

**Resilience and transparency in social systems**

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# Resilience and Transparency in Social Systems

## Structured abstract

**Purpose:** This paper draws on the literature of cybernetics to argue that the resilience of organizations can be diminished by an unconsidered maximization of transparency and accountability. In doing so it critically examines the concept of resilience, and the relationship of resilience to neoliberalism.

**Method:** A conceptual analysis of resilience is carried out at two levels. Firstly, the use of the concepts of resilience, viability, transparency, accountability and neoliberalism is considered, together with the relationship between them. Secondly the management interventions that result from the application of these related ideas are critiqued from the perspective of cybernetics, and particularly of variety and black boxes.

**Findings:** It is shown that within complex social environments the unconsidered imposition of transparency and accountability as a management strategy may constrain the resilience of the organizations and individuals rather than enhance it. The use of data analytics enhances this tendency.

### Research limitations / implications

The theoretical analysis of the relationship between transparency and resilience offers a basis for carrying out empirical studies.

**Implications:** There are practical implications for organizational managers, employees and stakeholders, offering them a means of understanding the systemic threat posed by organizational design decisions which enhance transparency and accountability without taking into consideration the full range of interactions which act to maintain organizational viability. In this way it provides a rationale for resisting the neoliberal inspired imposition of these policies.

**Originality:** The bringing together of the concepts of resilience, neoliberalism, transparency and accountability, and their exposure to cybernetic analysis, provides a novel perspective on resilience, and new insights into way that organizations maintain their viability.

**Keywords:** resilience, transparency, accountability, neoliberalism, education, conversation, black box, variety.

## Resilience is more than toughness

Building on the use of the concept in ecology, resilience in social systems is often thought of in terms of the capacity to withstand stress without suffering harm. For example, in the financial sector “Too often, policy makers implicitly equate ‘financial system resilience’ with the ability of individual banks to withstand short-term, externally generated shocks without going bust.” (NEF, 2015). Similarly, in the education sector the resilience of institutions is often equated with their ability to withstand adverse market conditions, for example The Council of Independent Colleges (2017). A similar criterion is applied to the students who attend those institutions. As an early paper on the topic states: “Resiliency refers to a general capability to deal successfully with sustaining stressful life situations, either resulting from permanent status (like extreme poverty) or from disruptive incidents (like natural catastrophes, war, death of parents)” (Niesel & Griebel, 2005, p4). However, as Hornborg notes, this extension of the ecological term is problematic:

... the concept of resilience can be more or less precisely defined in engineering and ecology, but can serve only as a vague and contested metaphor in the social and behavioural sciences, where it will inevitably raise normative questions about the relative desirability of different states and conditions. (Hornborg, 2013, p.119)

The term ‘resilience’ is problematic from a cybernetic perspective when it identifies a quality within an individual or organization that is ascribed to it because we can observe that the system

1 withstands stress. For example, a UK report ‘Building children and young people’s resilience in  
2 schools’ stated that “Those who are resilient do well despite adversity” (Public Health England  
3 2014, p3). This raises the danger of a circular explanation, which we might represent as

4 Question: “What is resilience?”

5 Answer: “The ability to withstand stress.”

6 Question: “Why is the system resilient?”

7 Answer: “Because the system has resilience in it. We can measure the amount of resilience  
8 by seeing how resilient to stress the system is”

9 Question: “How do you know that what you are measuring is resilience?”

10 Answer: “Because we can observe that the system is resilient to stress.”

11 Bateson would have recognized such an explanation as the application of a dormitive principle  
12 (Bateson, 1980, p.85).

### 13 **A cybernetic view of resilience: conversations for viability**

14 Ross Ashby described the modus operandi of cybernetics: “it treats, not things but *ways of*  
15 *behaving*. It does not ask “what *is* this thing?” but “*what does it do?*”” (Ashby 1957, p. 1, italics in  
16 the original). A cybernetic inquiry into resilience, therefore, cannot view it as a thing which is  
17 located within the system, as do the definitions cited above. Rather, resilience is appropriately  
18 conceived of as a performance required of the system (including the individual human being) which  
19 maintains viability. The task of the cybernetician is to inquire into the mechanisms which produce  
20 this performance, and the constraints which operate upon it. Pangaro provided a starting point for  
21 this inquiry in his keynote to the conference which was the basis for this special issue, defining  
22 resilience from a cybernetic perspective as:

- 23 1. the continuous regulation of variety
- 24 2. designing for conversation in social systems, in order to achieve responsive, proactive internal  
25 change, as a means of maintaining stability in the face of continuous external change. (Pangaro  
26 2017)

27 Pangaro’s discussion of conversation is posited in terms of Pask’s conversation theory, as set out,  
28 for example, in Dubberly and Pangaro (2009)\*, with conversation being understood as referring to  
29 the whole range of interactions between the components of a social system. These conversations  
30 enable the system to orchestrate and adjust its responses to a changing environment, and so to  
31 maintain its viability. Conversation is a process, rather than a quality, so if we accept Pangaro’s  
32 analysis, how can we then continue to use the noun ‘resilience’? In Beer’s Viable System Model  
33 (Beer, 1972) the noun ‘viability’ is used in describing viable systems, but is not used to refer to a  
34 quality that explains why a system in focus is viable. A similar usage for the noun ‘resilience’  
35 avoids the reification of processes and leads away from dormitive explanations.

36 Dubberly and Pangaro (2009) discuss what designers can do to support the maintenance of  
37 conversations, considering design in the broad sense set out by Simon: “Everyone designs who  
38 devises courses of action aimed at changing existing situations into preferred ones.” (Simon 1996,  
39 p.111)\*. Here I consider how these preferred situations may be elusive if the design decisions of  
40 managers and technologists constrain the possible conversations within a social system, and, by  
41 doing so, threaten the system’s capacity to sustain its own viability.

### 42 **The link between neoliberalism and resilience**

43 At the largest scale, design decisions are taken which structure the conversations that determine the  
44 conditions of the economy. The rise to prominence of the concept of resilience coincides with the  
45 period of dominance of neoliberalism, and I argue that the two are closely entangled. Much has  
46 been written about neoliberalism, and it is not possible to review that literature here. David Harvey  
47 provides the following brief definition of neoliberalism, which will serve for present purposes:

48 ... a theory of political economic practices that proposes that human well-being can best be advanced  
49 by liberating individual entrepreneurial freedoms and skills within an institutional framework  
50 characterized by strong private property rights, free markets and free trade. The role of the state is to  
51 create and preserve an institutional framework appropriate to such practices. ... and to guarantee, by  
52

force if need be, the proper functioning of markets. Furthermore, if markets do not exist (in areas such as land, water, education, health care, social security or environmental pollution) then they must be created, by state action if necessary. (Harvey, 2005, p. 2)

A strand of critique of the concept of resilience has also affirmed a relationship between neoliberalism and resilience, including a sustained discourse in the journal 'Resilience'. For example, Joseph (2013, p51) concludes that "Resilience is best understood in the context of rolling-out neoliberal governmentality." Similarly Zebrowski concludes that "Resilient populations as such must be regarded as a particular enframing of life which arose as the correlate to neoliberal governance." (Zebrowski, 2013, p170). Youssef *et al.* explore this enframing, and argue that neoliberalism has brought about a shift in discourse from 'resistance' to 'resilience':

Building resilient subjects involves the deliberate disabling of the political habits, tendencies and capacities of peoples and replacing them with adaptive ones. Resilient subjects are subjects that have accepted the imperative not to resist or secure themselves from the difficulties they are faced with but instead adapt to their enabling conditions. (Youssef *et al.*, 2013, p.85)

The conviction of these authors that increased prominence of "resilience" during the rise of neoliberalism is significant is supported by Google's Ngram Viewer. Ngram Viewer has its limitations (Pechenick *et al.*, 2015), but it nevertheless provides a broad picture of the relative use of use of words in published books in UK and US English (ignoring the popularity of those books).

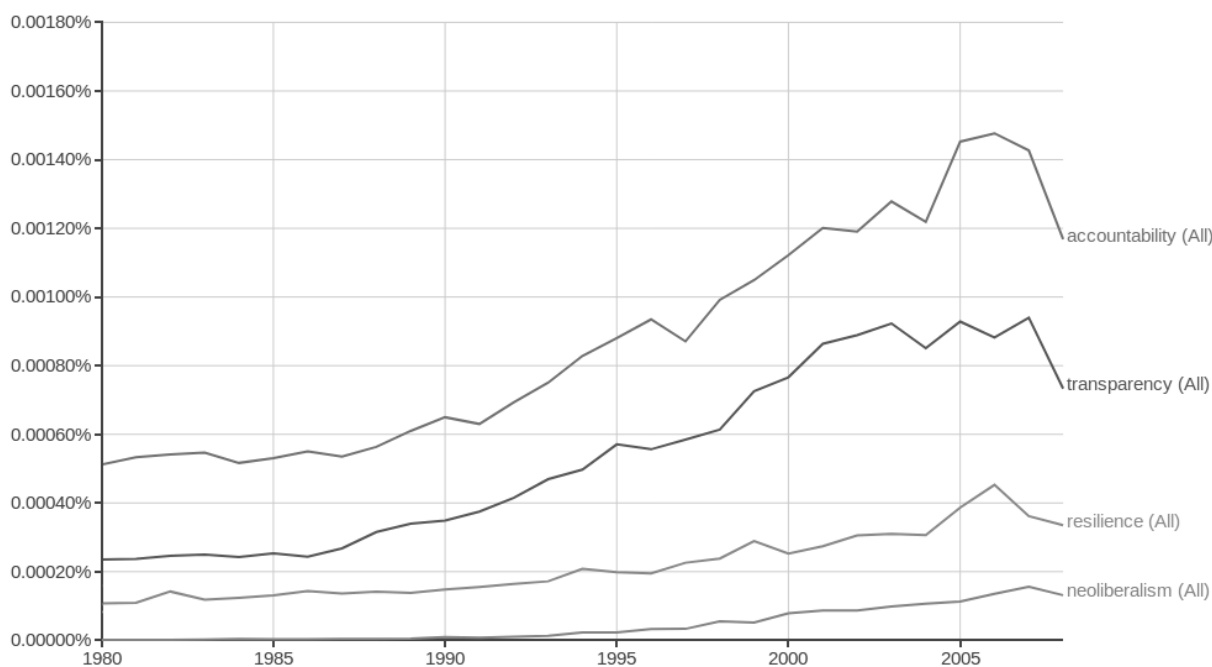


Figure 1: Use of the words 'neoliberalism', 'resilience', 'transparency' and 'accountability', between 1980 and 2008 in British and American English. Source: Google Books Ngram Viewer, 5th January 2018

In figure 1 it can be seen that 'neoliberalism' starts to register in 1990, and from that date to 2008 the use of the word 'resilience' more than doubled, having previously been more or less stable for some years. The same is true for the words 'transparency' and 'accountability', which, I will argue below, are closely related to resilience. Between 2005 and 2008, the final date for the data provided, the use of all four words drops a little, in parallel. The graph does not show what, if any, causal relationship there might be between the four rises, but their common movement strongly suggests that the concepts are closely linked, and that it is worth examining how they are related.

## Resilience and competition

1 The first proposed relationship between neoliberalism and resilience is a simple one. Inherent in the  
 2 neoliberal emphasis on markets is an increase in competition. Adam Smith himself provided the  
 3 justification: “if any branch of trade, or any division of labor, be advantageous to the public, the  
 4 freer and more general the competition, it will always be the more so.” (Smith, 2013). Increased  
 5 competition in education, health and the job market, has led inevitably to increased pressure on  
 6 individuals and organizations. If organizations or individuals are unable to cope with increased  
 7 competitive pressure, then this is ascribed to a lack of resilience. As Neocleous argues

8 The neoliberal subject can “achieve balance” across the several insecure and part-time jobs they  
 9 have, can “overcome life’s hurdles” such as facing retirement without a pension to speak of, and just  
 10 “bounce back from whatever life throws at us” ... Neoliberal citizenship is nothing if not a training  
 11 in resilience. (Neocleous, 2012, p.192)  
 12

13 From this perspective, the promotion of resilience as a necessary quality can be framed as an  
 14 attempt to help individuals and organizations to survive the process of marketization without  
 15 suffering too much damage. This help can be provided through effort and training. For example,  
 16 Vālikangas writes that "a company is as resilient as its ability to survive and thrive over multiple  
 17 changes in its competitive environment" (Vālikangas, 2010, p. 13) and proposes a process to  
 18 increase organizational resilience. Similarly, school children and those with mental health problems  
 19 are encouraged to increase their resilience (Mind, 2007)• , (Willis, 2016). This training may have  
 20 value for the organizations and individuals who receive it. It should, however, be noted that this  
 21 conceptual shift from social processes to the ascribed qualities present in individuals and  
 22 organizations deflects responsibility for social and individual degradation onto those who suffer,  
 23 and away from those who design those social processes, and, in particular, away from those  
 24 promoting the neoliberal agenda. Regardless of this point, however, the cybernetic principles  
 25 established in section 2, mean that any cybernetician, whatever their political or social views,  
 26 should reject explanations which depend on a quality of ‘resilience’ situated in the individual.  
 27  
 28

### 29 **Resilience and transparency**

30 The second link between neoliberalism and resilience concerns transparency and, by extension,  
 31 accountability. Transparency, understood as the degree to which others can inspect the activities of  
 32 an individual or organization, is associated with many positive aesthetic, social and political  
 33 experiences. It can prevent bullying, corruption, and abuse, as well as facilitating understanding and  
 34 collaboration, and improved standards in public life. Transparency is also an important theme for  
 35 neoliberalism: “Markets are plagued by problems of information asymmetries, and there are  
 36 incentives for market participants both to exploit and to increase these information asymmetries.”  
 37 (Stiglitz 2009, p. 11). In response, many governments have made legal and policy interventions to  
 38 increase transparency, with the fundamental purpose of “rendering greater discipline and  
 39 accountability of policymakers and actors to the market.” (Rodan, 2006, p.198)• .  
 40

41 Transparency can be both an enabler of neoliberalism and an inhibitor of its negative tendencies.  
 42 For example, in the UK neoliberal policies on the assessment of disabilities have been challenged  
 43 and partially reversed by transparency on the cost of the private companies carrying out the work,  
 44 the poor quality of their assessments, and the consequences for individuals (Walker, 2016).  
 45 Similarly, David Attenborough’s BBC documentary ‘Blue Planet II’ provided “devastating footage  
 46 of poisoned stillborn whales and turtles trapped in plastic bags has led to a public outcry, with  
 47 consumers vowing to cut down on plastic waste and the UK government promising concrete action”  
 48 (Bley Griffiths, 2018).  
 49

50 At the personal level, the popularity of social networks demonstrates that increased personal  
 51 transparency can support communication patterns which many people value. Nevertheless, it is, by  
 52 now, often recognized that personal transparency brings both benefits and problems, following the  
 53 work of researchers such as Turkle, e.g. (Turkle, 2011)• , and legal interventions such as the Right  
 54 to be Forgotten in Europe (European Parliament and Council, 2016).  
 55

56 Transparency, then, is inherently neither good nor bad. However, Lawrence Lessig, writing about  
 57 political transparency, has argued persuasively that “We are not thinking critically enough about  
 58 where and when transparency works, and where and when it may lead to confusion, or to worse.”  
 59  
 60

1 (Lessig 2009, p.2)• . It is argued here that the same is true of transparency in the internal processes  
 2 of organizations, and I now explore some perspectives on how the critical thinking requested by  
 3 Lessig might be achieved.  
 4

### 6 **Transparency and accountability**

7 Within political and other social systems, transparency is sought in order to achieve  
 8 ‘accountability’. Accountability, in its origin, simply refers to the rendering of accounts. To take an  
 9 ancient example, in the parable of the talents money is distributed, the recipients do with it as they  
 10 will, and after a year they are called to account for the results. Those who fail to perform to an  
 11 acceptable standard are punished. Investment bankers are in a similar position to their biblical  
 12 predecessors. Accountability therefore specifies and imposes transparency (financial results must be  
 13 reported), and the degree of autonomy of the actors (use of the money is an individual decision).  
 14 Citizens, and, particularly, professionals, are held accountable for their actions in a more general  
 15 sense. Politicians are accountable for their probity and the success of their policies. Parents are  
 16 accountable for their children’s attendance at schools, while teachers are accountable for the  
 17 children’s learning when they get there.  
 18

19 At issue here is not the existence of accountability, but rather the nature of the accounts, and  
 20 required transparency and constraints on autonomy which are required by and of managers,  
 21 employees and politicians. Key Performance Indicators (KPIs) have become ubiquitous as the  
 22 means of imposing transparency and accountability in management in the USA and UK, as well as  
 23 other countries. They were defined by Fitz-Gibbon at a relatively early stage of their deployment:

24 ... as an item of information collected at regular intervals to track the performance of a system.  
 25 Performance indicators (PIs) are collected in many complex systems which, like education, deliver a  
 26 service. Thus ‘near-misses’ are recorded to monitor air transport; the length of hospital waiting  
 27 queues is recorded by the Health service. (Fitz-Gibbon 1990, p.1)

28 Selective transparency is generated by KPIs, and this enables managers to control the activities of  
 29 the managed. The relevant questions for the present inquiry are how neoliberalism has changed the  
 30 reporting conditions for accountability, how the balance between specified autonomy and imposed  
 31 transparency has changed as a result, and what the implications of these changes are for resilience.  
 32 See Seddon (2008) for a valuable critique of these developments in public administration.  
 33

### 35 **Complicated and complex systems**

36 It may be noted that Fitz-Gibbon, above, describes both education and air transport as ‘complex  
 37 systems’. However, air transport is better conceptualized as a ‘complicated’ system. Snowden  
 38 (Snowden & Boone, 2007, table 1) describes complicated systems as requiring expert diagnosis,  
 39 and concerning “Cause-and-effect relationships, discoverable but not immediately apparent to  
 40 everyone; more than one right answer possible.” This describes well most of the issues that emerge  
 41 in air transport, which is effectively managed by computer algorithms, and where enhanced safety  
 42 has largely come from reducing the importance of human factors in running the system. ‘Complex’  
 43 systems, according to Snowden are distinct, involving flux and unpredictability, and “No right  
 44 answers; emergent instructive patterns... A need for creative and innovative approaches”. This latter  
 45 characterization is a better fit for the challenges of managing social systems such as education. In  
 46 Taleb’s terms, Fitz-Gibbon mistakenly saw education as a washing machine (complicated) when in  
 47 fact it is a cat (complex) (Taleb, 2012, p.56). Donald Schön warned of this danger of this error in  
 48 1983, referring to the solution of complicated problems as ‘Technical Rationality’.

49 From the perspective of Technical Rationality, professional practice is a process of problem solving.  
 50 Problems of choice or decision are solved through the selection, from available means, of the one best  
 51 suited to establish ends. But with this emphasis on problem solving, we ignore problem setting, the  
 52 process by which we define the decision to be made, the ends to be achieved, the means which may be  
 53 chosen. In real world practice, problems do not present themselves to the practitioner as givens. They  
 54 must be constructed from the materials of problem situations which are puzzling, troubling, and uncertain.  
 55 (Schön, 1983, p.40)  
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1  
2 By treating complex systems as if they were merely complicated, the ‘puzzling, troubling, and  
3 uncertain’ aspects of problem situations can be elided.  
4

### 5 **Social organizations as a network of black boxes**

6 Within a hierarchical social structure, the law of requisite variety (Ashby, 1958) determines that not  
7 all the details of the functioning of the managed system can be exposed to the manager. There are  
8 therefore black boxes (Glanville, 2003)• within the system where action is taken independently of  
9 the manager’s control. Such boxes are not black because they are inherently impenetrable, as, for  
10 example, the interior of the nucleus of the atom was to Rutherford. Rather, their blackness is  
11 relative to the social position of the observer. For example, the operations of a kitchen may be a  
12 black box to a restaurant owner, but not to the chef that is employed to work there. It is such social  
13 black boxes that we are concerned with here.

14 Within black boxes, interpersonal and professional practices arise that maintain the viability of the  
15 organization by adsorbing the variety generated by the activities that occur within the black box. To  
16 take the example of education, teachers carry out many undocumented tasks which are invisible to  
17 educational managers, such as maintaining mental models of all their learners and adapting their  
18 communication with them accordingly, adapting learning materials to the learning needs of  
19 individuals or groups, responding to learners’ personal crises, or eliciting a positive social  
20 environment in the classroom. All these activities take place within a black box, as far as  
21 management is concerned.  
22

23 Similar black boxes are present at each level of recursion of the system. Thus, the learners’  
24 activities outside the classroom are a black box as far as the teacher is concerned. The teacher may  
25 assign homework and study materials, but the learners have responsibility for maintaining a balance  
26 between the competing demands of different subjects while considering their own strengths and  
27 weaknesses, and for judging at what point their personal life should take precedence over an  
28 additional hour of study. Such decisions are beyond the capacity of a teacher, and in many cases  
29 ethically out of scope for the teaching profession. Similarly, a school is a black box as far as  
30 Ministers of Education are concerned. They have no ability to inspect work done by staff to build an  
31 effective and collaborative team, or to promote social cohesion in the school.  
32  
33

### 34 **Models**

35 For a manager to make sense of the information emerging from a black box, she or he needs to have  
36 a model of the function of that black box. A model is an idealization, i.e. ‘a deliberate simplification  
37 of something complicated with the objective of making it more tractable’ (Frigg and Hartmann,  
38 cited in Heidl, 2016, p.164). Kühne (2005, p.2) summarizes Stachowiak’s description of how a  
39 model achieves this idealization (Stachowiak’s original is available only in German). Stachowiak  
40 argues that a model needs to possess three features:  
41

- 42 • mapping feature: A model is based on an original
- 43 • reduction feature: A model only reflects a (relevant) selection of the original’s properties.
- 44 • pragmatic feature: A model needs to be usable in place of the original with respect to some  
45 purpose.

46 Thus, a model used to understand a black box itself implies a strategy for variety management (the  
47 ‘reduction feature’), and an implicit purpose (the pragmatic feature).

48 Returning to the example of education, as argued in Griffiths (2017) the models of the on-going  
49 activity within the system maintained by managers are not the same as those of the managed. For  
50 example, an educational manager may conceive of the black box of the classroom in terms of the  
51 ‘delivery’ of a course, achieved by presenting the learning materials in the right order, monitoring  
52 and correcting learners’ responses, and marking assignments. The teacher, on the other hand, may  
53 be concerned with remedial teaching to enable learners to handle the course material, and  
54 maintaining individual learners’ motivation. These and similar differences in understanding of the  
55 processes underway in a social system develop over time. They constitute an evolved response to  
56 the complexity of running a system which, like all social systems, involves the construction by  
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1 multiple actors of a disputed “process by which we define the decision to be made, the ends to be  
2 achieved, the means which may be chosen” referred to by Schön above.  
3

#### 4 **Black boxes and resilience**

5 It is the blackness of the boxes in social systems that provides the flexibility which is necessary to  
6 sustain the coexistence of contradictory models of the processes underway in social systems. In the  
7 example of teaching policy, variety equations make it hard, or impossible, for policymakers to  
8 perceive the problems of teachers and learners. These problems can be addressed in conversations  
9 between teachers and with learners that take place in an unrestrained way within black boxes,  
10 enabling responses to emerging problems to be developed and elaborated. For these conversations  
11 to take place, flexibility is needed in both time and activities. However, if the black box becomes  
12 transparent because of the introduction of management philosophies and methods informed by  
13 neoliberalism, then those active in the black box will be required to be accountable to management  
14 using a set of metrics to which financial value is eventually attached. The adjustments in the  
15 balance of reporting and autonomy which are designed while carrying out this process will not  
16 support conversations whose purpose is not perceptible from the standpoint of the manager.  
17 Such a suppression of conversation threatens the viability of the organization in two ways.  
18 Firstly, the capacity to compensate for error is reduced. In education, for example, policy may  
19 mandate certain pedagogic approaches to be taken in schools, but governments are unable to inspect  
20 the detail of teaching processes, and so policy edicts can be adapted to the realities of learners needs  
21 and teachers capabilities (see (Griffiths, 2017, p.122-123) for a discussion of the teaching of  
22 reading). Similarly, teachers can use their judgment in the application of institutional rules and  
23 norms in order to maintain learners’ engagement, while learners can ignore study advice if it is  
24 inappropriate to their circumstances. Increased transparency and accountability may make such  
25 adaptations impossible.  
26

27 Secondly, we have seen that Pangaro argues that conversations are the means whereby viability is  
28 maintained in the face of a changing environment. Black boxes enable multiple conversations to  
29 take place, generating multiple perspectives and interventions with which to meet the challenges  
30 generated by continual external change. A design initiative by management to increase transparency  
31 and accountability, without respecting the historically evolved network of black boxes that  
32 maintains organizational viability, is therefore likely to negatively impact on the resilience of the  
33 system.  
34

35 These considerations apply to all organizations, but are particularly severe in education, because  
36 those involved ascribe a wider range of purposes to the organization than the case in most  
37 institutions. These purposes include personal growth, employability, the award of qualifications in  
38 return for payment, the health of the economy and the preservation of national cultures. Many of the  
39 conversations and activities which take place to address these conflicting purposes are  
40 undocumented and take place in black boxes. Opening up these black boxes to management control  
41 based on a subset of educational purposes may be expected to suppress those undocumented  
42 purposes, and to suppress functions which are valuable to individuals and society.  
43

44 Constraints to the conversations within black boxes can be catastrophic. Outsourcing of government  
45 work to the private sector is in effect a dramatic reduction in conversation between government and  
46 those who carry out work in its name. In outsourcing, activities within the existing black boxes of a  
47 system are not made transparent, but rather completely eliminated, and replaced with other black  
48 boxes external to the system. Carillion was a company through which much of UK Government  
49 outsourcing was channeled, until it collapsed in 2018. A public report stated that the government  
50 had been “attempting to transfer risks that the government itself has completely failed to analyze or  
51 to understand. ... Government procurement has been driven by price while failing to appreciate  
52 differences in quality that contractors may be offering.” (House of Commons, 2018, p3). These risks  
53 had, presumably, previously been handled within black boxes in the civil service. The report also  
54 states (p19) that outsourcing was favored because “the debt does not have to be shown in the  
55 National Accounts or within the national debt.” As a result, conversations which could have  
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1 identified dangers were also avoided in parliament. The outsourcing model was intended to  
 2 guarantee value for money by exclusively focusing on cost, but the lack of conversations about  
 3 evolving risks, and the quality of work carried out, led to a collapse which left 57 construction  
 4 projects unfinished, worth a total of £5.7 billion, and £1.5 billion of debt (Barbour ABI, 2018).  
 5

### 6 **Computer networks as a managerial amplifier**

7 We have thus far discussed the methods of management and their impact on resilience. We now  
 8 need to discuss, if only briefly, the role of tools. The ever-increasing use of computers and networks  
 9 generates vast quantities of data and makes it available to the managers. This might appear to be an  
 10 inherently good thing: what could be wrong with obtaining more information about the system to be  
 11 managed? Indeed, this data opens up many exciting opportunities, and we can only be intrigued to  
 12 imagine what Beer and the Cybersyn team might have done with it (Beer 1981, chapter 4). The  
 13 problem is, however, that the data is partial, not only in the sense of being a subset, but also of  
 14 being biased because it is the result of design decisions, at two levels. Firstly, it is the managers of  
 15 the system, or their peers, who procure and control computer networks, and who decide what data  
 16 will be generated, and thus how the system to be managed will be represented to managers.  
 17 Secondly, tools are used to manage the increased variety which is generated by the flow of data,  
 18 through the use of analytics algorithms. These algorithms, designed by analysts in collaboration  
 19 with managers, are themselves models, in Stachowiak's sense above. The purpose of the algorithm  
 20 is precisely to reflect only "a (relevant) selection of the original's properties" (cf. Kühne (2005, p.2)  
 21 above), otherwise it would not provide variety reduction. The analytical tools used by managers  
 22 therefore have two layers of modeling which mold the representation of the system to be managed.  
 23 Computer networks can be designed in many configurations, including peer-to-peer. However, in  
 24 businesses and public administrations they almost universally constitute centrally controlled  
 25 hierarchies, and it is this class of models which is reflected in the data which is gathered and the  
 26 algorithms which are applied. Such models are unable to represent recursive variety management,  
 27 the task undertaken by Beer's Viable System Model, and Beer described the function of hierarchical  
 28 models as being "to apportion blame" (Beer, 1972, p201). On the contrary, the hierarchical model  
 29 encourages managers to use technology to maximize transparency, and to obtain data on potential  
 30 points of failure, which hitherto were inaccessible to managerial inspection. A striking example is  
 31 the use made of data by Bridge International Academies:  
 32

33 Teachers must ... run their lessons almost verbatim from the tablet's lesson scripts. Back at Bridge's  
 34 Nairobi offices and Massachusetts-based headquarters, all the data is compiled and analyzed. ...  
 35 Whenever teachers arrive late to school, miss a class, or even take too long to scroll through a  
 36 specific lesson, it's all tracked by Bridge's "Master Teachers"—the moniker given to members of the  
 37 company's analytic team—in nearly real time (Ross, 2014).  
 38

39 In this and similar systems a design decision has been taken to prevent Pangaro's "conversation in  
 40 social systems", while the black boxes which support recursive variety management have been  
 41 eliminated as far as possible. From a cybernetic perspective, therefore, resilience is gravely  
 42 threatened. The Bridge International Academies, and some other organizations taking a similar  
 43 approach, have nevertheless survived.  
 44

### 45 **Shifting the purpose of the system**

46 A full exploration of the apparent viability of Bridge schools would require an in-depth study. It  
 47 may be that there are more interactions and conversations than it appears from the reports, in other  
 48 words, there may be black boxes in the schools which are entirely invisible to the Massachusetts  
 49 headquarters. It may also be that the funding which Bridge International Academies receives, and  
 50 the socio-political context in which it is active, insulate it from pressures for the time being.  
 51 However, considering only the bare outlines reported, we can assert Beer's maxim that the Purpose  
 52 Of the System Is What It Does (POSIWID) (Beer, 2002). If the conversations which have  
 53 historically taken place in the black boxes of a social system are suppressed, and new activities are  
 54 imposed, then to this extent the system now does something different, and its purpose is changed. In  
 55 the face of a major change. such as teaching practice we have just discussed, it is reasonable to ask  
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1 if the resilience of the system has been enhanced by its adaptation, or if a system has been destroyed  
2 and replaced by something new. The answer may depend on how much we value a name, and on the  
3 viewpoint of the judge. One might ask for example, if the people delivering the classes for Bridge  
4 International Academies are teachers in the sense that the profession has previously been  
5 understood. A candidate explanation for the viability of Bridge International Academies, and for  
6 other initiatives using similar methods in different fields, is that they have taken a complex system,  
7 and replaced it with a complicated system in order to be able to deploy their preferred methods of  
8 control. In Taleb's terms, the educational cat, with all its contingency, creativity and  
9 unpredictability, has been euthanized, and replaced with a washing machine.  
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### 12 **Concluding remarks**

13 I have argued that increases in transparency and accountability, when deployed within a neoliberal  
14 context, impoverish the interactions of organizations, employees and stakeholders, concentrate  
15 problem solving at the pinnacle of the organization, and may gradually redefine the purpose of the  
16 organization. The neoliberal reform program frames the problems that emerge in terms of resilience,  
17 and seeks to promote resilience by exposing all actors to the Darwinian rigors of the market. It is  
18 argued here that, on the contrary, not only do some organizations fail to survive market competition,  
19 but also the strategies applied to promote participation in markets, i.e. the promotion of  
20 transparency and accountability, can themselves constrain the maintenance of viability in complex  
21 social organizations. Political and social action may be necessary to correct these problems.  
22 Nevertheless, the analysis presented contributes to a possible solution in two ways: firstly, by  
23 clarifying the need for the recognition of the hidden contribution to the maintenance of  
24 organizational and individual viability made by undocumented conversations and interactions, and,  
25 secondly, by showing the need for close analysis of the systemic contribution made by the  
26 conversations and interactions which take place in black boxes before opening up those black boxes  
27 to managerial accountability.  
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Kybernetes

## Resilience and Transparency in Social Systems

### Structured abstract

**Purpose:** This paper draws on the literature of cybernetics to argue that the resilience of organizations can be diminished by an unconsidered maximization of transparency and accountability. In doing so it critically examines the concept of resilience, and the relationship of resilience to neoliberalism.

**Method:** A conceptual analysis of resilience is carried out at two levels. Firstly, the use of the concepts of resilience, viability, transparency, accountability and neoliberalism is considered, together with the relationship between them. Secondly the management interventions that result from the application of these related ideas are critiqued from the perspective of cybernetics, and particularly of variety and black boxes.

**Findings:** It is shown that within complex social environments the unconsidered imposition of transparency and accountability as a management strategy may constrain the resilience of the organizations and individuals rather than enhance it. The use of data analytics enhances this tendency.

### Research limitations / implications

The theoretical analysis of the relationship between transparency and resilience offers a basis for carrying out empirical studies.

**Implications:** There are practical implications for organizational managers, employees and stakeholders, offering them a means of understanding the systemic threat posed by organizational design decisions which enhance transparency and accountability without taking into consideration the full range of interactions which act to maintain organizational viability. In this way it provides a rationale for resisting the neoliberal inspired imposition of these policies.

**Originality:** The bringing together of the concepts of resilience, neoliberalism, transparency and accountability, and their exposure to cybernetic analysis, provides a novel perspective on resilience, and new insights into way that organizations maintain their viability.

**Keywords:** resilience, transparency, accountability, neoliberalism, education, conversation, black box, variety.

### Resilience is more than toughness

Building on the use of the concept in ecology, resilience in social systems is often thought of in terms of the capacity to withstand stress without suffering harm. For example, in the financial sector “Too often, policy makers implicitly equate ‘financial system resilience’ with the ability of individual banks to withstand short-term, externally generated shocks without going bust.” (NEF, 2015). Similarly, in the education sector the resilience of institutions is often equated with their ability to withstand adverse market conditions, for example The Council of Independent Colleges (2017)• . A similar criterion is applied to the students who attend those institutions. As an early paper on the topic states: “Resiliency refers to a general capability to deal successfully with sustaining stressful life situations, either resulting from permanent status (like extreme poverty) or from disruptive incidents (like natural catastrophes, war, death of parents)” (Niesel & Griebel, 2005, p4).

However, as Hornberg notes, this extension of the ecological term is problematic:

... the concept of resilience can be more or less precisely defined in engineering and ecology, but can serve only as a vague and contested metaphor in the social and behavioural sciences, where it will inevitably raise normative questions about the relative desirability of different states and conditions. (Hornborg, 2013, p.119)

1 The term ‘resilience’ is problematic from a cybernetic perspective when it identifies a quality within  
 2 an individual or organization that is ascribed to it because we can observe that the system  
 3 withstands stress. For example, a UK report ‘Building children and young people’s resilience in  
 4 schools’ stated that “Those who are resilient do well despite adversity” (Public Health England  
 5 2014, p3). This raises the danger of a circular explanation, which we might represent as

6 Question: “What is resilience?”

7 Answer: “The ability to withstand stress.”

8 Question: “Why is the system resilient?”

9 Answer: “Because the system has resilience in it. We can measure the amount of resilience  
 10 by seeing how resilient to stress the system is”

11 Question: “How do you know that what you are measuring is resilience?”

12 Answer: “Because we can observe that the system is resilient to stress.”

13 Bateson would have recognized such an explanation as the application of a dormitive principle  
 14 (Bateson, 1980, p.85).

### 15 **A cybernetic view of resilience: conversations for viability**

16 Ross Ashby described the modus operandi of cybernetics: “it treats, not things but *ways of*  
 17 *behaving*. It does not ask “what *is* this thing?” but “*what does it do?*”” (Ashby 1957, p. 1, italics in  
 18 the original). A cybernetic inquiry into resilience, therefore, cannot view it as a thing which is  
 19 located within the system, as do the definitions cited above. Rather, resilience is appropriately  
 20 conceived of as a performance required of the system (including the individual human being) which  
 21 maintains viability. The task of the cybernetician is to inquire into the mechanisms which produce  
 22 this performance, and the constraints which operate upon it. Pangaro provided a starting point for  
 23 this inquiry in his keynote to the conference which was the basis for this special issue, defining  
 24 resilience from a cybernetic perspective as:

25 1. the continuous regulation of variety

26 2. designing for conversation in social systems, in order to achieve responsive, proactive internal  
 27 change, as a means of maintaining stability in the face of continuous external change. (Pangaro  
 28 2017)

29 Pangaro’s discussion of conversation is posited in terms of Pask’s conversation theory, as set out,  
 30 for example, in Dubberly and Pangaro (2009)• , with **conversation being** understood as referring to  
 31 the whole range of interactions between the components of a social system. These conversations  
 32 enable the system to orchestrate and adjust its responses to a changing environment, and so to  
 33 maintain its viability. Conversation is a process, rather than a quality, so if we accept Pangaro’s  
 34 analysis, how can we then continue to use the noun ‘resilience’? In Beer’s Viable System Model  
 35 (Beer, 1972) the noun ‘viability’ is used in describing viable systems, but is not used to refer to a  
 36 quality that explains why a system in focus is viable. A similar usage for the noun ‘resilience’  
 37 avoids the reification of processes and leads away from dormitive explanations.

38 Dubberly and Pangaro (2009) discuss what designers can do to support the maintenance of  
 39 conversations, considering design in the broad sense set out by Simon: “Everyone designs who  
 40 devises courses of action aimed at changing existing situations into preferred ones.” (Simon 1996,  
 41 p.111)• . **Here** I consider how these preferred situations may be elusive if the design decisions of  
 42 managers and technologists constrain the possible conversations within a social system, and, by  
 43 doing so, threaten the system’s capacity to sustain its own viability.

### 44 **The link between neoliberalism and resilience**

45 At the largest scale, design decisions are taken which structure the conversations that determine the  
 46 conditions of the economy. The rise to prominence of the concept of resilience coincides with the  
 47 period of dominance of neoliberalism, and I argue that the two are closely entangled. Much has  
 48 been written about neoliberalism, and it is not possible to review that literature here. David Harvey  
 49 provides the following brief definition of neoliberalism, which will serve for present purposes:

50 ... a theory of political economic practices that proposes that human well-being can best be advanced  
 51 by liberating individual entrepreneurial freedoms and skills within an institutional framework

characterized by strong private property rights, free markets and free trade. The role of the state is to create and preserve an institutional framework appropriate to such practices. ... and to guarantee, by force if need be, the proper functioning of markets. Furthermore, if markets do not exist (in areas such as land, water, education, health care, social security or environmental pollution) then they must be created, by state action if necessary. (Harvey, 2005, p. 2)\*

A strand of critique of the concept of resilience has also affirmed a relationship between neoliberalism and resilience, including a sustained discourse in the journal 'Resilience'. For example, Joseph (2013, p51) concludes that "Resilience is best understood in the context of rolling-out neoliberal governmentality." Similarly Zebrowski concludes that "Resilient populations as such must be regarded as a particular enframing of life which arose as the correlate to neoliberal governance." (Zebrowski, 2013, p170). Youssef *et al.* explore this enframing, and argue that neoliberalism has brought about a shift in discourse from 'resistance' to 'resilience':

Building resilient subjects involves the deliberate disabling of the political habits, tendencies and capacities of peoples and replacing them with adaptive ones. Resilient subjects are subjects that have accepted the imperative not to resist or secure themselves from the difficulties they are faced with but instead adapt to their enabling conditions. (Youssef *et al.*, 2013, p.85)

The conviction of these authors that increased prominence of "resilience" during the rise of neoliberalism is significant is supported by Google's Ngram Viewer. Ngram Viewer has its limitations (Pechenick *et al.*, 2015)\* , but it nevertheless provides a broad picture of the relative use of use of words in published books in UK and US English (ignoring the popularity of those books).

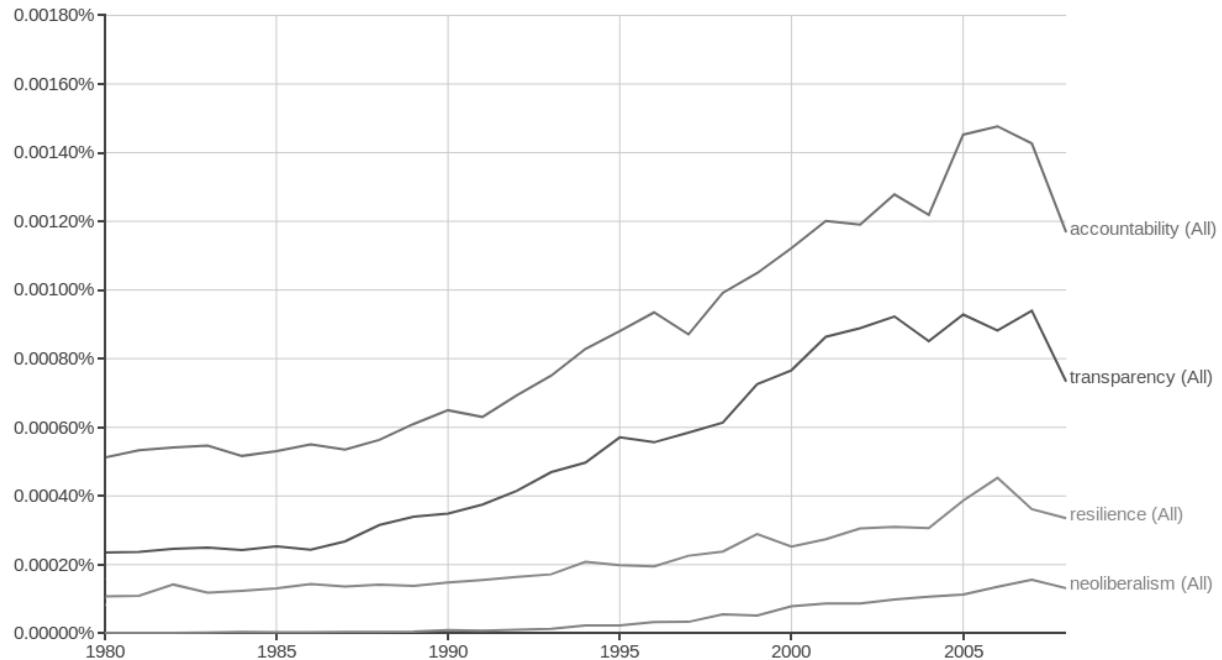


Figure 1: Use of the words 'neoliberal', 'resilience', 'transparency' and 'accountability', between 1980 and 2008 in British and American English. Source: Google Books Ngram Viewer, 5th January 2018

In figure 1 it can be seen that 'neoliberalism' starts to register in 1990, and from that date to 2008 the use of the word 'resilience' more than doubled, having previously been more or less stable for some years. The same is true for the words 'transparency' and 'accountability', which, I will argue below, are closely related to resilience. Between 2005 and 2008, the final date for the data provided, the use of all four words drops a little, in parallel. The graph does not show what, if any, causal relationship there might be between the four rises, but their common movement strongly suggests that the concepts are closely linked, and that it is worth examining how they are related.



## Resilience and competition

The first proposed relationship between neoliberalism and resilience is a simple one. Inherent in the neoliberal emphasis on markets is an increase in competition. Adam Smith himself provided the justification: “if any branch of trade, or any division of labor, be advantageous to the public, the freer and more general the competition, it will always be the more so.” (Smith, 2013)• . Increased competition in education, health and the job market, has led inevitably to increased pressure on individuals and organizations. If organizations or individuals are unable to cope with increased competitive pressure, then this is ascribed to a lack of resilience. As Neocleous argues

The neoliberal subject can “achieve balance” across the several insecure and part-time jobs they have, can “overcome life’s hurdles” such as facing retirement without a pension to speak of, and just “bounce back from whatever life throws at us” ... Neoliberal citizenship is nothing if not a training in resilience. (Neocleous, 2012, p.192)

From this perspective, the promotion of resilience as a necessary quality can be framed as an attempt to help individuals and organizations to survive the process of marketization without suffering too much damage. This help can be provided through effort and training. For example, Välikangas writes that “a company is as resilient as its ability to survive and thrive over multiple changes in its competitive environment” (Välikangas, 2010, p. 13) and proposes a process to increase organizational resilience. Similarly, school children and those with mental health problems are encouraged to increase their resilience (Mind, 2007)• , (Willis, 2016)• . This training may have value for the organizations and individuals who receive it. It should, however, be noted that this conceptual shift from social processes to the ascribed qualities present in individuals and organizations deflects responsibility for social and individual degradation onto those who suffer, and away from those who design those social processes, and, in particular, away from those promoting the neoliberal agenda. Regardless of this point, however, the cybernetic principles established in section 2, mean that any cybernetician, whatever their political or social views, should reject explanations which depend on a quality of ‘resilience’ situated in the individual.

## Resilience and transparency

The second link between neoliberalism and resilience concerns transparency and, by extension, accountability. Transparency, understood as the degree to which others can inspect the activities of an individual or organization, is associated with many positive aesthetic, social and political experiences. It can prevent bullying, corruption, and abuse, as well as facilitating understanding and collaboration, and improved standards in public life. Transparency is also an important theme for neoliberalism: “Markets are plagued by problems of information asymmetries, and there are incentives for market participants both to exploit and to increase these information asymmetries.” (Stiglitz 2009, p. 11). In response, many governments have made legal and policy interventions to increase transparency, with the fundamental purpose of “rendering greater discipline and accountability of policymakers and actors to the market.” (Rodan, 2006, p.198)• .

Transparency can be both an enabler of neoliberalism and an inhibitor of its negative tendencies. For example, in the UK neoliberal policies on the assessment of disabilities have been challenged and partially reversed by transparency on the cost of the private companies carrying out the work, the poor quality of their assessments, and the consequences for individuals (Walker, 2016). Similarly, David Attenborough’s BBC documentary ‘Blue Planet II’ provided “devastating footage of poisoned stillborn whales and turtles trapped in plastic bags has led to a public outcry, with consumers vowing to cut down on plastic waste and the UK government promising concrete action” (Bley Griffiths, 2018).

At the personal level, the popularity of social networks demonstrates that increased personal transparency can support communication patterns which many people value. Nevertheless, it is, by now, often recognized that personal transparency brings both benefits and problems, following the work of researchers such as Turkle, e.g. (Turkle, 2011)• , and legal interventions such as the Right to be Forgotten in Europe (European Parliament and Council, 2016).

Transparency, then, is inherently neither good nor bad. However, Lawrence Lessig, writing about political transparency, has argued persuasively that “We are not thinking critically enough about

1 where and when transparency works, and where and when it may lead to confusion, or to worse.”  
 2 (Lessig 2009, p.2) . It is argued here that the same is true of transparency in the internal processes  
 3 of organizations, and I now explore some perspectives on how the critical thinking requested by  
 4 Lessig might be achieved.  
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### 6 **Transparency and accountability**

7 Within political and other social systems, transparency is sought in order to achieve  
 8 ‘accountability’. Accountability, in its origin, simply refers to the rendering of accounts. To take an  
 9 ancient example, in the parable of the talents money is distributed, the recipients do with it as they  
 10 will, and after a year they are called to account for the results. Those who fail to perform to an  
 11 acceptable standard are punished. Investment bankers are in a similar position to their biblical  
 12 predecessors. Accountability therefore specifies and imposes transparency (financial results must be  
 13 reported), and the degree of autonomy of the actors (use of the money is an individual decision).  
 14 Citizens, and, particularly, professionals, are held accountable for their actions in a more general  
 15 sense. Politicians are accountable for their probity and the success of their policies. Parents are  
 16 accountable for their children’s attendance at schools, while teachers are accountable for the  
 17 children’s learning when they get there.  
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19 At issue here is not the existence of accountability, but rather the nature of the accounts, and  
 20 required transparency and constraints on autonomy which are required by and of managers,  
 21 employees and politicians. Key Performance Indicators (KPIs) have become ubiquitous as the  
 22 means of imposing transparency and accountability in management in the USA and UK, as well as  
 23 other countries. They were defined by Fitz-Gibbon at a relatively early stage of their deployment:  
 24

25 ... as an item of information collected at regular intervals to track the performance of a system.  
 26 Performance indicators (PIs) are collected in many complex systems which, like education, deliver a  
 27 service. Thus ‘near-misses’ are recorded to monitor air transport; the length of hospital waiting  
 28 queues is recorded by the Health service. (Fitz-Gibbon 1990, p.1)  
 29

30 Selective transparency is generated by KPIs, and this enables managers to control the activities of  
 31 the managed. The relevant questions for the present inquiry are how neoliberalism has changed the  
 32 reporting conditions for accountability, how the balance between specified autonomy and imposed  
 33 transparency has changed as a result, and what the implications of these changes are for resilience.  
 34 See Seddon (2008) for a valuable critique of these developments in public administration.  
 35

### 36 **Complicated and complex systems**

37 It may be noted that Fitz-Gibbon, above, describes both education and air transport as ‘complex  
 38 systems’. However, air transport is better conceptualized as a ‘complicated’ system. Snowden  
 39 (Snowden & Boone, 2007, table 1) describes complicated systems as requiring expert diagnosis,  
 40 and concerning “Cause-and-effect relationships, discoverable but not immediately apparent to  
 41 everyone; more than one right answer possible.” This describes well most of the issues that emerge  
 42 in air transport, which is effectively managed by computer algorithms, and where enhanced safety  
 43 has largely come from reducing the importance of human factors in running the system. ‘Complex’  
 44 systems, according to Snowden are distinct, involving flux and unpredictability, and “No right  
 45 answers; emergent instructive patterns... A need for creative and innovative approaches”. This latter  
 46 characterization is a better fit for the challenges of managing social systems such as education. In  
 47 Taleb’s terms, Fitz-Gibbon mistakenly saw education as a washing machine (complicated) when in  
 48 fact it is a cat (complex) (Taleb, 2012, p.56). Donald Schön warned of this danger of this error in  
 49 1983, referring to the solution of complicated problems as ‘Technical Rationality’.  
 50

51 From the perspective of Technical Rationality, professional practice is a process of problem solving.  
 52 Problems of choice or decision are solved through the selection, from available means, of the one best  
 53 suited to establish ends. But with this emphasis on problem solving, we ignore problem setting, the  
 54 process by which we define the decision to be made, the ends to be achieved, the means which may be  
 55 chosen. In real world practice, problems do not present themselves to the practitioner as givens. They  
 56 must be constructed from the materials of problem situations which are puzzling, troubling, and uncertain.  
 57 (Schön, 1983, p.40)  
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1  
2 By treating complex systems as if they were merely complicated, the ‘puzzling, troubling, and  
3 uncertain’ aspects of problem situations can be elided.

#### 4 5 **Social organizations as a network of black boxes**

6 Within a hierarchical social structure, the law of requisite variety (Ashby, 1958)• determines that  
7 not all the details of the functioning of the managed system can be exposed to the manager. There  
8 are therefore black boxes (Glanville, 2003)• within the system where action is taken independently  
9 of the manager’s control. Such boxes are not black because they are inherently impenetrable, as, for  
10 example, the interior of the nucleus of the atom was to Rutherford. Rather, their blackness is  
11 relative to the social position of the observer. For example, the operations of a kitchen may be a  
12 black box to a restaurant owner, but not to the chef that is employed to work there. It is such social  
13 black boxes that we are concerned with here.

14 Within black boxes, interpersonal and professional practices arise that maintain the viability of the  
15 organization by adsorbing the variety generated by the activities that occur within the black box. To  
16 take the example of education, teachers carry out many undocumented tasks which are invisible to  
17 educational managers, such as maintaining mental models of all their learners and adapting their  
18 communication with them accordingly, adapting learning materials to the learning needs of  
19 individuals or groups, responding to learners’ personal crises, or eliciting a positive social  
20 environment in the classroom. All these activities take place within a black box, as far as  
21 management is concerned.

22 Similar black boxes are present at each level of recursion of the system. Thus, the learners’  
23 activities outside the classroom are a black box as far as the teacher is concerned. The teacher may  
24 assign homework and study materials, but the learners have responsibility for maintaining a balance  
25 between the competing demands of different subjects while considering their own strengths and  
26 weaknesses, and for judging at what point their personal life should take precedence over an  
27 additional hour of study. Such decisions are beyond the capacity of a teacher, and in many cases  
28 ethically out of scope for the teaching profession. Similarly, a school is a black box as far as  
29 Ministers of Education are concerned. They have no ability to inspect work done by staff to build an  
30 effective and collaborative team, or to promote social cohesion in the school.

#### 33 34 **Models**

35 For a manager to make sense of the information emerging from a black box, she or he needs to have  
36 a model of the function of that black box. A model is an idealization, i.e. ‘a deliberate simplification  
37 of something complicated with the objective of making it more tractable’ (Frigg and Hartmann,  
38 cited in Heidl, 2016, p.164). Kühne (2005, p.2) summarizes Stachowiak’s description of how a  
39 model achieves this idealization (Stachowiak’s original is available only in German). Stachowiak  
40 argues that a model needs to possess three features:

- 41 • mapping feature: A model is based on an original
- 42 • reduction feature: A model only reflects a (relevant) selection of the original’s properties.
- 43 • pragmatic feature: A model needs to be usable in place of the original with respect to some  
44 purpose.

45 Thus, a model used to understand a black box itself implies a strategy for variety management (the  
46 ‘reduction feature’), and an implicit purpose (the pragmatic feature).

47 Returning to the example of education, as argued in Griffiths (2017) the models of the on-going  
48 activity within the system maintained by managers are not the same as those of the managed. For  
49 example, an educational manager may conceive of the black box of the classroom in terms of the  
50 ‘delivery’ of a course, achieved by presenting the learning materials in the right order, monitoring  
51 and correcting learners’ responses, and marking assignments. The teacher, on the other hand, may  
52 be concerned with remedial teaching to enable learners to handle the course material, and  
53 maintaining individual learners’ motivation. These and similar differences in understanding of the  
54 processes underway in a social system develop over time. They constitute an evolved response to  
55 the complexity of running a system which, like all social systems, involves the construction by  
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1 multiple actors of a disputed “process by which we define the decision to be made, the ends to be  
2 achieved, the means which may be chosen” referred to by Schön above.  
3

#### 4 **Black boxes and resilience**

5 It is the blackness of the boxes in social systems that provides the flexibility which is necessary to  
6 sustain the coexistence of contradictory models of the processes underway in social systems. In the  
7 example of teaching policy, variety equations make it hard, or impossible, for policymakers to  
8 perceive the problems of teachers and learners. These problems can be addressed in conversations  
9 between teachers and with learners that take place in an unrestrained way within black boxes,  
10 enabling responses to emerging problems to be developed and elaborated. For these conversations  
11 to take place, flexibility is needed in both time and activities. However, if the black box becomes  
12 transparent because of the introduction of management philosophies and methods informed by  
13 neoliberalism, then those active in the black box will be required to be accountable to management  
14 using a set of metrics to which financial value is eventually attached. The adjustments in the  
15 balance of reporting and autonomy which are designed while carrying out this process will not  
16 support conversations whose purpose is not perceptible from the standpoint of the manager.  
17 Such a suppression of conversation threatens the viability of the organization in two ways.  
18 Firstly, the capacity to compensate for error is reduced. In education, for example, policy may  
19 mandate certain pedagogic approaches to be taken in schools, but governments are unable to inspect  
20 the detail of teaching processes, and so policy edicts can be adapted to the realities of learners needs  
21 and teachers capabilities (see (Griffiths, 2017, p.122-123) for a discussion of the teaching of  
22 reading). Similarly, teachers can use their judgment in the application of institutional rules and  
23 norms in order to maintain learners’ engagement, while learners can ignore study advice if it is  
24 inappropriate to their circumstances. Increased transparency and accountability may make such  
25 adaptations impossible.  
26

27 Secondly, we have seen that Pangaro argues that conversations are the means whereby viability is  
28 maintained in the face of a changing environment. Black boxes enable multiple conversations to  
29 take place, generating multiple perspectives and interventions with which to meet the challenges  
30 generated by continual external change. A design initiative by management to increase transparency  
31 and accountability, without respecting the historically evolved network of black boxes that  
32 maintains organizational viability, is therefore likely to negatively impact on the resilience of the  
33 system.  
34

35 These considerations apply to all organizations, but are particularly severe in education, because  
36 those involved ascribe a wider range of purposes to the organization than the case in most  
37 institutions. These purposes include personal growth, employability, the award of qualifications in  
38 return for payment, the health of the economy and the preservation of national cultures. Many of the  
39 conversations and activities which take place to address these conflicting purposes are  
40 undocumented and take place in black boxes. Opening up these black boxes to management control  
41 based on a subset of educational purposes may be expected to suppress those undocumented  
42 purposes, and to suppress functions which are valuable to individuals and society.  
43

44 Constraints to the conversations within black boxes can be catastrophic. Outsourcing of government  
45 work to the private sector is in effect a dramatic reduction in conversation between government and  
46 those who carry out work in its name. In outsourcing, activities within the existing black boxes of a  
47 system are not made transparent, but rather completely eliminated, and replaced with other black  
48 boxes external to the system. Carillion was a company through which much of UK Government  
49 outsourcing was channeled, until it collapsed in 2018. A public report stated that the government  
50 had been “attempting to transfer risks that the government itself has completely failed to analyze or  
51 to understand. ... Government procurement has been driven by price while failing to appreciate  
52 differences in quality that contractors may be offering.” (House of Commons, 2018, p3). These risks  
53 had, presumably, previously been handled within black boxes in the civil service. The report also  
54 states (p19) that outsourcing was favored because “the debt does not have to be shown in the  
55 National Accounts or within the national debt.” As a result, conversations which could have  
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1 identified dangers were also avoided in parliament. The outsourcing model was intended to  
 2 guarantee value for money by exclusively focusing on cost, but the lack of conversations about  
 3 evolving risks, and the quality of work carried out, led to a collapse which left 57 construction  
 4 projects unfinished, worth a total of £5.7 billion, and £1.5 billion of debt (Barbour ABI, 2018).  
 5

### 6 **Computer networks as a managerial amplifier**

7 We have thus far discussed the methods of management and their impact on resilience. We now  
 8 need to discuss, if only briefly, the role of tools. The ever-increasing use of computers and networks  
 9 generates vast quantities of data and makes it available to the managers. This might appear to be an  
 10 inherently good thing: what could be wrong with obtaining more information about the system to be  
 11 managed? Indeed, this data opens up many exciting opportunities, and we can only be intrigued to  
 12 imagine what Beer and the Cybersyn team might have done with it (Beer 1981, chapter 4). The  
 13 problem is, however, that the data is partial, not only in the sense of being a subset, but also of  
 14 being biased because it is the result of design decisions, at two levels. Firstly, it is the managers of  
 15 the system, or their peers, who procure and control computer networks, and who decide what data  
 16 will be generated, and thus how the system to be managed will be represented to managers.  
 17 Secondly, tools are used to manage the increased variety which is generated by the flow of data,  
 18 through the use of analytics algorithms. These algorithms, designed by analysts in collaboration  
 19 with managers, are themselves models, in Stachowiak's sense above. The purpose of the algorithm  
 20 is precisely to reflect only "a (relevant) selection of the original's properties" (cf. Kühne (2005, p.2)  
 21 above), otherwise it would not provide variety reduction. The analytical tools used by managers  
 22 therefore have two layers of modeling which mold the representation of the system to be managed.  
 23 Computer networks can be designed in many configurations, including peer-to-peer. However, in  
 24 businesses and public administrations they almost universally constitute centrally controlled  
 25 hierarchies, and it is this class of models which is reflected in the data which is gathered and the  
 26 algorithms which are applied. Such models are unable to represent recursive variety management,  
 27 the task undertaken by Beer's Viable System Model, and Beer described the function of hierarchical  
 28 models as being "to apportion blame" (Beer, 1972, p201). On the contrary, the hierarchical model  
 29 encourages managers to use technology to maximize transparency, and to obtain data on potential  
 30 points of failure, which hitherto were inaccessible to managerial inspection. A striking example is  
 31 the use made of data by Bridge International Academies:  
 32

33 Teachers must ... run their lessons almost verbatim from the tablet's lesson scripts. Back at Bridge's  
 34 Nairobi offices and Massachusetts-based headquarters, all the data is compiled and analyzed. ...  
 35 Whenever teachers arrive late to school, miss a class, or even take too long to scroll through a  
 36 specific lesson, it's all tracked by Bridge's "Master Teachers"—the moniker given to members of the  
 37 company's analytic team—in nearly real time (Ross, 2014).  
 38

39 In this and similar systems a design decision has been taken to prevent Pangaro's "conversation in  
 40 social systems", while the black boxes which support recursive variety management have been  
 41 eliminated as far as possible. From a cybernetic perspective, therefore, resilience is gravely  
 42 threatened. The Bridge International Academies, and some other organizations taking a similar  
 43 approach, have nevertheless survived.  
 44

### 45 **Shifting the purpose of the system**

46 A full exploration of the apparent viability of Bridge schools would require an in-depth study. It  
 47 may be that there are more interactions and conversations than it appears from the reports, in other  
 48 words, there may be black boxes in the schools which are entirely invisible to the Massachusetts  
 49 headquarters. It may also be that the funding which Bridge International Academies receives, and  
 50 the socio-political context in which it is active, insulate it from pressures for the time being.  
 51 However, considering only the bare outlines reported, we can assert Beer's maxim that the Purpose  
 52 Of the System Is What It Does (POSIWID) (Beer, 2002). If the conversations which have  
 53 historically taken place in the black boxes of a social system are suppressed, and new activities are  
 54 imposed, then to this extent the system now does something different, and its purpose is changed. In  
 55 the face of a major change. such as teaching practice we have just discussed, it is reasonable to ask  
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1 if the resilience of the system has been enhanced by its adaptation, or if a system has been destroyed  
2 and replaced by something new. The answer may depend on how much we value a name, and on the  
3 viewpoint of the judge. One might ask for example, if the people delivering the classes for Bridge  
4 International Academies are teachers in the sense that the profession has previously been  
5 understood. A candidate explanation for the viability of Bridge International Academies, and for  
6 other initiatives using similar methods in different fields, is that they have taken a complex system,  
7 and replaced it with a complicated system in order to be able to deploy their preferred methods of  
8 control. In Taleb's terms, the educational cat, with all its contingency, creativity and  
9 unpredictability, has been euthanized, and replaced with a washing machine.  
10  
11

### 12 **Concluding remarks**

13 I have argued that increases in transparency and accountability, when deployed within a neoliberal  
14 context, impoverish the interactions of organizations, employees and stakeholders, concentrate  
15 problem solving at the pinnacle of the organization, and may gradually redefine the purpose of the  
16 organization. The neoliberal reform program frames the problems that emerge in terms of resilience,  
17 and seeks to promote resilience by exposing all actors to the Darwinian rigors of the market. It is  
18 argued here that, on the contrary, not only do some organizations fail to survive market competition,  
19 but also the strategies applied to promote participation in markets, i.e. the promotion of  
20 transparency and accountability, can themselves constrain the maintenance of viability in complex  
21 social organizations. Political and social action may be necessary to correct these problems.  
22 Nevertheless, the analysis presented contributes to a possible solution in two ways: firstly, by  
23 clarifying the need for the recognition of the hidden contribution to the maintenance of  
24 organizational and individual viability made by undocumented conversations and interactions, and,  
25 secondly, by showing the need for close analysis of the systemic contribution made by the  
26 conversations and interactions which take place in black boxes before opening up those black boxes  
27 to managerial accountability.  
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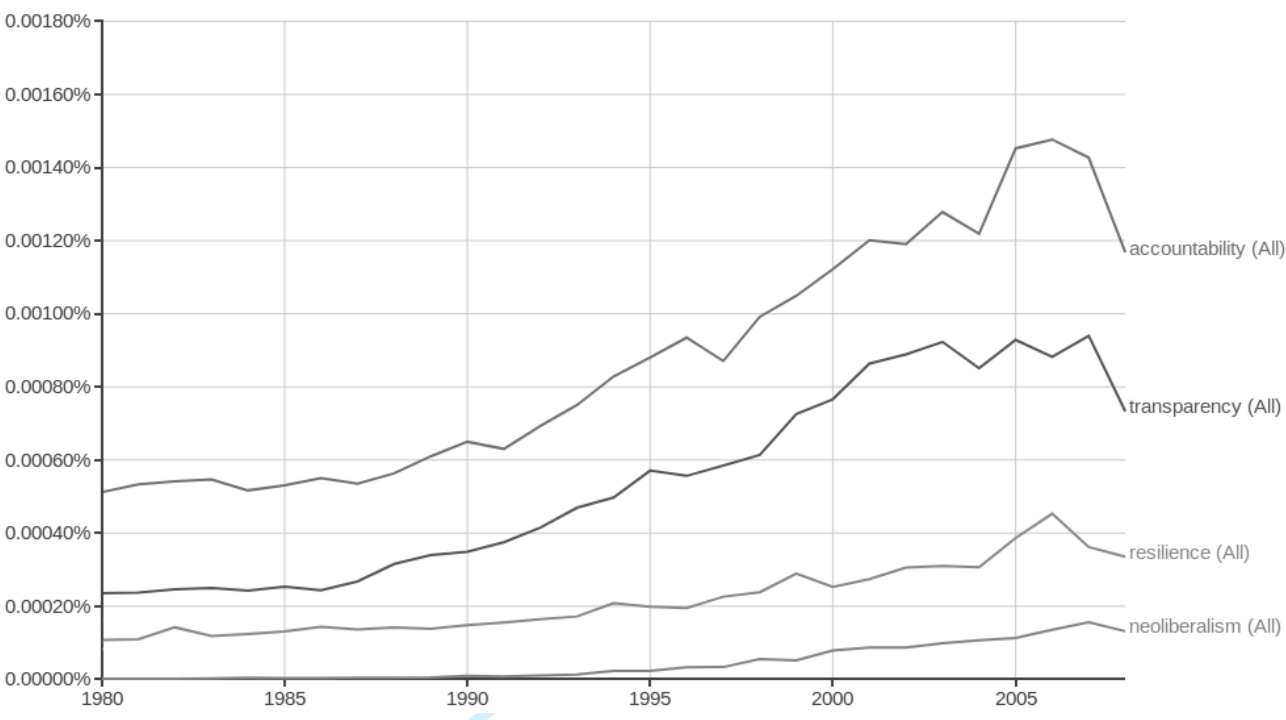
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