoral working, the Health Act 1999 sought to weaken the power of existing professional and managerial enclosures by introducing a new duty of cooperation within the NHS, together with an extended duty of cooperation between NHS bodies and local authorities. A new statutory mechanism for strategic planning was introduced, with the aim of improving health care services, along with provision for NHS bodies and local authorities to make use of new operational flexibilities. These 'flexibilities' introduced in Section 31 of this Act – pooled budgets, lead commissioning and integrated service provision – provided further practices through which the modernizing government programme could be rendered operable. As one might expect, at a local level this programme encountered traditional and entrenched views that health care and social care professionals do not speak the same language, that one group is trying to take over the other, and that professional rivalries within health care make inter-organizational cooperation extremely difficult. But a kind of regulated hybridization, in the form of evolving cooperative forums to enable inter-professional and inter-organizational exchanges, also emerged. In one area, there developed 'lead commissioning' of continuing care placements, through which the social services

purchasing manager came to be responsible for commissioning all placements funded either by social services or health care, or jointly by these agencies. In another area, a multi-agency team was formed to conduct joint assessments for nursing home care, made up of a consultant geriatrician, an occupational therapist, a community psychiatric nurse, a social service manager, a care manager, a community care manager and a district nurse. In both instances, the risk of individuals falling between the ‘gaps’ between different professional and administrative groups was seen to be reduced, although the longer term impact of formal ‘partnership working’ remains to be seen.

These brief examples are intended to be no more than indicative of the range and multiplicity of hybrids that we argue need to be more fully recognized. We have deliberately taken examples from both the private and the public sector, for we do not consider hybridization to be confined to one or the other. We have suggested that hybridization can occur between the domains of science, technology and the economy, between the calculative practices of engineering and accounting, between medical and financial expertise, and between medical and social care agencies. In the case of the microprocessor industry, we have argued that Moore’s Law and technology roadmapping practices can reduce risk by coordinating and aligning expectations within and among firms. In the case of Caterpillar Inc., we have suggested that investment bundling can reduce risk by focusing attention on the set of assets whose successful integration can improve financial returns. In the context of the Finnish health care reforms, we have argued that the hybridization of financial and medical expertise can reduce risk by reducing uncertainty for the health care system as a whole. And in the UK health care reforms, we have suggested that formal partnership working can reduce systemic risks likely to arise through individuals falling through the ‘gaps’ between different professional and administrative groups. We do not conclude from these examples that hybridization is always benign, or that it always has positive effects for risk management. We do argue, however, that it demonstrates that there is much that falls outside the domain of formalized risk management, and that the hybrid nature of the processes, practices and expertises we have referred to is central to their ability to effect coordination across domains and boundaries. No doubt more examples are needed, and a more robust assessment of the factors that encourage or inhibit such developments. We need also to consider how and whether formalized risk management practices and regimes may inhibit such developments. And we need a better understanding of the interaction between localized practices that contribute to the management of risk, and the increasingly prevalent and formalized risk management and governance regimes. But we do believe that these examples are sufficient to indicate that researchers should consider a range of processes, practices and expertises that are currently confined to the penumbra of formalized risk management.

Conclusion

Hybridization is a continually inventive process, in which proliferation and multiplication is the norm. But if hybrids are where so much of the action is, and if so many social scientists from so many disciplines have emphasized their importance for two decades or more, why are they not given greater prominence in risk management? And why are hybrids particularly neglected in the public sector, as Hood and

Rothstein (2000) have observed? The answer, no doubt, resides in large part in the exacerbation of formal *process*, as Power (2004) has argued, and the regulatory pressures towards standardization that characterize much of risk management. Relatedly, risk regulation regimes may in part be a means for regulators, public bodies and government to manage the risks to themselves, rather than to manage the underlying risks. If one's organization has in place the appropriate risk management committees, officers and practices, then at least there exists some *ex post* protection against possible accusations of recklessness or neglect. But it is undoubtedly also because hybrids are a challenge to risk management, for they typically reside beyond the boundaries of existing entities, and do not lend themselves readily to traditional ways of sorting the world. The types of risk and uncertainty management practices we have documented fall between the conventional professions of regulation such as accounting and law. And as topics of research, they also fall between the conventional academic disciplines of accounting, economics, law, organization theory and the sociology of the professions, which may in part explain their neglect by researchers. The attention paid in the literature to hybrid organizational forms supports this contention, as does inversely the relative neglect of hybrid processes, practices and expertises.

We have drawn attention in this essay to the importance of hybrids in both the public and private sectors, and across the boundaries of these increasingly overlapping domains. In no way has our selection aspired to be comprehensive for either the areas or individual examples. But we do think they indicate the considerable variety and significance of hybrids. For instance, we have demonstrated the role played within Caterpillar Inc. of a firm-wide practice for evaluating and monitoring investments. This practice, termed investment bundling, blends together a range of engineering and financial metrics into something that fits neither the conventional categories of accounting nor the more recent notion of a balanced scorecard. Remaining with investment evaluation, but this time in the microprocessor industry, and with the focus on inter-firm as well as intra-firm practices, we have shown how technology roadmaps facilitate coordination across sub-units of the firm, as well as between the firm and its complementors. We have indicated how 'Moore's Law', which pre-dates and broadly defines the contours that roadmaps have to follow, mediates between science and the economy, and defines the rules under which competition occurs in the microprocessor industry.

In a very different context – an encounter between medical and financial expertise – we have shown the process of hybridization to be equally important. As hospital clinicians in Finland showed a willingness to acquire competence in budgeting, costing and pricing, and to attend associated training schemes designed specifically for medics, their skill-sets changed. In countries such as the UK at that time, and in contrast, the boundaries between medical and financial expertise within hospitals remained more clearly drawn. None the less, one can discern more recently evidence of a process of hybridization even in the UK, in the context of the 'Modernising Government' programme and the calls for formal 'partnership working'. And the calculative practice called 'Reference Costing', together, with the 'Payment by Results' programme, has resulted in hybrid practices being formed at a national level out of medical categories such as Healthcare Resource Groups and costing practices such as standard costing.

Clearly, these are no more than snapshots that illustrate the diverse nature of hybrids, although even these brief illustrations draw from a growing body of literature. These examples show, however, the importance of broadening the focus beyond hybrid organizational forms to consider also the wide range of hybrid processes, practices and expertises that create and enable lateral rather than vertical transfers of information and knowledge. For hybridization can occur whenever two or more elements normally found separately are combined to create something new. The formation of relatively stable organizational forms that do not fit readily the categories of market and hierarchy is only one example. Practices and processes such as investment bundling and technology roadmapping that draw on more than one type of expertise are another, whether these are formalized or not, and whether they are used for planning or monitoring purposes. The hybridizing of professional expertise is a further example, although the conditions for this to occur are probably more demanding in light of what may be perceived to be at stake in some contexts as a dilution of the self-image of a profession. And interdisciplinarity, an enduringly fashionable leitmotif for those who seek to design academic policy, is yet another, although it is a type of hybrid that is perhaps more frequently imagined than realized.

The implications of hybrids for the accounting and risk management literature are considerable. We have argued that it is through hybrid practices, processes and expertise that the actual management of risk occurs, rather than through the formalized and obligatory routines of risk management. Even if this is currently more of an assertion than a rigorously documented fact, it is clear none the less that the management of uncertainty and risk happens in large part at the boundaries or margins of conventional entities and practices. It is clear also that accounting is being hybridized yet again in this process, and in diverse ways in different locales. Coordination across sub-units of a firm, cooperation and the sharing of expertise among firms, inter-professional knowledge transfer and even the emergence of new bodies of expertise, formal and informal cooperation across organizations and groups of experts, and the creation of metrics that draw upon different bodies of expertise are among the multiple dimensions of hybrids. These are only some of the examples of accounting and hybridization, and how it can have significant implications for the management of risk. The literature on accounting and risk management needs to acknowledge that the formalized hierarchical models that characterize much of the regulatory arena are at odds with the hybrids and the lateral relations that enable the management of organizations and the management of risk in all its forms to flourish. No doubt, to the extent that the practices we have described here come to be increasingly stabilized and taken for granted, they will appear less like hybrids. They may even come to be embedded in formalized risk management routines and thereby lose their ability to manage actual risks. But, as we have argued, such is the nature of hybridization.

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