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The Accountability Dilemma in the Network Centric Era

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Abstract

How do Defence Forces operating in complex networked environments maintain accountability? In Australia, Canada and the United Kingdom debates have swirled about the 'diffuse' nature of decision-making in this 'network centric era' and absence of a single point of accountability, particularly for procurement (e.g. the Black Review in Australia, and the Gray Report in the United Kingdom). Concerns are felt by military officers who need to balance agility with accountability of decisions. The Accountability Dilemma is that the very networking by which Common Intent is achieved in a military force – the prerequisite to coordinated action for Pigeau and McCann [2000], and, therefore, to enabling of agility in the face of uncertainty – naturally also diffuses accountability. In this paper we present an empirical, philosophical and organisation-theoretic examination of accountability. What forms of accountability exist? What are the external conditions for them to be applied? How do they relate to familiar concepts in Command and Control? Building on a geometric model for characterising organisational dimensions and environments, we identify cases where known Accountability Types validly apply. Within this model we identify the open challenges in achieving accountability in Network enabled military forces.

The question is often asked: why aren't Defence officials held to account when things go wrong? … diffuse and confused accountabilities within Defence make it difficult to know who to ultimately hold to account for anything. The 'system' more often than not is viewed as the culprit.
Mark Thompson, Australian Strategic Policy Institute, 2011

The report also finds a blurring of roles and accountability between the "Capability" group …and the Defence Equipment and Support "Delivery" organisation ….
Bernard Gray, Review of Acquisition for the Secretary of State (UK) for Defence, 2009

At the end of the day, establishing a single point of accountability will improve the process and therefore benefit our men and women in the military. They deserve the best and we ought to be willing to deliver the best. This government came into power with the mantra of demanding increased accountability. Allowing billions of dollars to be spent without being able to hold someone accountable undermines this commitment. I look forward to the Prime Minister standing up and saying "make it happen".
Alan Williams, former Assistant Deputy Minister, Canadian Department of National Defence, The Hill Times, 2010

Introduction

The three quotations above, each echoing a similar concern for three of the five TTCP nations, reinforce the sense that there is an accountability deficit across the Anglo-American Defence establishments. Not coincidentally, we will argue, these are all nations that have adopted Network Centric Warfare (NCW) or Network Enablement in some form or other into Command and Control doctrine. Each of these quotes targets, among other things in the respective Defence organisations, capability

procurement, which is a key strategic function; there is ample evidence that the strategic level is very much the realm of non-linear, informal and thus 'networked' activity. The quotes either speak of "diffuse" or "blurred" accountability – divided accountability across many individuals or organisations – or invoke a "single point" of accountability as the cure. A recent review of accountability in the Australian Defence Department by Rufus Black (in response to issues that Thompson [2011] also addresses) made similar recommendations in terms of "personal accountability":

> Accountability for delivery needs to be assigned to clearly named individuals and, where there is joint accountability for delivery of an outcome (as will occur from time to time in a matrix organisation), a clear articulation of who does what to deliver the outcome.

This is starkly at odds with modern principles in Command and Control (C2). The NCW tenets posit that sharing of information and collaboration across distributed networks will increase shared Situational Awareness, which enhances self-synchronisation and in turn mission effectiveness [Alberts and Hayes 2003]. But even omitting the "network" as an explicit enabler, Pigeau and McCann [2000] define C2 (in contrast to the separate terms[1] "Command" and "Control") as "the establishment of common intent to achieve co-ordinated action". Common intent is achieved by the merging of explicit and implicit intent from a Commander with "spontaneous emergent behaviour" from subordinates [Pigeau and McCann 2006]. When this merging has occurred, how is common (or shared) intent to be "assigned clearly to named individuals"? In the Political Science literature, this is known as the "Problem of Many Hands" [Thompson 1980]. While Pigeau and McCann [2002] in their model of the Balanced Command Envelope talk about extrinsic responsibility defined as a degree to which an individual is accountable to supervisors and to subordinates, we must ask a question: how can moral responsibility be assigned to public officials when many different officials have contributed in different ways to an outcome? The essence of what we have termed the 'Accountability Dilemma' is that the very means by which military forces can achieve greatest success in the field makes them unaccountable, at least according to traditional notions of Accountability.

We shall analyse this dilemma by exploring aspects of Organisational Theory and Political Philosophy. The first part will provide the insight that many forms of accountability exist, and present a model for understanding the types of organisation that are appropriate – are 'fit-for-purpose' – for specific environmental contexts. The second part will enable us to systematically derive the properties that must apply to organised groups of individuals in order that they may be considered like an individual, to be accountable for an outcome. This will lead us to, what we shall call, a contingency theory of accountability by which we match an accountability type to a 'fit-for-purpose' organisational type.

The paper is structured as follows. We explore further the nature of the Accountability Dilemma. We then demonstrate the acuteness of the concern for accountability in network enabled operations expressed by recently deployed Australian military officers. We then review accountability in Organisational Theory and present the Contingency Theory of Organisational Design. We show how

[1] Command: the creative expression of human will necessary to accomplish the mission; Control: those structures and processes devised by command to enable it to manage risk.

individual accountability can be systematically extended to different types of collectives of individuals, namely to organisations, using a Theory of Group Agency. Our unified model is then presented. We conclude with a summary of our results and some open challenges.

Unpacking the Dilemma: Complexity and Organisation

The Accountability Dilemma goes beyond recent articulations of C2 Theory to far more traditional and ancient concepts. In his paper on "control and administration of the Department of Defence" in Australia, Mark Thompson [2011] pinpoints the problem with accountability here as the application to the strategic political-military interface of a tried-and-tested model from the operational and tactical military command levels, "Objective Control", which is Samuel Huntington's [1957] term for "Mission Command" applied at the civilian-military interface. In Mission Command a Commander specifies Intent, Context, Resources and Constraints, while leaving the 'Method' of fulfilment of that Intent to the subordinate. As an explicitly articulated principle, it goes back to Moltke for Land Warfare [van Creveld 1985] and Nelson for the Maritime domain [Palmer 2005]. Mission Command leaves a sphere of autonomy to the subordinate, trusting in their skill and professionalism to achieve the objective. (In this respect, Mission Command provides room for the "emergent behaviours" anticipated by Pigeau and McCann [2006].) Objective Control sees "politicians identify objectives for the military to deliver and the military delivers those objectives" [Thompson 2011].

If military operations and their sustainment were conducted in an environment for which political and military concerns could be cleanly separated, this would be viable. It is now a truism, but the literature is emphatic in recognising the modern military operational landscape as complex, characterised by constant change and uncertainty, and exposed to the vagaries of the political, societal, and economic climate. Paparone, Anderson *et al*. [2008] describe the military operational environment as volatile, uncertain, complex and ambiguous. Therefore the separation of political and military spheres required for Objective Control does not apply: political implications run down the chain of military levels. This is a concern for Thompson [2011], who is specifically addressing military accountability to civilian government.

For us, this is a specific example of a more general concern. As we shall detail later from the perspective of organisational theory, to be fit-for-purpose for complex environments, the military must manifest a commensurate degree of complexity; hence the network enablement of military organisations. Even separating out the political dimension leaves a number of overlapping areas that constitute our domain of concern: across military services, across coalition nations, government and non-government organisations, and between civilians and reservists [Australian Defence Force 2002: p. 23]. Complexity, therefore, encompasses not only the operational landscape but also inter- and intra-organisational connectivity through which various subsystems interact with each other in formal and informal ways, forming relationships based on both authority and informality. This complexity is further amplified by information and communication technologies that facilitate the dissemination of information to a soldier decision-maker. Bar-Yam [2003] states that, "war is a complex encounter between complex systems in a complex environment".

Complexity therefore defies demarcation into spheres of autonomy in which a subordinate may operate according to Mission Command and by which 'lines of accountability' can be assigned.

The complexity of the operational environment and the need for agile forces requires that people are given more latitude in their day-to-day decision making [Alberts and Hayes 2003]. At the same time they are expected to exercise a great measure of self discipline, perform their duties to the highest standard, use resources appropriately, and display flawless ethical behaviour. While it is just that society expects the military, and for that matter any public official, to be held accountable for the outcome of their decisions and actions, in complex environments 'the problem of many hands' [Thompson 1980] means that there are difficulties in determining who should be held to account for outcomes in the last instance. Furthermore, self organising behaviour of people in organisations usually happens for a purpose, and may be in effect for a particular circumstance, or for a part of a sequence of developments [Ehin, 2004]. It may dissipate as quickly as it is created, and accountability may become a casualty in such cases.

Empirical Data: the Accountability Dilemma in Deployed Operations

The concern for balancing the agility to respond to complex environments and accountability for those responses is not just theoretical. We provide here evidence that senior military officers are deeply concerned with the Dilemma. Ali [2011] reported on research into the co-existence of formal and informal forms of organisation in military deployments. This research included an interview program covering a wide range of issues (e.g. decision-making processes, C2 arrangements, interdependence, information sharing and gathering, and communication flows) with Australian Defence Force (ADF) personnel. These personnel were deployed during 2001–2007 in three different operations spanning the spectrum between combat and humanitarian relief. In addition, in 2010 we conducted a workshop involving 26 participants with operational experience in the period 2007–2009 and representing the three military services. The aim was to determine the reliability of findings from the earlier interview program, and to extend the research by discussing priorities and actions to facilitate the coexistence of formal organisational structures and informal networks in future operations. The data was transcribed into electronic form and entered into NVivo, a software suite for processing qualitative data, and analysed by means of a thematic scheme. This analysis painted a rich picture into how warriors make sense of a complex operational environment, and how they go about gathering information and making decisions to balance agility of response while trying to follow procedural requirements. Although there are various definitions of agility and this construct is usually viewed as multidimensional [e.g. Atkinson and Moffat 2005, Alberts and Hayes 2006, Dekker 2006], in the context of this research we define agility as the ability to suitably change organisational processes and structures to the environmental contingencies to achieve desired outcomes.

Although not a focus of the interview program, the issue that strongly emerged was the prevalence of and reliance on informal networks, in that they enhance capability and contribute positively to achieving mission outcomes. The findings indicated that informal networking was critical for deployment preparation, during handovers,

getting to know organisational culture, gaining access to information within coalition forces, for intelligence gathering, and for resource sharing and obtaining needed supplies in a timely manner. As expressed by one of the interviewees: *"It is really about making sure that your network exists so that you can contact people"*. Informal networks were used to cut through, what were perceived as inflexible or insufficiently agile formal structures to achieve outcomes more speedily.

However, the same participants expressed concerns for accountability in the midst of this necessary informality: "*I would use some sort of formal information process because the formal processes have checks and balances*". The participants clearly saw the benefits of the co-existence of informal and formal elements of an organisation in achieving better performance during deployments, but showed concern about what needs to be addressed in balancing formal and informal systems, e.g. "*you would always start with informal, but the formal would be always after…*" The interviewees and the workshop participants were cognisant of the importance of achieving a balance between formal and informal organisational structures. They held strong views that informal networks served to enhance the formal command and not to replace or undermine it.

In this paper we derive additional forms of accountability by which the balancing of formal and informal, displayed by the subjects of this earlier study, can be enriched and systematised.

Defining Accountability

Accountability is a basic principle upon which societies operate, including organisations that are part of society. The concept of accountability has ancient origins. In the book of Genesis 3:14-19 it is written that the Serpent, Adam, and Eve were held accountable for their actions. In ancient Greece, society was described as "obsessed with keeping their officials legally accountable for their actions in office [Frink, *et al*. 2008: 179]. In ancient Rome, although it was believed that intelligent, independent-minded soldiers who worked together as a unit posed a significantly greater threat to an enemy than blindly obedient men who only did what they were told, the discipline of the Roman army was an iron one. Accountability was taken very seriously by the Romans and was implemented through the mechanism of *Decimation* where one tenth of the soldiers from a unit that fled ignominiously from the battle were selected by lot for execution (Latin: *decem*='ten') [Goldsworthy 2003]. For all that, the majority of academic accountability research has been conducted in the past 25 years [Frink, *et al.* 2008: p179]. The function of accountability is to ensure that those that wield power on behalf of others are answerable for their conduct. Therefore, to demand and to exercise accountability implies power.

In organisations, the concept of accountability arose with role specialisation and the need to evaluate discrete tasks and duties ([Lindkvist and Llewellyn 2003 quoting [MacIntyre, 1967, p. 84]). In traditional hierarchical organisations, with clear structure, rules and division of labour, accountability and responsibility are well delineated and traceable. One might say that authority and accountability measures are *embedded* in such systems [Bennet and Bennet 2004; Fairtlough 2005]. However, formalisation fails to cope with the non-rational dimensions of organisational behaviour and an unstable environment [Rank 2008]. Moreover, in many organisations, the formal and informal structures are intertwined and often indistinguishable [Mintzberg, 1979]. Also, it is broadly assumed that organisations

are complex systems [Anderson 1999; Stacey 2001; Kurtz and Snowden 2003; Griffin and Stacey 2005]. In such systems the problem of 'many hands', referred to earlier, poses a real challenge.

There is a relationship amongst the concepts of responsibility, accountability and authority. In this relationship authority plays an integral role as no entity can be held responsible and accountable in the absence of authority to make decisions and not having a degree of autonomy [Bovens, 1998; Bennet and Bennet 2004]. While the terms accountability and responsibility are often used interchangeably and while they are interconnected, the former originates in *accounting* for: what has been done, how it has been done, what level of completion has been achieved and what it means to be held to the consequences of the outcome [Schlenker *et al.* 1994; Mulgan 2000; Romzek and Ingraham 2000]. Responsibility denotes the ability to respond: is there something that can be done about a given situation? Responsibility implies ownership of a given endeavour. Accountability connotes instrumentality and external controls. Responsibility connotes virtue, morality and inner controls, where the individual feels obliged to consider reflectively what is a reasonable action in the situation at hand [Mulgan 2000; Lindkvist and Llewellyn 2003]. Schlenker *et al.* [1994] moreover propose that responsibility cannot be void of the context, and link together the event (i.e., a specific circumstance), the prescriptions for that event (i.e., standards that should direct conduct), and the identity of an actor in that event (i.e., including the actor's roles, values, etc.). This model assumes that individuals are held responsible to the extent that there are explicit prescriptions relating to the event, i.e. contingencies for each circumstance or a set of circumstances.

Bovens [1998] distinguishes a number of models of accountability. Firstly, he separates Active and Passive Accountability; the former is what other authors denote responsibility[2]. Within Passive Accountability, there are a number of forms by which organisations may 'answer' after the fact for their actions. These are depicted in Figure 1. Through this plurality of modes, Bovens answers 'the problem of many hands' in complex organisations. He argues that alongside corporate accountability there is the possibility of personal accountability for the conduct of complex organisations. The personal accountability, in turn, can be in the form of a collective model as complex organisations act by virtue of the collective conduct, or an individual model if individual members contributed by their actions to the conduct of the organisation, or of a hierarchical model where the hierarchical structure of a complex organisation is held liable for its conduct. Similarly, Frink *et al.* [2008] refer to individuals, groups or organisations as entities of interest in the context of accountability.

[2] Pigeau and McCann [2002] refer to "extrinsic responsibility", the willingness for a person to be held accountable for resources. We argue that this may be accepted as axiomatic for military officers through their training and indoctrination.

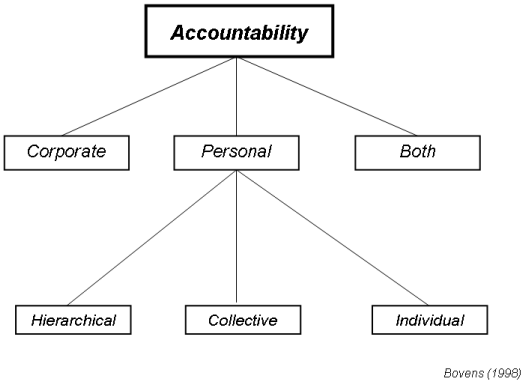


Figure 1 Models of accountability [Bovens, 1998: 51]

Further, Bovens [1998] states that 'Cultural Pluralism[3]' is the solution to the problem of many hands: there is no one model of accountability that fits all circumstances. The environmental context and the culture of an organisation should determine how the lines of responsibility within the organisation are regulated. We review shortly Mintzberg's [1979] approach to organisational theory, which features a relatively small number of stable organisational types each of which is 'fit-for-purpose' for a specific environment. Bovens [1998] only partly maps his models of accountability to the Mintzberg organisational types. This is the hole that we shall seek to fill.

Out of this body of literature on accountability, then, we gain the following. A definition: accountability is the capacity for an *organisational entity to answer for actions, successful or unsuccessful, undertaken in the past,* which also aligns with the Webster dictionary meaning of accountability. There are many forms of accountability, where the entity is an individual or a group. The appropriate form of accountability depends on the environment, as does the appropriate form of organisation. We therefore turn to a more systematic classification of organisations and their environments.

Contingency Theory of Organisations

We adopt an approach known as (Structural) Contingency Theory. Essentially, this posits that effective organisations are those which are structured to be fit-for-purpose for the contingencies they encounter; when contingencies change in nature then the organisation needs to be able to adapt its structure to those changes. This relationship between organisational design and the environment is evident in a number of contemporary approaches: Stafford Beer's Viable System Model [Beer 1972; Beer 1985], Dave Snowden's Cynefin Approach [Kurtz and Snowden 2003] and the Alberts-Hayes C2 'Cube' model [Alberts and Hayes 2006], to name a few. These approaches exhibit, with Contingency Theory, some instantiation of Ashby's

[3] Cultural Pluralism is a condition in which minority groups participate fully in the dominant society, yet maintain their cultural differences.

Principle of Requisite Variety[4]; that if a system is to be stable, the number of states of its control mechanism must be greater than or equal to the number of states in the system being controlled [Ashby 1958]. Contingency Theory articulates *the variables* by which organisations and their environments can be analysed such that the organisation adjusts to achieve fitness-for-purpose to function in its environment. A thorough review can be found in [Donaldson 2001][5]. In the following, we use a two point scale, Low and High values, in order to illustrate the concepts. Later on, as we apply this to accountability, we will modify this to a three point scale.

Variables categorising Organisations

Skills Mixture: the degree to which specialist skills are linked in the performance of tasks. On a scale from Low to High, *Low* skills mixture means that specialists are compartmentalised and work in isolation from other specialists. *High* skills mixture means a high degree of linking of one specialist skill with another as in multi-disciplinary tasks.
Centralisation of Decision-Making is the degree to which important decisions are made by a single executive (*High* centralisation) or dispersed across many individuals or across the entire organisation (*Low* centralisation).
Organisational Size is the number of people in the organisation. *Low* means small organisations, of between two to tens of individuals. *High* means anything from hundreds to thousands. The boundary between these levels is the number of people that can be effectively directly supervised by one individual; an organisation of less than 12-15 may be deemed 'small'.
Task Interdependence is the degree to which the tasks are inter-related or coupled to one another.

There are other related variables. The first three of the above set are sufficient for a parsimonious description, to be defined below. We stress the coarseness of these variables: real organisations are not particularly homogeneous so that in one part there may be very tight dependence between tasks and low dependence in another part, or very centralised decision-making in one area and distributed decision making in another. The variables may be taken as averaged over the whole entity that is regarded as the 'unit of analysis' in applying this model. Different combinations of settings of these variables characterise different organisational types proposed by Mintzberg [1979], as follows.

Adhocracy: This is the most informal of organisations: fellow workers collaborate at a peer-to-peer level (in other words, 'network centrically') through mutual adjustment (or, 'self-synchronising') towards achievement of common goals. Decision-making is thus dispersed, with high skills mixture and low formalisation. This type is not viable with large sizes in the absence of some technological enhancement; we return to this point in the final section. We note that for small sizes this organisational type is indistinguishable from what is known as the 'Edge Organisation' [Alberts and Hayes 2003].

[4] In the mathematical approach known as Statistical Mechanics, Ashby's Principle can be derived as a requirement for a dynamical system to maintain equilibrium with its environment. However, in application to richer human systems the Principle is often axiomatic or a heuristic guide.
[5] Because the literature is so large we do not attempt to summarise it here, but will refer in this paper to Donaldson's 2001 work as a proxy for this literature.

Simple Organisation: This type builds on the Adhocracy in retaining mutual adjustment between organisational members, but the 'workers' are overseen by a single decision maker[6]. Because of limits on the capacity of any individual to oversee multiple sophisticated activities by a number of subordinates, this type is limited in the size it can attain.
Machine Bureaucracy: In order to sustain larger sizes than is possible for Simple organisations, the Machine Bureaucracy relies on standardisation of specialised and compartmentalised work practices – low skills mixture – with decision making concentrated at the apex. The outputs of the Machine Bureaucracy are correspondingly formalised so that the contributions made by each compartment can be readily composed. The larger the size of the organisation, the more that compartments need to be encapsulated and overseen locally by delegation to subordinate decision makers.
Professional Bureaucracy: If the outputs of the organisation do not require standardisation, then decision making can be located within compartments themselves. The organisational members work in sub-organisational Adhocracies or Simple structures with standardised outputs appropriate to the skill specialisation of their compartment but not constrained to fit with any other outputs.
Divisional Form: Whereas the specialised skills in the Machine Bureaucracy are individually compartmentalised, the Divisional Form integrates these diverse skills into 'Divisions' which then produce standardised outputs.

We can now make explicit what we mean by a parsimonious description. We use a geometrical representation of the organisational types in a space spanned by the organisational dimensions such that *no two organisational types share the same domain of the space*. We note that such geometrical approaches have been used in the literature. For example, Jundt *et al*. [2004] use a two-dimensional model to represent a range of organisational types. Alberts and Hayes [2006] use a two-cube model for C2 Problem and Approach spaces. Our model is similar but uses the more traditional variables arising in the Contingency Theory literature. In Figure 2 we represent this space as a cube whose sides are labelled by the three dimensions of Skills Mixture, Centralisation of Decision-Making and Organisational Size [Kalloniatis, Macleod and Kohn 2010]. The Mintzberg types are then plotted within the space. The cube is presented both in perspective (top right hand corner of Figure 2 as well as 'orthographic projection' of the cube and the locations of organisational types within it. Colour coding of the blocks in the cube and the organisational types further assists in locating the types in blocks.

Variables categorising the Environment

Environmental Complexity: Intuitively, complexity is a state between simple order and randomness [Gell-Mann 1994]. If the elements of the environment can be distinguished into discrete components then the environmental complexity can be related to the interconnectedness between the components, by identifying the components as nodes of a network, and relationships as the links[7]. A number of

[6] This supervision may exhibit aspects of both 'Command' and 'Control', as per the definition of Pigeau-McCann [2000, 2002]
[7] Such an approach is used, for example, in a related principle known as Conway's Law [Conway 1968] which describes the relationship between a 'designer' and the 'design'.

network complexity metrics are actively discussed in the literature [Kim and Wilhelm 2008].
Spread of Environment: represents the scale or number of distinct components of the problem space, for example, the number of business customers, the number of armed adversaries or the geographic extent of an operation[8].
Environmental Coupling: the tightness or looseness with which linked elements of the environment are bound to each other.
Near-Far Coupling: the degree to which elements in the environment adjacent ('near') to the organisation are coupled with those in the environment where the organisation conducts its operations ('far'[9]). Since organisations reside in a society, surrounded by a public who might otherwise have no formal relationship to the organisation or its business, this variable describes the degree to which 'public' concerns/standards/measures factor into the success or failure of the activities of an organisation in its 'natural operational environment', for instance, the impact of civilian casualties of military operations on domestic support for the military activity. This name for the variable is our development [Kalloniatis, Macleod and Kohn 2010]. In the Contingency Theory literature this variable is known as Public Accountability. We changed the name to reflect it more neutrally as a property of the environment but also, consistent with our approach in this paper, in recognition that there is more than one type of accountability.

There are other variables, related to these. For example, some authors refer to 'turbulence' or 'instability' in the environment [Bar-Yam 2003; Paparone, Anderson *et al*. 2008]. These are dependent variables, the *product of coupling and complexity*: the more tightly coupled elements are, the more rapidly small changes can propagate from one element to another; the more complex the linking between elements, the more a fluctuation can propagate beyond nearest-neighbour interactions across to large parts of the system.

As with the organisational variables, the environmental variables should be seen as an average over the entire environment relevant to the organisation. The above selection is, again, parsimonious because Contingency Theory pairs each of the above organisational variables, which sufficed to distinguish organisational types, with an environmental variable [Donaldson 2001]. Increasing an organisational design variable increases the organisation's fitness-for-purpose for a corresponding property of the external environment. Through the empirical studies summarised in Donaldson [2001], in [Kalloniatis, Macleod and Kohn 2010] we derived three pairs of contingency correspondences:

- Skills-Diversity ↔ Environmental Complexity;
- Organisational Size ↔ Spread of the Environment;
- Centralisation ↔ Near-Far Coupling.

We also invoke a fourth:

- Task Interdependence ↔ Environmental Coupling.

We can understand these pairs intuitively as follows. Skills Diversity manifests the organisation's internal complexity, hence its correlation to Environmental

[8] Mintzberg [1979] uses 'Market Diversity' in this way but we effectively multiply this by a 'Scale' to get to 'Spread'.
[9] 'Far' does not necessarily imply 'geographically distant': a military operation may be on or inside domestic borders in the case of defence against invasion.

Complexity consistent with Ashby's Principle of Requisite Variety[10] [Ashby 1958]. High Spread of the Environment means more environmental components that require more components of the organisation to process corresponding information[11]. Within a model that every worker in the organisation processes some set of elements of the environment, Task interdependence manifests the organisation's lateral or horizontal coupling (namely, between workers at the same level) which must match the coupling of those environmental elements.

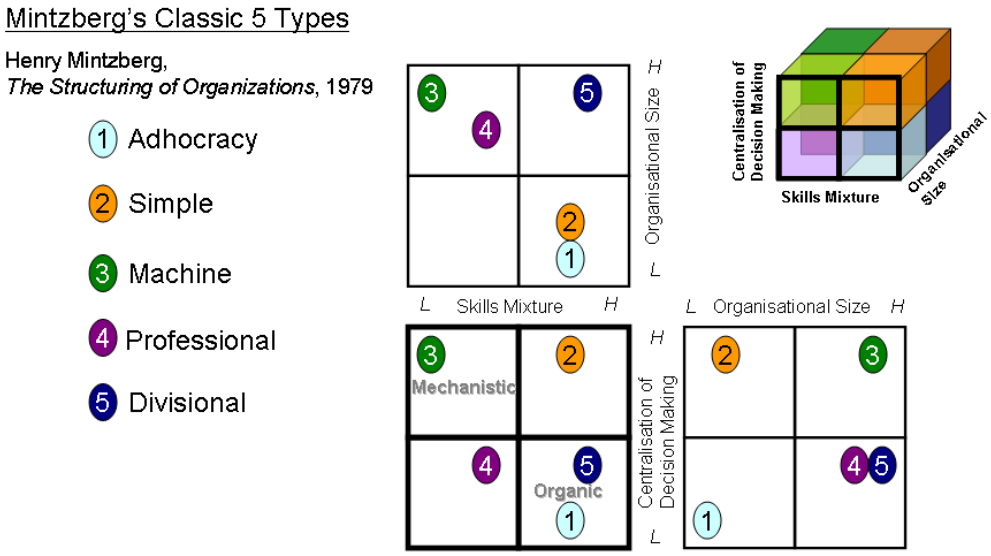


Figure 2 Locating Mintzberg's organisation types in a geometrical space based on three variables.

Near-Far Coupling (aka Public Accountability), the contingency variable for Centralisation, is controversial even in the Contingency Theory literature [Donaldson 2001, pp.89-91]. Fundamentally, this variable is intended to address that aspect of organisational performance which centralisation 'objectively' improves. Centralised decision-making offers identifiable lines of responsibility which can be traced through cause-and-effect chains subsequent to an incident involving violation of public 'standards'. In the literature we cited earlier, this is evidently Hierarchical Accountability [Bovens 1998]. Its reliance on the identifiable cause-and-effect clearly

[10] The 'Variety' in Cybernetics is the number of distinct states of a system obtained by counting discrete elements. In this sense it is an early attempt at defining complexity but one that overlooks the connectivity of the elements.

[11] Organisational Size is often treated as a contingency factor (or environmental variable) in the literature [Mintzberg 1979] in that large organisations typically are more formalised with multiple echelons. However, this invariably deals with 'whole-of-organisation' or the organisation as an Institution (see Khalil [1995] for the contrast). In applying these categories to military entities, we see the 'organisation' as one part of the military institution, directed to specific outcomes such as military operations. In this way Size can be treated as a design, not environmental, variable for that organisation.

limits the fitness-for-purpose of Centralisation for complex environments. However Public or Hierarchical Accountability is but *one type of accountability*, as Bovens makes clear, and not purely a property of the environment. In any case, the stronger the coupling between near and far, the more the near environment imposes measures of performance on the organisation that may be quite different to those naturally arising in the far environment. In this case, when organisational performance departs from such measures, the near environment has the right to call a part of the organisation to account. Centralised decision-making distinguishes an individual who can be called to account.

We could again represent the different types of environments as regions of a cube, analogous to Figure 2, and plot the positions of the Mintzberg organisational types within the cells according to the environments for which the types are 'fit'. Essentially this would be the same diagram as Figure 2 but with different axes labels. For example, the Adhocracy is suited for highly complex (and tightly coupled) environments for small scales – consistent with the intent of the Edge Organisation [Alberts and Hayes 2003]. While there is a viable Mintzberg organisational type for most areas of the cube, we observe that there is none for the domain of High environmental spread (or large scale operation), High complexity and High Near-Far coupling. All 'one-dimensional' answers to any one of the problem's size, complexity and coupling are inadequate here. Centralising control in one individual overwhelms that individual with information. Bureaucratisation with multiple layers for filtering information slows the organisational response to changes in the environment and potentially creates disconnects in plans. Importantly, for this paper, devolution of decision-making to lower-levels of a complex structure obscures final accountability in the cauldron of external scrutiny for real or perceived errors/failures.

Thus far we have treated organisations as if they could be purely described according to a Mintzberg type. This is not the case, as even Mintzberg recognises [Mintzberg 1979 p. 301]: real organisations are hybrids of the types. The mixture of coexisting types may even change over time as the organisation's environment changes. For example, a military headquarters may adopt one form of organisation to plan a particular operation, another form to execute it, and still another as it repatriates forces at the completion of an operation. All of these types for the planners and executors may reside in the overall headquarters which assumes yet a different organisational type. This organisational change is also the result of shifts between Command and Control (as per Pigeau-McCann [2000, 2002] definitions) that fluctuate as the operation moves through the planning-execution continuum as shown in Figure 3.

Accountability can be looked at from two perspectives with respect to time. Active or forward looking accountability is action in the present by an entity (the human figures in Figure 3) to prepare to hold accountability. Passive or backward looking accountability is to hold some entity (again, the human figures in Figure 3) to account for actions that have occurred in the past. Although these accountability types can exist in the same space, they do not apply in the same space at the same time, as shown in Figure 3.

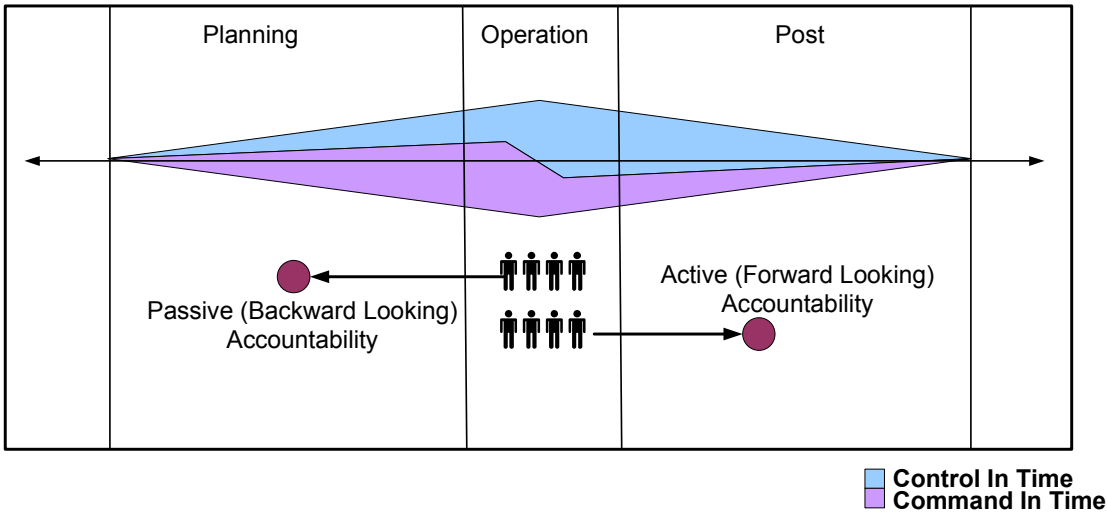


Figure 3 Accountability and Operations in Time

In this paper our concern is for accountability after-the-fact i.e. passive accountability; we shall be concerned to specify, out of the Mintzberg types, the *form of organisation that was used in the context of the actions for which account is being made*.

Constructing Accountability: a philosophical approach

Applied philosophers have debated how and when people can or should be held accountable for their actions. Not all actions require accountability and not all people are capable of holding accountability but there are some common parameters that develop a set of guidelines for how accountability should be applied to individuals. Pettit [2007] addresses these issues and points out three conditions that are individually necessary for fitness to be held accountable. These are:

Value Relevance – An autonomous agent faces a value relevant choice involving the possibility of doing something good or bad or right or wrong
Value Judgement – The agent has the understanding and access to evidence required for being able to make judgements about the relative value of such options
Value Sensitivity – The agent has the control necessary for being able to choose between options on the basis of judgements about their value.

We explain these in more detail. Firstly, the agent needs to make a decision that has a *value* relevant choice, in other words the decision to be made has *significance*. For example, a decision such as choosing to employ military force in a tense diplomatic context has value relevance; a decision to choose a red or blue pen most likely does not have value relevance. No question of accountability needs to be raised for decisions of low value relevance. The next criterion concerns the *judgement* of the agent which turns on whether the agent has the ability to *access and understand* data and information in order to choose between existing options. The final criterion, *sensitivity*, concerns whether the agent is *empowered* to make and implement decisions. According to Pettit [2007], these three conditions are *individually necessary*[12]

[12] 'Individually necessary' means that all statements, each on their own, need to be true for fitness to be held accountable.

for an agent to be held accountable; an agent who fails any of these conditions can not be reasonably held accountable for an action.

Thus far one may read the 'agent' as an individual person. As discussed in previous sections, not all organisational structures allow for the devolution of decisions to individuals: the larger the organisation, the more the 'problem of many hands' is manifested. There are also issues when people collectively make decisions; how then can accountability be devolved to each individual? What if one person in the group disagreed at the decision meeting; does this mean that they are not held accountable? All of these questions imply that holding individuals responsible for organisational decisions is difficult. Therefore, we need to consider different groupings of individuals in organisations and thus different accountability types, rather than just individual accountability. Pettit's [2007] conditions form a basis for a theory of Group Agency, a means of extending accountability now beyond the individual to a 'group agent'. He argues that a group agent should also meet the fitness to be held accountable in the same way required of an individual agent.

Collective Responsibility is the term that is used in philosophy to mean responsibility that can be assigned to some group or organisation [Honderich 2005]. Consistent with the literature, in this paper we use the word *collective* to refer to a type of grouping formed by individuals performing some work or actions together. Are there criteria by which the group can be regarded as an entity in its own right? Pierik [2008] states that there needs to be a *Corporate* identity that is separate from the individuals that make up the group[13]. This group identity of itself is defined by the decisions made by the individuals in the group, including *decisions about how they will make decisions*. Even if the individuals within the group disagree, as long as there is a set of agreed rules defining how decisions are made for these cases[14], then the group can be held accountable for its actions. This means **collective accountability can only be ascribed to an agent when: the members of the collective can deliberate, decide and act as an autonomous agent.** This leads to *Corporate* accountability, where the corporation answers for outcomes as an entity in its own right. The organisation must have a corporate identity, demonstrating some form of strong inter-relationship between individuals by which the individuals' sense of group is enhanced. There may be a chief executive but that role does not dominate the board of directors.

The next step is to devolve accountability amongst the individuals that make up the organisation. Pierik [2008] states that, **collective accountability can only descend to individual agents, when:**

1. **it is clear who is included in and excluded from the collective**
2. **when those included participate in the collective decision making in one way or another**

Miller [2007] argues there is a collective practice model that ascribes accountability to all participants in a practice that share in the benefits. He argues that as long as people can deliberate fairly, and accept benefits (e.g. income from the company) then

[13] Despite the common use of the term, we are referring to a more abstract notion of Corporate than used in Law. 'Corporations', organisations that have, established in law, an identity, privileges and liabilities distinct from their members, will not necessarily satisfy these conditions, particularly if they have a very dominant Chair of the Board of Directors or Chief Executive Officer.

[14] For example the principle of Cabinet Solidarity in the Westminster system of government is a case where even members who disagreed with a Cabinet decision must publicly defend it.

it is possible to assign the costs of accountability to these people. Taken together, Pierik [2008] and Miller [2007] provide an understanding of a collective and how the individual can be distinguished within it leading to a variety of types of Group Agent depending on the strength of horizontal and vertical decision-making styles. Pettit [2007] provides the criteria by which accountability can be applied to these different forms of Agency. We are therefore able to derive now additional accountability types.

If all people have a share in some part of the corporate benefits, and participate within the corporate decision making, then the way to devolve accountability is to all individuals within the organisation. This form of accountability application we call *Corporate Collective*. People operating in the corporate collective must have a strong sense of corporate decision making. Decision-making is participatory and the skill/contribution brought by each member to the outcome links strongly with those of others but the character of each member is preserved. They must join together as a team, as one, and have rules to define or delineate how all individuals are involved.

Contrastingly, "When decisions are made by a small select group then other participants are kept in the dark. In that case, 'Collective' responsibility no longer extends to all members, but at most to the decision makers or the leading beneficiaries of the practice" [Miller 2007]. When these decision makers sit within formal organisational lines, and decisions are decomposed, and each part devolved to differing depths down a linear command chain, there is a greater sense of every individual making an individual decision but all decisions are connected. We are therefore still dealing with some form of collective decision making but the hierarchy guides the traceable connection between the individual decisions. We therefore term the accountability type here as *Hierarchical Collective*. Here, accountability is devolved to a *set of individuals* as far down the organisation as all the sub-parts of the decision have penetrated.

In organisations where decisions are focused within a particular team, and not shared across teams, it is not possible to link the task work of different teams across the organisation. This setup we denote a *Team Collective*. Some of these teams could be formed on a short time-frame and some could be longer and larger. These individuals in the team are bound by a common output or outcome, i.e. a group of scientists working on a paper, and they can only be held accountable in relation to that outcome or output.

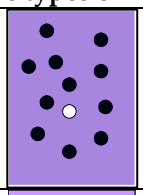
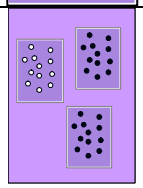
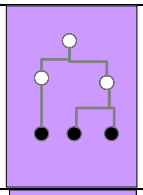
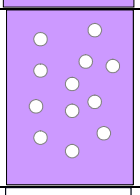
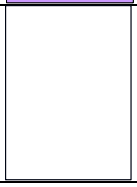
These five types of accountability discussed thus far are summed up in Table 1. We use a diagrammatic representation by which a position being held accountable is represented as white, and a non-accountable position is black.

A unified model: Contingent Accountability

We now draw together the various elements introduced in the paper. We invoke the organisational variables employed earlier in Contingency Theory and see how they relate to the accountability types we have just defined. Whereas Contingency Theory is concerned with the right organisation for the particular environment, here we address the question: *what is the right accountability type for the particular organisation*? We are evidently converging on an approach which sets three elements in a triangular relationship: environment-organisation-accountability. To tie down one

end of the triangle here we therefore assume at this point that *the organisation to be held to account is fit-for-purpose for its environment.*

Table 1 The five types of Accountability: diagrammatic representations and definitions

Positional (P)		Accountability related to a position or a profession, an individual could have a number of different positional accountable requirements depending on what they do and what organisations they are a member of.
Team Collective (TC)		Accountability of all individuals within one of a set of collectives that are not output or outcomes linked across different collectives; i.e. can not link the individuals across collectives, but within each collective, individuals are tightly coupled.
Hierarchical Collective (H)		Top down accountability of individuals within a collective. Accountability could descend across a number of individuals, or be limited to the higher levels
Corporate Collective (CC)		Accountability of **all** individuals within a collective for the behaviour of the whole.
Corporate (C)		Accountability related to an organisation as a whole entity that is not delineated to the individuals. This occurs when the individuals followed the rules and regulations but things still went wrong.

In mapping the accountability types to organisations or environments we need to take into account a slightly more realistic ordinal scale allowing for a Medium setting on the variables. This is particularly important in view of our discussion about 'turbulence' as the product of coupling and complexity. Though in our model turbulence is a dependent variable, it is important for determining whether an environment is amenable to having cause and effect disentangled. Thus Low turbulence is a consequence of Low coupling and complexity; Medium turbulence is a combination of one of complexity or coupling reaching Medium levels; the threshold for High turbulence is the coincidence of both Medium coupling and complexity. The degree of turbulence in turn determines the extent to which one can trace accountability to: an individual, an individual within a collective or the collective without distinguishing an individual.

For low spread environments with small organisations, matters are reasonably straightforward and our model is simply a formalisation of common-sense: Positional accountability applies to environments with low settings on all variables, so that effectively little organisation is necessary and individuals answer for themselves, e.g. autonomous individuals working on self directed tasks, such as individual researchers in small university departments. If there is no concept of team or group, there are no links between the work packages so there is no basis for

holding any entity other than the individual accountable. Team collective accountability applies to environments with low Near-Far coupling but higher environmental complexity and coupling where an Adhocracy is fit-for-purpose. An example of this type of organisation may be found in the typical research collaboration. The larger organisation would consist of a number of such small close-knit teams working on unconnected tasks. The teams are accountable separately for the quality and methods of their work.

Hierarchical accountability applies to environments with higher Near-Far Coupling but low (to medium) environmental complexity or coupling for which a Simple form is appropriate. Many start-up organisations are structured this way. The CEO maintains close control of the work of the number of subordinates, who are realising the CEO's strategy. This simple form of hierarchy means a limited devolution of responsibility down the chain, thus leaving the CEO the only level of the hierarchy accountable. This pattern naturally applies over multiple levels for larger organisations (and that is why hierarchies are so attractive for defining accountability).

To take the next step, consider the requirements for an organisation to satisfy Corporate accountability, namely the entire corporation answers for outcomes as an entity in its own right. A corporate identity is critical, one that is more than just a name but an intricately linked set of processes, which all need to be rigorously followed. We represent this by a combination of high horizontal coupling and high complexity. Centralisation is *not* high: the corporate identity is not superseded by the identity of the central decision-maker. Holding the Corporate entity accountable for some failure may involve some form of financial sanction, limitation of power or enforced restructure. However, the Corporation itself may implement such feedback unjustly on its internal structure intending that the failure may be avoided in the future. For this reason, this form of accountability provides a weaker feedback for changed behaviour than those that identify a single individual.

In contrast to Corporate accountability, Corporate Collective accountability is where there is a sharing of collective 'guilt' by human individuals: all participants in some way chose to either make active decisions or to ignore decisions that had been made. However, these individuals, to have accountability devolved to all individuals within the group, would need to have a high involvement in all decisions. In this, all decision-making is participatory, there is a corporate identity but each member contributes distinctively to the, otherwise, complex outcome. In this respect, Corporate Collective provides for a stronger stimulus for improvement by impinging on individuals in a structure. Corporate Collective may be characterised by the variable settings: High complexity, Medium horizontal coupling. We summarise the matching of the accountability types to organisational variables in Table 2.

Table 2 Relating the Accountability Types to value ranges of the organisational variables

Accountability Type	*Centralisation of Decision-Making*	*Task Inter-dependence*	*Skills Mixture*
Positional (P)	Low	Low	Low
Team Collective (TC)	Low	Medium	Medium
Hierarchical (H)	High	Low	Low
Corporate Collective (CC)	Low	Low-Medium	Medium-High
Corporate (C)	Low-Medium	High	High

On the other side, we can match accountability types to environments using the variables for the latter. Here we can use our cube model. However, because we now have a four dimensional model we use two separate cubes for small and large organisations, respectively. We present the final result in Figure 4. In this diagram the cube is 'unpacked' to enable accountability types to be applied more easily. The diagram on the left represents small organisations, the one on the right applies to large organisations. Although we have added a 'Medium' setting for our variables, for simplicity we have not changed the cube model but rather have chosen to superimpose the cells with regions according to the low-medium-high transitions in Table 2.

Satisfyingly, large regions of the space of possible environments are now covered by an accountability type. Nevertheless, there remains the region of high coupling, high complexity, high spread and high near-far coupling where no classical organisational form is available and where the problem of many hands remains unsolved.

Conclusions

In view of the focus of this paper at the outset on network-centricity, the main conclusion we draw from our work is that *network-centric (or Edge) organisations are not hierarchically accountable*. Rather, network-centric organisations must be held accountable using a range of models, from Team out to Corporate. In extreme cases we still lack viable models for holding large, highly complex and tightly coupled organisations to account. As long as the principle of Contingent Accountability is acknowledged and accepted at strategic levels of both military and civilian organisations, there is no inconsistency with elements at lower (operational and tactical) levels operating 'network centrically' – civilian and military working collaboratively, in partnership – and being held accountable appropriately. Where matters become difficult is network-centricity at the strategic level where the principle of Objective Control becomes dominant: the Civilian constitutionally controls the Military. It is beyond our expertise to determine whether non-hierarchical accountability types can legally apply in this domain.

More broadly we have filled some holes in the accountability literature, by proposing a variety of accountability models that are correspondingly fit-for-purpose, for both the organisation and many forms of environment. This was achieved using the Contingency Theory of organisational structure [Mintzberg 1979, Donaldson 2001] and the Theory of Group Agency [Pettit 2007]. Though the classical organisational types do not provide a 'fit-for-purpose' organisation for every type of environment, they nonetheless cover for low spread environments the cases for which network centricity is intended to assist military forces.

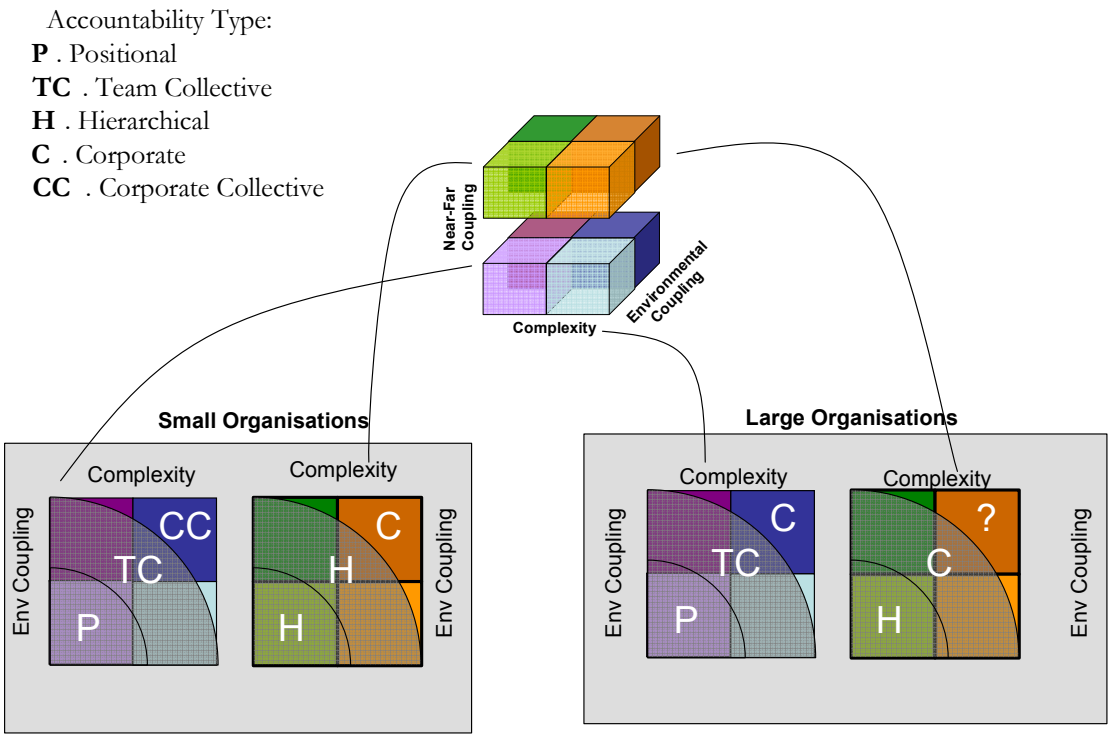


Figure 4 Applying the accountability types to the spaces describing different environments; it is assumed that the organisation being held accountable is fit-for-purpose for the respective environment.

There are two significant questions that we can address in our future work. First, what form of accountability applies when an organisation assumes a form unfit for its environment? Second, what form of accountability applies in environments characterised as high in all variables? In relation to standing military organisations, the first question turns essentially on the ability of *parts* of a large, already existent, organisation to change *between* Mintzberg types; not so much agility within a particular form but agility across the whole space of organisational forms; not so much decision-making within the act of controlling the specific fluctuation in the environment, but how decisions will be made overall. These are the decisions for which individuals or groups must answer. Progress on these mechanisms of flexibility is necessary first. We are better positioned for the second question. Since Mintzberg's classification of organisations, technology has seen remarkable transformation which in turn has generated new forms of organisation. Using Mintzberg's principles, Lars Groth [1999] has identified five new forms, which we have previously analysed using our geometrical approach in [Kalloniatis, Macleod, Kohn 2010] and related to proposals for larger scale Edge Organisations. Though Groth's organisational types still do not offer a universal solution, they nonetheless narrow the 'High[4]' cell in which the models used in this paper lack 'fitness'. Using the principles of Group Agency espoused in this work it may be possible to extend the notions of accountability further in our next stage of research.

A final comment on future validation of our model is warranted. A more detailed analysis of case studies of successes and failures of accountability (as provided in a work like Bovens [1998]) is feasible, but provides for less control over the numerous variables in our model. An experimental approach is viable, in which sets of variables can be tested sequentially. In contrast to most 'organisational

experimentation', such a study would not involve testing different organisations against a set of pre-defined tasks. Rather, experimental subjects would be called upon to determine appropriate accountabilities for a set of scenarios with clearly delineated measures of performance; these scenarios represent different organisations conducting tasks. The accountability may be indicated by selecting from a range of entities introduced in the scenario: individuals and organisational units. The scenarios may be represented through a textual description or audio-visual simulation. The challenge is in determining the measures of performance and in designing an instrument for the conduct of such a study.

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