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Learning to organise risk management in organisations: what future for enterprise risk management?

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Enterprise risk management (ERM) was originally developed to manage financial risks and was later transferred to other businesses, sectors and, crucially, government. ERM aims at a maximum of comprehensiveness suggesting the integration of all risks to an organisation's objective in a portfolio to inform organisational strategy. However, the concept suffers from unknown interdependencies between risks, implementation strategies that lack empirical validation and ambivalences and uncertainties arising from their management. It is only weakly rooted in organisational theory. Drawing on knowledge generation, theory key aspects for the empirical study of risk management in organisations are identified. These address the commensuration of risks, the comprehensiveness of the risk portfolio and the communication of explicit and tacit knowledge enabling organisational learning processes in different institutional contexts.

Keywords: ERM; organisational risk management; organisational learning; public administration; commensuration;

1. Introduction

The pervasiveness of risk in modern society has shifted the focus of the social sciences from primary risks to those risks created by the management of primary risks (i.e. secondary risks) (Power 2004). Initially, risk research identified inadequate regulation of primary risk as a core research theme (Irwin et al. 1997); however, more recently risk research has turned to understanding organisations and their capability to manage risk (Power 1999, 2008; Hutter and Power 2005). Today, various risk assessment and management techniques are applied across organisations and this article will focus on arguably the most influential of the last two decades, enterprise risk management (ERM).

ERM was initially developed in the finance and insurance sectors to manage risks associated with investments and liability. It stands separate from other organisational risk management systems as the only one that attempts to integrate strategic, financial, hazard and operational risk into a single framework to inform an organisation's strategic objectives. Indeed, the ERM framework suggests that even more risks can be progressively added to a central portfolio as management capability increases. It subsequently spread to other economic sectors and businesses

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(FERMA FERMA 2002) before the UK took the lead in adopting it within the government sector (Cabinet Office 2002).

The basis of ERM is the assumption that any event threatening an organisation's objectives constitutes a risk and that these risks that may befall an organisation can be compared. A systematic assessment of these risks may then inform the formulation of an organisational strategy (COSO 2004). From this vantage, the opportunities appear unlimited as ERM might transform risk from a defensive concept into a future-oriented concept enabling organisations to seek new opportunities in their environment. This active position may explain ERM's appeal across different types of organisations, sectors and fields.

Despite differences in method and context, there exist a shared set of assumptions and rules underpinning risk management in both private and public organisations. When introduced to the business of government, ERM sought to improve the handling of risk – after several high-profile crises – by seemingly aligning the concept of rational precaution with that of strategy formulation. However, transferring organisational innovations from one context to another bears risks as well, since different contexts comprise different institutions and problems. Despite the diffusion of ERM through private business and government, it is surprising that many champions of risk management have remained sceptical of it (e.g. Hood and Rothstein 1999; Power 2009).

This article elaborates on the challenges of carrying out risk management in organisations. In particular, we discuss the problems arising for organisational risk management when implementing and integrating risks to form a comprehensive management system. Recent research on risk management in organisations will serve as a starting point (Section 2) followed by an examination of the conceptual foundations of ERM and its limits (Section 3). Organisations will only alter their risk management, if they learn to integrate different risks coherently (Section 5). In the process, they may face trade-offs. When integrating risks commensuration poses a key challenge that demands special consideration (Section 4), and goes hand in hand with risk knowledge generation (Section 6). Finally, we discuss the identified problems and conclude with a discussion on future research needs (Section 7).

2. Risk management in organisations

As organisations engage under different social context, they encounter different types of risks. What may appear like a truism however, is not well reflected in the realities of organisational risk management research. From an academic perspective, few empirical studies on organisation-wide risk management in either government or business exist (e.g. Bozeman and Kingsley 1998; Aabo, Fraser, and Simkins 2005; Fraser and Henry 2007; Mikes 2009; Arena, Arnaboldi, and Azzone 2011; Verbano and Venturini 2011) and instead the field is dominated by consultants who produce confidential reports for clients and selected surveys for wider audiences (e.g. FERMA, AXA, and Ernst &Young 2008; COSO 2010). The former does not permit wider dissementation of findings and subsequent advancement of explanations and the latter is largely based on subjective perceptions, e.g. of risk officers reporting of their perception of the field. Therefore, there is scope for academic studies to move beyond the selectivness and methodological weakness of current research by investigating the premises of organisational risk management approaches

(cf. also Yaraghi and Langhe 2011), which in practice may be too simplistic to match organisational complexity.

Academic research has only recently investigated the implementations of integrative organisational risk management. Verbano and Venturini (2011) distinguish seven different fields of application in business organisations.

(1) Financial risk management (FRM)
(2) Insurance risk management (IRM)
(3) Strategic risk management (SRM)
(4) Enterprise risk management (ERM)
(5) Project risk management (PRM)
(6) Engineering risk management (EnRM)
(7) Clinical risk management (CRM).

The authors point out that FRM, IRM seek to integrate risks by commensurating them in monetary terms. SRM also integrates risk, yet is signified by a literature with heterodox views of the relationship between organisational risk and economic return or organisational performances and competitive advantage indicating frictions between prices and objectives. The types vary considerably. PRM differs from the aformentioned concepts as it addresses risks to the delivery of projects while engineering and clinical risk management occur in specific types of organisations or divisions of organisations. This diversity of risk management schemes and their specific challenges is hardly surprising given the plurality of organisations, the judgement required in the management of risk and the complex environments, these schemes operate in.

The implementation of ERM has proved to be even more varied. ERM differs from other organisational risk management approaches, since it aspire greatest comprehensiveness in the risks covered and managed of all organisational risk management schemes. It is even open to include secondary risks. This radical expansion of what risk management covers has been encouraged by voluntary standards issued by different, predominantly private, organisations (e.g. AS/NZS/ISO 31000 2009). Yet, this expansion increases the challenge to commensurate the risks in the portfolio, to control for interdependencies between risks and to assure all risks are equally well communicated. Furthermore, existing frameworks claim that their guidance is readily transferable between different organisations and sectors and thus applies equally well in different institutional contexts (ibid.). However, scarce evidence about the performance of ERM suggests that the outcomes are wide-ranging, even in similar organisations (Fraser and Henry 2007; Mikes 2009; Arena, Arnaboldi and Azzone 2011).We suggests that the reasons for this are that ERM:

- requires the reduction of risk to probabilities and impacts;
- leads to a commensuration rationality that is not useful in practice;
- suggests a degree of comprehensiveness that is often neither obtainable nor practical;
- tries to reintegrate the unintended consequences of primary risk management by adding these as (secondary) risks to the portfolio;
- is insensitive to organisational context.

As a result, it is unlikely that ERM is implemented as intended and is more likely that what we might see in practice are arbitrary, biased and limited versions of organisational risk management. This has the potential to mislead managers, shareholders, taxpayers or voters by falsely making them believe that risks are being properly managed when the ERM framework is being applied. To understand ERM's extraordinary flexibility and to scrutinise its claim of transferability (AS/NZS/ISO 31000 2009) it is necessary to investigate ERM's conceptual basis including how risks are integrated when different organisations implement this type of risk management. To do so, we draw on a communicative learning framework that allows us to highlight key challenges for safe organisational risk management.

3. The promise of risk management in enterprise

One of the most influential frameworks providing guidance on ERM was put forth by the private Committee of Sponsoring Organisations of the Treadway Commission (COSO 1992, 2004). The 1992 framework suggested that:

- by calling upon the risk awareness of employees an internal risk culture can be created;
- risk attitudes are aligned with strategies and objectives;
- hazards and opportunities are identified in relation to an organisation's objectives; and
- risks are assessed by the potential likelihood and impact of their harm.

Additional management components include control activities, information and communication, and monitoring of risk management processes.

This framework was expected to facilitate cross-silo thinking capable of revealing new correlations and 'natural hedges'. Whereas, the 1992 framework re-established a control-bias focused on the delivery of the organisation's strategic objectives with the help of internal audit (Spira and Page 2003) it was not until release of the 2004 framework, when risk management was defined as the purpose of internal control. This change is indicative of divergent orientations at the conceptual level. The framework effectively sets out two risk assessment processes, one for opportunities and another for hazards. Opportunities are thought to support the development of strategy and objectives while hazards are ignored for this end. This approach may miss crucial information for developing a robust, well-rounded strategy. In addition, the choice of risk management standards is left to the organisation, or more specifically its management board. Because of this lack of independent standards, the COSO framework has been compared with a closed system that establishes process control while ignoring outcome control (Williamson 2007). The framework has seen various adaptations across the world and in the UK is most closely associated with the Turnbull report (Turnbull 1999).

The ERM framework of corporate governance has served as the blueprint for the UK government, which introduced statutory guidance owing heavily to the ERM framework (NAO 2000; SU 2002; HM Treasury 2004). As a conceptual innovation, UK government pioneered the notion of risk maturity (OGC 2007), itself an evolution of capability maturity models that represent an internal development process (e.g. software development). These models cast several organisational functions into a process-guiding framework (cf. MacGillivray et al. 2007) and although they offer

different frameworks, most implicitly start from an organisation's capability to control internal processes. Risk maturity models should thus help to organise the processes required for improving the management of a particular risk. The introduction of risk maturity can be seen as a practical response to the lack of control over implementation outcomes (Fraser and Henry 2007; Mikes 2009). Strutt et al. (2006) suggests that the process be initiated by defining goals followed by identifying processes – an approach that may remind more of strategic risk planning than ERM.

The ERM concept has been highly unspecific about the actual integration and management of risks. Indeed, notional dominance of the portfolio (e.g. Ai et al. 2012) has been obstructing the recognition of the communicative social processes that support the portfolio with information. Integrating risks in a portfolio requires the recognition of those risks, their comparison and communication within the organisation. In a finance department, all risks might be comparatively expressed in monetary terms whereas in other departments, this might challenge existing risk management efforts. These issues have not been particularly addressed by either the COSO framework or UK governance guidance. Instead, this guidance has called upon an organisational risk culture to drive risk management implementation (COSO 2004; HM Treasury 2004).

Indeed, no existing ERM framework has consideration for the differences between organisations and their diverse institutional contexts. While most organisations simply assess risks concerning their operations government departments, for instance, may additionally have legal obligations to identify risks to society and the environment at large. Organisations may generally be interested in expanding their search to investigate 'known unknowns' and possible 'unknown unknowns' (see e.g. Stirling et al. 2007) but some, including government departments, are responsible for a far greater variety of risks with more diverse cultural signatures creating substantial knock-on problems for the comprehensiveness and integration of their portfolios. ERM guidance suggests that organisations can abstract from these complex contexts by calling for risk management that only addresses risks to the strategy or objective of organisations (COSO 2004; HM Treasury 2004).

4. The challenge of commensurating risks and uncertainties

Due to its financial origin, ERM assumes that all risks relevant for organisational strategy can be rendered commensurate in financial terms. This assumption may not be appropriate for organisations, whose risk portfolio is disparate, complex and touches upon the values of many stakeholders. These organisations face fundamental challenges of commensuration that tend to grow with portfolio size and have knock-on effects for the institutionalisation of risk management in the organisation as well as the future coherence of risk management. Problems of commensurating primary risks are common and exist in all fields (e.g. in the environmental domain USEPA 1987; WBGU 1998; Pollard et al. 2004).

These problems are constituted by competing explanatory natural and social scientific theories, autonomous institutions or both (Espeland and Stevens 1998). Kuhn used the term *incommensurable* to signify the epistemic gap between succeeding paradigms in the natural sciences (Kuhn 1962). Against Kuhn's view of incommensurable scientific theories, it has been argued that ideas and concepts expressed in the language of one scheme (theory) can usually be expressed in the language of another (Davidson 2001).

However, these epistemological debates do hardly touch the social and normative aspects of incommensurability. The explicit negation of commensurability has some recognition in the humanities. Values are said to be incommensurable, if they refer to different measures that lack an agreed standard to justify norms. Incommensurability has come to be defined as 'the absence of a common unit of measurement across plural values' (Martínez-Alier et al. 1998, 280; similarly Stirling et al. 1999). Each of these values might be objectively valid and imperative and each creates instructions for actions that are incompatible with the others (Berlin 1988). Any course of action might then be considered normatively wrong by some objectively valid standard. The stakes are altered if the associated processes are path-dependent. In opposition to this, commensurability implies that morally justified norms exist to judge amongst other things risks. Human rights, for instance, establish a commensurable state where all people hold equal rights even though they face different risks in different jurisdictions. Moral theory suggests that universal norms can justify plural ethical values (Habermas 2003), thus allowing for the recognition of weak incommensurability.

Commensurability and comparability have been introduced to economics in a similar manner as they have in ethics but with an emphasis on comparability. Martinez-Alier, Munda and O'Neill (1998) argue that strong comparability may only imply weak commensurability if value preserving methods are used, though it may invoke strong commensurability if the range of risks being compared are compressed using value-insensitive methods. The sometimes divergent use of these terms in economics arises in part from the absence of a concept of non-action. Different from economics, non-action is central to law, e.g. as prohibition of particular actions reflecting not least incommensurable values expressed in society and politics. Unlike voluntary private standards, law binds all organisations equally.

With respect to these problems of comparability and commensurability, there is no direction from ERM's undefined concepts such as 'holistic portfolio management', 'balanced approach', 'risk transfer' or 'risk appetite' (e.g. HM Treasury 2006). Given ERM's origin in finance, it is also not surprising that the framework has been a priori confined to risk (COSO 1992, 2004) at the expense of ignorance, uncertainty and ambivalence (Tversky and Kahneman 1974). Ignorance, uncertainty and ambivalence cannot be stated as probability times impact while the associated hazards, including those arising from risk management, may still be real and call for action. While ERM considers mitigation, acceptance or transfer of risks it ignores the possibility of incommensurability and incomparability.

Known difficulties with comparability in ERM include lacking taxonomies to compare risks and uneven levels of maturity across the organisation to assess risks (Von Känel et al. 2010). Challenges of commensuration are not least related to independent institutions governing risks and the fact that these risks affect third parties. The need for public legitimacy of private (Economist Intelligence Unit 2007) and public organisations (HM Treasury 2004; OECD 2010) would be expected to take possible incommensurabilities into account from the onset (Levinthal and March 1981; Scott and Meyer 1994). Yet, empirically speaking, powerful organisational and institutional biases are at work (Thompson, Wildavsky 1986) that may prevent this from happening and may lead to strong Berlinian incommensurabilities instead.

The incommensurability of risk is not a sole case of competing scientific paradigms or directly conflicting values, but instead comprises a blend of these two institutionalised across organisations. Its relevance may substantially differ between

organisations as for instance government can draw on generalised coordination mechanisms like markets and law to define incommensurable states to which private and subordinate public organisations have to adapt. Such institutional complexity has not prevented ERM guidance to cast its framework in strongly commensurable terms (COSO 2004; HM Treasury 2004). This might be one of the reasons why implementation has come to add ever more risks to the portfolio. But can ERM be coherently integrated if underlying commensuration problems are ignored and risks including secondary ones are indiscriminatingly added to the portfolio? Or is ERM itself flawed, in that it simulates comprehensiveness and integration but instead creates the secondary risks it tries to reintegrate? In order to answer this question, we have to specify the problems associated with implementing a comprehensive and integrative organisational risk management. We will thus show next how commensuration problems and a bias for comprehensiveness may influence coherence of integration.

5. Integration of organisational risk management

Implicit to the ERM framework are a series of presumptions including: (a) risks are and can be objectively and unambiguously defined and clearly distinguished from uncertainties, ignorance or ambiguity (COSO 1992, 2004); (b) risk-related information is reported without technical or behavioural frictions to the top of the organisation (i.e. management board) (COSO 1992, 2004); (c) the risks in an organisations' portfolio directly correspond to executable tasks (COSO 1992, 2004; HM Treasury 2004); and (d) the success of executing these tasks can be phrased again in risk-analytical terms covering the internal (e.g. operations) and external dimensions (e.g. reputation) equally well (HM Treasury 2004). All this, however, encounters problems of translating actions (risky activities) accurately into systems knowledge (hazards) and back into now reformed actions (risk mitigation).

In principle, an ERM system could apply decomposable actions (see Simon 2002). More specifically, once risk information is available at the top of the organisation it is up to the board to manage the risks and allocate responsibilities hierarchically downwards. This approach to ERM, whereby individuals (managers) interpret the natural and social environment of the organisation (relative to the outside world) and redefine roles, rules and behaviours within the organisation to implement risk management is representative of correspondence theory and in practice is associated with bounded and rational choices.

If we understand the arguably vague idea of 'risk appetite' (Power 2009) as a propensity of choice (see March 1994), the decision context the board faces might be restated as a problem of integrating different preferences to decide upon a particular management option. From Arrow's well-known impossible theorem (Arrow 1950), which states that three different options (e.g. risk management strategies) ranked on an ordinal scale and that adhere to the conditions of transitivity, unanimity and independence cannot be sorted consistently, it is apparent that within the confines of rational choice the way forward for resolving management decisions is by either relaxing the axioms or by moving to cardinal information. A straight-forward practical response is to measure all management options as prices and to apply cost-benefit analysis. On these grounds, the measurement allows for development of cost functions e.g. costs associated with the specific management options. However, this is not a feasible option for all risks and all organisations since it establishes strong

comparability and commensurability. It is not a sufficient condition to assure safe and coherently integrated risk management either (Lindblom 1959; Olsen and March 2004). Organisations may face more fundamental challenges with respect to commensuration that relate to legitimacy.

As we have argued above, commensurating risks can be analytically distinguished into comparability e.g. by developing standards such as global warming potential and commensurability, which has been signified by organisations' dependence on legitimacy. This can refer to authority outside the organisation exerted amongst others things as isomorphic pressure, e.g. when confidentiality is challenged by calls for sharing information (Bellamy et al. 2008); yet these challenges arise internally too, for instance, when comparing dissimilar risks such as extremities to lives lost. Although the threshold for conflicting management strategies might be lower, when risks are highly comparable plurality of values remains implicit in all risk portfolios (6, Bellamy, and Raab 2010). For example, even translation of marketable goods to a single monetary value may include problems of commensuration (e.g. Huault and Rainelli-Weiss 2011). Predicting prices ex-ante is, for instance, often difficult in the face of uncertain price-defining processes (Stehr, Henning, and Weiler 2006; Rona-Tas and Hiß 2011); and often enough prices are de facto defined ex-post (Fourcade 2011). Defining (weak) incommensurability qua legal standards ex-ante offers a solution. It is perhaps little surprising when incommensurability between different financial products has been identified as a necessary condition to resolve the financial crisis (Roubini and Mihm 2010). Given this reality, ERM insists that inconsistent comparisons can be avoided and that if commensuration conflicts still emerge, these can be reintegrated through constant bottom-up risk scanning exercises as secondary risks (e.g. Hillson 2003; Beasley and Frigo 2007). This resolution confronts three fundamental problems:

(1) Management of a risk portfolio is constrained by the budget in which it operates. This suggests that no risk portfolio with different associated management options can provide information for an optimal resource allocation independent from the overall budget (Cox 2008). Moreover, all risks are interdependent with regard to budget. This immediately creates a hierarchical context within which any organisational unit or dependent organisation operates. Few organisations hold exclusive control over their budgets, instead negotiating them with boards or central government Government differs from business organisations in as much as it has the power to allocate or distribute adaptation or mitigation costs qua policies or regulation to risk producers or hazard takers (Coase 1960; Luhmann 1993). In particular, the missing link between risk and social welfare concepts constitutes a fundamental commensuration problem for public organisations because direct links between investment/public expenditure and social cost of e.g. environmental risks, may not be fully established ex-ante (e.g. by insurance markets) while others are defined ex-post (e.g. by court rulings). While for many risks, the outcome de facto depends on competitive markets for risks and ex-post attribution of responsibility risks like climate change may not allow ex-post attribution within existing institutions as these may loose management capability as the risks unfold. These risks are judged by severity instead of probability.
(2) Cost-efficient risk management decisions based on fully quantified costs for each management option would render risk comparisons highly

commensurable. This encapsulates two problems for the management of public risks. First, there exists a threat to legitimacy in which the complexity of risk comparisons collapses into the uniform minimalism associated with prices/costs (Martínez-Alier, Munda, and O'Neill 1998). This affects the public legitimacy of the organisation. Second, evaluation of existing risk management practice using a strongly commensurable standard would essentially turn strategy changes into zero-sum games. Both problems may come into direct conflict with an organisations' search for safety. As we know from failing train operators and banks, depending on the (regulatory) context risk management can in fact become instrumental to open up safe operational areas for risk taking (Hutter 2005; Moss 2010).

(3) Interdependencies between risks are emergent and in many instances unidentified. Most risks are interdependent because they are embedded in complex social systems or integral parts of these. When integrating risks in the implementation process ERM is actively creating interdependencies between the managed risks not least through the budget (Beasley and Frigo 2007). These display very different statistical behaviours compared to independent risks. Whereas independent risks generally follow Gaussian distributions, interdependent risks represent Paretian distributions, which represent extreme system behaviours or black swan events (Andriani and McKelvey 2007; Mandelbrot 2009). ERM guidance has not yet accounted for these alternations in risk character (COSO 2004). While strategic opportunities from merging organisational silos are regularly emphasised, ERM has been ignorant of how it creates interdependencies between risks.

These limitations should have far-reaching implications for the future of organisational risk management. One question arising in this respect for ERM is whether risk maturity models can prevent it from misleading organisations into false safety believes.

6. Learning to manage risks

Risk maturity models have been around for over a decade with one model explicitly drawing on organisational learning theory (Strutt et al. 2006). The basis of this idea is to identify the processes relevant for mitigating primary risks. Once this is achieved, the model suggests defining attributes of each process associated with greater safety and map out improvement steps for each to progress from one attributed safety level to the next. An organisation is thought to exhibit organisation-wide maturity of a certain level if all processes have reached or exceeded said level. Hence, the overall risk maturity level of the organisation is defined by its weakest process. While the learning perspective in this approach is apparent, it is confined to Argyris' and Schön's framework (1978) and to the improvement of a *single* risk (Strutt et al. 2006). Depending on the comprehensiveness aspired by organisational risk management, that is, the integration of multiple risks; a more complex organisational learning theory is needed. This is so because, the more comprehensive a risk portfolio becomes, the more learning processes have to be institutionalised (Fraser and Henry 2007; Mikes 2008). This is not addressed neither by the COSO framework (2004) nor the Orange Book (HM Treasury 2004) which suggest a feedback

from *iterative* risk analyses to the emerging risk portfolio will do. As we will make clear next this fails to account for the emerging risk management structures let alone conceptualise the complexity at the frontier between codified and tacit knowledge generation processes and intentional and non-intentional outcomes.

Amongst the abundance of theories addressing organisational learning, organisational knowledge creation theory (Nonaka 1994) stands out as the one offering the most compelling synthesis for organisational risk management. This theory overcomes ERM's presumption of established, universal risk information since it views organisations as knowledge generating. It shares with cultural theory, the view that knowledge is generated in historically situated interactions (Nonaka and Toyama 2003; Nonaka, von Krogh, and Voelpel 2006; Nonaka and von Krogh 2009). In particular, the theories' distinction between explicit and tacit knowledge is crucial for approaching complex risks in non-reductionist ways.

Drawing on behavioural theories of organisational learning, Nonaka (1994) discerns four organisational learning processes, which are perpetuated by a constant alternation of tacit and explicit knowledge: socialisation to the organisation, externalisation of new knowledge, combination of new information and the internalisation of this information. Tacit knowledge creates the bounds to socialise new personnel to the organisational learning process. Because it is action-oriented, difficult to formalise and personally acquired through routines it surpasses mere data or information and is necessarily specialised and restricted to particular domains. As it is dispersed and subjective, it cannot easily be aggregated or generalised, e.g. three conversations between (a, b), (a, c) and (b, c) is not the same as a single conversation between (a–c). Distinct from this, explicit knowledge can be conveyed formally. This involves controlled, intentional actions as well as cognitive processes and represents the type of knowledge that ERM expects to use to inform the portfolio management system. Creating organisational knowledge includes conversions of both explicit aspects of knowledge such as formal risk assessments or project documentation, and tacit estimates such as personal expertise about particular risks or ambivalences.

ERM guidance has ignored the generation and transfer of implicit and explicit knowledge (OGC and HM Treasury 2003; HM Treasury 2004, 2009; ALARM 2005, 2006; OGC 2007). Yet, because of the constant socialisation and internalisation processes in organisations both types of knowledge are necessary to successfully assess and communicate risks, uncertainties and ambivalences throughout an organisation and beyond. A tangible challenge in reorganising risk management in this respect remains to unlock relevant tacit and codified risk knowledge from existing intra- and inter-organisational networks of (sometimes independent external) actors to generate risk knowledge (Amin and Cohendet 1999; Borgatti and Cross 2003). This requires a valid empirical understanding of these processes. Nonaka and colleagues see the key challenge not in redesigning and adapting the organisation to information under conditions of maximising or bounded rationality, but in securing the fragile transmissions of knowledge between individuals in the organisation (Nonaka and Toyama 2003; Nonaka, Krogh, and Voelpel 2006). Because of its link with the roles and tasks of organisations, codified knowledge dominates this process. It allows specifying tasks ex-ante. Formal structures are however, always enacted by personal relationships and social networks in which mostly tacit knowledge is exchanged. Organisations thus have to align both types of knowledge, since without tacit knowledge accompanying codified risk

information, organisational risk knowledge will be dangerously incomplete. Tacit knowledge is already necessary to understand the very meaning of codified knowledge and is particularly needed to communicate ambiguity, uncertainties and ignorance across epistemic communities, up and down the organisational hierarchy and across inter-organisational networks. To understand and govern these processes, organisations rely on empirical evidence. The alternation of both knowledge types thus goes beyond analytical models of information diffusion and may raise explicit truth claims in commensuration processes. This relates to the methods used as we have seen above as well as existing and emerging institutions, e.g. when in the interest of making timely decisions, practitioners overlook issues of commensurability (Prpich et al. 2012).

Many organisations have moved to project risk management in response to this organisational complexity (Hillson 2003) but this has also led to subjective ad hoc assessments of perceived risks to cope with the increasing comprehensiveness (Mauelshagen et al. unpublished paper). While organisational biases are inevitable (cf. Thompson and Wildavsky 1986) subjective assessments are bound to increase these and hamper risk knowledge creation.

Depending on the organisational context, contractual mechanisms and/or financial instalments have been used to influence role performance in risk management. Although incentive-based contracting has dominated in the past (cf. Dixit 2007), the difficulty is of course that bonus payments are linked to outcomes that only materialise in the future and are thus uncertain. There is also a particular asymmetry between private and public sector organisations. The latter's capacity to incentivise staff is constrained by the existence of intrinsic and extrinsic motivation amongst staff (Le Grand 2003). In particular, intrinsic motivation is indispensable for socialisation and internalisation processes in risk knowledge creation. Intrinsic motivation is not an add-on to induced incentives (extrinsic motivation), since it is directly related to crowding-in and crowding-out effects that signify facilitating (crowding-in) or corrupting effects of rewards (crowding-out effect). Financial compensation for blood donations for instance are known to reduce contributions (Osterloh and Frey 2000). It is thus the mix of both types of motivation that organisations need to create risk management capability and, indirectly, to reduce risks to reputation.

Intra-organisationally speaking various organisational studies have shown that knowledge creation processes are highly sensitive to social contexts, such as the timing of activities (Massey and Montoya-Weiss 2006), the organisation of processes (Dyck et al. 2005) and staff motivation (Osterloh and Frey 2000). Employees can have various motives for not sharing their knowledge including fear of criticism or misleading colleagues, indecision about the relevance of an individual contribution or the factual accuracy of a potential input (Ardichvili, Page, and Wentling 2003). The question is how do organisations address these influences so as to improve or refute existing concepts of organisational risk management.

'Internal publics' (IRGC 2005) have been suggested to institutionalise communicative feedback and may assume a similar function. In principle, they can attenuate strategic exploitation of otherwise weakly institutionalised processes (cf. also Fraser and Henry 2007). Internal publics confront possible strategic behaviour with peer-review and they may initiate internal discourses maximising cooperation amongst uneven risk mature units while supporting unbiased assessments of risks (Renn 2008, 343). In this way, they may facilitate internal risk discourses better supporting

coherent commensuration of risk through their consensus orientation (Rayner and Cantor 1987).

Risk maturity claims to captures this idea too by suggesting that organisations may establish skills that increase risk management capability by improving the coherent management of specific risks via vertical integration of all relevant organisational functions. The result may evoke organisational learning whilst indicating some kind of trajectories for individual risk management activities.

It is unclear as to how robust these internal pathways are. In the first instance, it is unknown as to how far risk maturity can establish organisational path dependency (cf. Sydow, Schreyögg, and Koch 2009), e.g. with respect to the interdependency with the budget. This presents an empirical research question with great importance for organisational risk management (Mikes 2008). In the second instance, within the ERM framework models are immediately confronting a risk portfolio, which regularly includes unknown next to known interdependencies between risks. Risk maturity models may hold value if individual risks and their interdependencies are fully understood and if risk management implementation is path-dependent. Yet, if interdependencies are not known, empirically understood, or indeed ignored they may have non-intended effects. Therefore, if interdependencies between primary risks are understood and management has been established only then adding more risks to the risk register (thus increasing comprehensiveness) appears to be safe. Crucially, this is interdependent with organisational capacity and budget. Ignoring the latter interdependences would again compromise safety.

ERM (COSO 2004) has abstracted from most of these difficulties assuming that organisations will strategise from objective risk assessments only, that problems of commensuration do not exist or are at most trivial, and that an emerging risk culture will be enough to institutionalise risk management. Although Government guidance (HM Treasury 2004) has added the notion of risk maturity it does not offer a concept of internal path dependency that might increase the chances of lasting organisational maturity.

7. Discussion

The uptake of ERM by private organisations and governments has been tepid. We suggest that this may be due to ERM's lack of underpinning in organisational theory and its lack of clear institutional design recommendations. As ERM nevertheless gains currency in many organisations, we observe more and more responsibilities being expressed as risks. While this may alter risk awareness amongst staff, it may also create internal risk-spirals not unlike that seen in the public policy domain (Rothstein, Huber, and Gaskell 2006). Yet, we have little empirical evidence showing what the resulting comprehensiveness is worth.

What is limiting organisational risk management is the lack of a concept of risk knowledge generation, with current incarnations of ERM assuming risk information arises from within the organisation like a deus ex machina. This failure to recognise the value of internal communication ultimately results in poorly integrated and potentially incoherent risk knowledge bases and risk management systems. Moreover, ERM is bound to produce ambivalence and uncertainty over outcomes without institutions with the ability to generate knowledge. Such failure actively produces secondary risks.

The confused perception of organisational processes and the lack of institutional design have resulted in a structural complexity that is difficult, if not impossible to manage. Under such structural complexity seemingly minor decisions, like opting for subjective instead of objective risk assessments, may lead risk management down unsafe pathways. For example, ERM may treat subjective assessments as a secondary risk and consider them as an instance of operational risk, yet this reintegration falls apart because of the time asynchrony between analysis and design. At times such problems are acknowledged in the literature, if only implicitly, e.g. in the form of the role of the risk manager. In a way risk management may be thought of as stop rules (against the board's search for profitability) and as search engines (scanning the horizon for new risks and opportunities). This presents a conflict for which the literature does not offer resolution.

There is a corresponding failure to recognise the difference between analytical and empirical reasoning in the ERM guidance and much of the practitioners' literature. Against this background, it is not surprising that ERM has sometimes developed into a performance management system rather than strategic risk management system. In public organisations parallel management processes are on the rise, some of which cover exclusively secondary risk (Mauelshagen et al. unpublished paper). In business, ERM has shown a tendency to replace existing principle-based rationales by rule-based rationales (Martin and Power 2007). Indeed, ERM can make organisational processes so fluid that changes are implemented in the gap between analysis and design and new risks are added before valid empirical knowledge about existing risk management has been generated (ibid.). As risk management starts to lack empirical validation (Wilkinson and Ramirez 2010), ambivalence builds up and grows into full uncertainty over operational outcomes. Under these circumstances, the generation of risk information is likely to become even more exposed to various cultural influences thus further eroding the credibility of risk management to produce safety, let alone inform strategy. This raises the very principled question of whether or not interaction in organisations should be considered in risk terms at all (March and Shapira 1987; Bunge 2008).

Many external relationships of organisations are defined in probabilistic terms, most commonly in the market place. For example, buyer-supplier relationships are commonly expressed and modelled as risks. Introducing the concept of risk to hierarchies, however, may turn these mixed-motive relationships (Scharpf 1994) sour. From a government department's perspective budget negotiations might be seen as a risk. Yet, codifying and including it in a departmental risk portfolio would hamper open relationships with central government. Risk is thus a highly ambivalent concept in relationships and particularly in complex hierarchical contexts that invite ignorance (Rothstein 2003; but also Kutsch and Hall 2010) and possibly even deviant behaviour (Vaughan 1999). Stop rules might offer a fix as long as they are accepted by all as viable and enduring solutions institutionalised to ascertain accountably (6, Bellamy, and Raab 2010).

There is a belief that ERM practice lags behind guidance and that public organisations lag behind private (Economist Intelligence Unit 2007; Collier and Woods 2011). Yet, this belief may well be turned around asking what empirical underpinning these frameworks actually provide to support the suggestion that they were theories and that they might work across organisations, sectors and indeed universally (e.g. AS/NZS/ISO 31000 2009)? The question is all the more important as interdependencies are increasing and responsibilities for tak-

ing risks or endorsing safety become increasingly blurred between organisations and within.

Knowledge generation theory suggests that the knowledge output is grounded in true belief seeking staff. Truth claims are generally established in any communication (Habermas 2003) but the more specific hypothesis put forward here suggests that organisational risk learning could be supported further if it is established transparently (IRGC 2005) and as a communicative feedback mechanism between communicative actors and organisational structure (Heracleous and Hendry 2000). As indicated above, internal commensuration processes might even be designed democratically involving affected parties in the organisation. In other organisations, such as government departments, commensuration processes are very much driven by legitimacy considerations that may involve claims of strong incommensurability, e.g. when no markets or legislation exist previously. Since ERM suggests that uncertainties, ambivalences and risks should all be rendered strongly commensurable it might in fact hinder identification and development of corresponding strategies. Commensuration processes deserve more empirical research in their own right, revealing for instance, what risks are added to risk registers and portfolios and when or, how some organisations succeed in establishing path-dependency in risk management. By contrast, some of the existing empirical research on organisational risk management is methodologically unprepared to explain the problems ERM has shown in practice.

While ERM has been designed for fluidity, we actually have little empirical evidence that organisations better mitigate or adapt to risks by becoming more fluid (Schreyögg and Sydow 2010). The convergence of ERM towards risks of ICT and hierarchical policies according to organisational size (Collier and Woods 2011) may thus reflect an appetite for organisational certainty. The scarce empirical evidence we have suggests that the contingent factors influencing ERM implementations are closely related to existing capabilities or the adaptation of specific new ones (Woods 2009). This would suggest that ERM's potential to integrate new risks may be much overstated. At the same time, poorly specified risk management concepts, such as risk transfers with their potentially huge welfare implication invite secondary risk. Given such consequences, it remains to be seen how defensible ERM in public organisations will be in society and courts and whether organisational risk-heuristics can assure accountability and liability. Because of the hybrid character of the uncertainties managed by public organisations (Miller, Kurunmäki, and O'Leary 2008), the outcome is hardly predictable.

In this article, we emphasised the fundamental conceptual weaknesses of ERM. In this vein we stated our concern with studies of organisational risk management that apply the stringent but conceptually flawed ERM framework to the study of organisational risk management. We emphasise that ERM is not based on valid, empirically tested theories – a state that can only be overcome if we produce meaningful, valid empirical studies. Greater empirical efforts should thus be devoted to explain risk knowledge generation and commensuration processes.

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