REVIEW ARTICLE

# Systemic Factors in Organisational Failures: A Review of some recent high-profile cases

*How astounding to speak of culture but never mention power, politics and ethics! (Rob Long)*

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ABSTRACT

This paper explores the various options for organisational structures by examining some high-profile incidents in the light of a number of theories that have been put forward to explain behaviours.

On first inspection, it might be concluded that a common theme emerging from studying the results of such organisational behaviours might be the slavish conformance to "acceptable" or expected "institutionalised" structures which stipulate impenetrable layers of middle management between the "sharp end" teams and the responsible executives and their governing Boards. This so called "clay layer" has been highlighted as a major factor in high profile incidents such as Challenger, Columbia, Chernobyl, Longford, Macondo blow out and many others .

However, on closer examination, there are other examples of corporate failures, (such as the Post Office computerisation scandal) which suggest that the "clay layer" in fact serves another purpose; to allow credible "deniability" for the controlling minds in difficult areas. The Health and Safety at Work Act 1974 maintains that the" person who was the 'controlling mind' of the organisation is personally responsible for the offence. This paper sets out to scrutinise whether these are borne out in practice. and urges that the design and application of organisational structures should be tailored to effective and ethical operation.

## Introduction

There is an assumption in the corporate world, that organisational structures are well designed and it's just how they are populated with supposedly fallible humans, that leads to the catalogue of corporate shortcomings, inadequacies and even avoidable disasters that they seem to perpetuate. Companies tend to rely on mimicking management structures from other companies that are "successful", and hence in fashion. There has been a range of improvements in the standard models suggested, such as quality circles[1], autonomous units, the usual fork model, democracy, etc. But if the structure does not fit the purpose of the company, or the people in it, it will fail. The health care system is under extreme pressure. This is not only because the demand has grown but also because over time several systemic issues have developed which makes it almost incapable of dealing with high and variable demand. This leads to long waiting lists, overcrowded wards, both in countries such as the Netherlands, where the health care system is privatized, and in the UK, where the health care system is a public service. This became especially apparent during the COVID pandemic waves but also as the current influenza season increasingly overloads the health system. A national post office service is not a bicycle factory, neither is a hospital or a health service and therefore should not be run as if it is[2].

## The Objective of this Study

The research question that this poses, is then, what aspects of the structures of these organisations cause them problems and whether there are any common patterns, or features, that emerge from studying a range of high-profile examples of organisational failures.

In *this* paper we have attempted to address this question and discern common features which could have predicted these outcomes. To do this, we have employed a systematic review approach to analyse a number of well reported events, involving a range of different organisations.

## The Approach adopted

To structure the analytical approach employed, in the paper we first trace the development of different theoretical interpretations of the organisational causes of underperformance and then examine each of the incidents to see if they exhibit the features implied.

From this review of the current theoretical approaches, a set of themes was extracted and denoted with an "identifier". For example, the key features identified by Vaughan in her identification of acceptance of "Normal Deviance" in organisational behaviours as responsible for the iconic NASA shuttle Failures were flagged as "ND", The full range of identifiers used is laid out in Table 1.

A set of high-profile cases was then identified from a literature review. The criteria for choice were that they were well known cases which were publicly available and relatively non-controversial, as the objective was to identify broad categories of behaviours rather than detailing individual responsibilities, actions, or lack of.

For each of these examples, what happened is not in dispute, although each analysis probably deserves a separate paper in its own right. The focus of the approach has been to see if there any pointers as to why these organisations performed as they did and what we can learn from this to design better organisations and organisational structures in future. This is particularly important at the moment, when the healthcare institutions are particularly hard pressed: and in the UK, new incidents keep surfacing as in the recent case of the Birmingham Hospital Trust[3]. The additional stresses and lessons of the recent COVID pandemic[4,5], require that now some serious thinking is needed as to how we design the organisational structures charged with managing future responses, better to support the "sharp end" medical teams and support systems.

Some 40 case studies were thus systematically reviewed, and the results summarised in the appendix listing the identified factors as playing a significant role in the observed behaviours and outcomes.

From this analysis, the frequency of occurrence of the various factors was plotted so as to highlight any patterns or surprises in the resulting plots.

1. Deming WE. Quality, productivity and competitive position. Cambridge: Massachusetts Institute of Technology; 1982. ISBN 0911379002.
2. Wallis N. The Great Post Office Scandal: the fight to expose a multimillion pound IT disaster which put innocent people in jail. Bath: Bath Publishing; 2021.
3. https://www.birminghammail.co.uk/news/midlands-news/calls-urgent-investigation-culture-toxicity-25660367 (as per 03/12/2022)

4 Slater D, Hollnagel E, MacKinnon R, Sujan M, Carson-Stevens A, Ross, A, Bowie P. A systems analysis of the COVID-19 pandemic response in the United Kingdom, Part 1, The overall context. *Safety Science*: 2022; 146: 105535. Doi.org/10.1016/j.ssci.2021.105525
5 Slater D. A Systems Analysis of the UK COVID 19 Pandemic Response: Part 2, Work as imagined vs Work as done. *Safety Science*: 2021; 146(8):105526. DOI: 10.1016/j.ssci.2021.105526

Finally, the resulting patterns are discussed as to whether perhaps a more basic underlying pattern emerges.

## The Historical Background

Ever since humans began organising themselves into structured groups to achieve a common purpose, there has been an understandable desire to determine which of these structures was most effective. This became increasingly important after the industrial revolution enabled these groups to control ever increasing centres of intensive machinery and energy hazards[6]. Although most of the unwanted incidents could be ascribed to expected slips trips, falls and misadventures, the sheer scale of the enterprises and the concentration of potential energy they "managed", meant that sometimes catastrophic consequences ensued, which clearly needed more careful organised supervision than had been normal for hired labour.

Le Coze[7] in his excellent review and reconciliation of the debate between Perrow's view of accident causation[8] and the analyses by Hopkins[9] examines the proposition that we should regard industrial accidents as "normal"; and points out that it had been suggested[10] that as early as the 19th century, such happenings had come to be accepted as inevitable: thus challenging the traditional oversimplistic causality explanations. "Train crashes were indeed described by some as the products of complex systems which men could not anticipate, while others vigorously then, as now, opposed this interpretation."

It took much longer for the "safety" profession to finally switch from assigning blame to individual components and people at the sharp end, to realising that perhaps the organisation itself might be at fault. A seminal book on the Aberfan mine spoil heap disaster by Turner[11],questioned the effectiveness and inertias associated with the conventional organisational structures that ran the industries.

The Three Mile Island event, however triggered the thought[12] that there were things that were outside management's control. Some processes and operations were, Perrow suggested, simply too complicated as they involved high energy, were tightly coupled and fast moving and therefore would inevitably at some point, exceed the capacity of the operators to respond. He thought that the traditional organisation should be restructured to become more responsive and resilient. He proposed that decentralisation of expertise and responsibility was desirable: i.e. that more responsibility and expertise should be devolved down to the "sharp end".

This view of the inevitability of accidents in complex systems was resisted from two angles, first it was suggested that it was possible to build "Highly Reliable Organisations"[13], an idea that resonates with people today. And secondly the widening of the debate, with important contributions coming from sociologists, notably Sagan's[14] and Vaughan's[15] telling analysis of the Challenger and Columbia incidents, tracing the lack of communication and awareness (also called Turner's information deficit) between the different levels of management.

Hopkins[16] had also been studying a number of high-profile incidents and totally rejected the idea that accidents should be accepted as inevitable and "normal" as an excuse. He thought that perhaps the emphasis on decentralisation had led to some loss of control and understanding about what was happening at the sharp end. So, he underlined the view that the structure of the organisation needed to respond to the task. He also pointed out that these structures were often determined by the "Culture" of the organisation in question.

This led to a wide range of contributions about how to define and instil the changes needed to create the right kind of culture which presumably, in turn, would engender the right stuff and structure in the organisation.

6. Swuste P, Van Gulijk C, Zwaard W. Safety metaphors and theories, a review of the occupational safety literature of the US, UK and The Netherlands, till the first part of the 20th century. *Safety Science*: 2010;48: 1000–1018.

7. LeCoze JC. Crisis Development: Normal Accidents and Beyond. Oxford Research Encyclopedias: 2022: https://oxfordre.com/politics/view/10.1093/acrefore/9780190228637.001.0001/acrefore-9780190228637-e-1557 (as per 18/11/2022).

8. Perrow C. Normal Accidents: Living with High-Risk Technologies. New York: Basic Books; 1984.

9. Hopkins A. The Limits of Normal Accident Theory. *Safety Science*: 1999; 2: 93 – 102.

10. Bonneuil C, Fressoz JB. The Shock of the Anthropocene: The Earth, History and Us. London: Verso; 2013.

11. Turner B.. The Organizational and Interorganizational Development of Disasters. *Administrative Science Quarterly*: 1976;21(3):378–397. CiteSeerX 10.1.1.393.67. doi:10.2307/2391850. JSTOR 2391850.

12. Perrow Charles. Normal Accidents: Living with High-Risk Technologies. New York: Basic Books; 1984.

13. La Porte TR, Consolini PM. Working in Practice But Not in Theory. *Journal of Public Administration Research and Theory*: 1991; J-PART; 1: 19-48.

14. Sagan S. The Limits of Safety. Princeton: Princeton University Press; 1993.

15. Vaughan D. The Challenger Launch Decision: Risky Technology, Culture, and Deviance at NASA. University Of Chicago Press: 1996. ISBN 978 0226851761.

16. Hopkins A. Lessons from Longford. London: Blackwells; 2002. ISBN 9781864686883.

**Table 1** Key features of LeCoze's timeline and the competing theory identifiers used

| Year | Author | Theory | Critique | Layers | Basis | Acronym |
|---|---|---|---|---|---|---|
| 1911 | Heinrich | Human Error | Blame the operator | Micro | Behaviour based Safety | HE |
| 1978 | Turner | Information Deficit | Too general? | Meso, Macro | Aberfan | ID |
| 1984 | Perrow | Normal Accident Theory | Devolution of responsibility | All | 3 Mile Island | NAT |
| 1989 | Roberts | Highly Reliable Organisation | Military only | Micro, Meso | Aircraft Carriers | HRO |
| 1990 | Reason | Internal Barriers | Defence in depth | Meso, Macro | Management systems | SCM |
| 1993 | Sagan | Competing Theories | HRT vs NAT | All | Deadlock to dead end | HRT |
| 1996 | Vaughan | Normalisation of Deviance | Unheeded | All | Challenger and Columbia | ND |
| 1999 | Snook | Practical Drift | Friendly Fire | All | Rasmussen drift? | FF |
| 2002 | Hopkins | Organisational Culture | Centralisation of decisions | All | Longford, 3 Mile Island, Macondo Well, et al. | CEN |
| 2010 | Downer | Epistemic Theory | Pro Perrow | All | Black Swans | BS |
| 2012 | Pritchard | Envirotechnical Disasters | Complex Perrow interactions | All | Fukushima | ED |
| 2020 | LeCoze | Post Normal Accident | Rationalization of approaches | All | Literature Review | PN |
| 2022 | Farjoun | Systemically Induced Inaction | Dysfunctional Organisations | Meso | Clay Layers (or SII) | SII |
| 2022 | This Paper | Deliberate Design | Plausible deniability | Macro | Inquiry immunity | PD |

LeCoze in his review[17], covers these arguments more thoroughly and comprehensively, so they will not be rehearsed further here, but he brings together a number of other contributions and ideas from the wider field of studies. These include the Epistemic Accident by Downer[18] the Environmental Disaster by Pritchard[19]and finally the Post normal Accident by LeCoze.

To quote LeCoze: "Post Normal Accident presents itself as a new narrative which suggests taking stock, historicising and revisiting the seminal text for our contemporary epoch in the 21st century. To take stock consists in finding common ground across authors' discussions, historicising entails a sensitivity to the change of context between the late 20th and 21st century, and revisiting implies an analysis of its contemporary implications for high-risk systems."

The theories treated by leCoze and to be tested for relevance have been given an identifying acronym shown in Table 1, which summarises the LeCoze timeline. This paper then attempts to proceed by studying a range of incidents, shown in table 2, to

see which, if any, of these theories seems to explain or has been a factor in the incident. Each case study from the set chosen, has been analysed against a common template and the summaries attached as Appendix 1.

The results are shown as a histogram of the frequency of occurrence of these relevant factors.

The discussion then addresses the implications of these patterns in the results shown, on the effectiveness, or otherwise, of the organisational structures involved.

**The Approach**

Our objective in this paper then is to explore real life organisational behaviours which have resulted in problems and to check systematically the relevance of the various theoretical propositions as explanations of the observed outcomes. To this end a range of high-profile incidents where there is considerable background information and authoritative treatises and /or, of which the author has had direct experience, have been studied.

17. Le Coze JC. Post Normal Accident. Revisiting Perrow's classic. Boca Raton: FL CRC Press, Taylor & Francis; 2020.
18. Downer J. 737-Cabriolet: The Limits of Knowledge and the Sociology of Inevitable Failure. *American Journal of Sociology*. 2011;117(3):725-762.

19. Pritchard S. An Environmental Disaster: Nature, Technology and Politics at Fukushima. *Environmental History*: 2012;17:219 – 243.

The list chosen is shown in Table 2

**Table 2** – The case studies chosen

| Study case | Organisation involved | Type of Structure | Organisation Objective (WAI) | Incident happened (WAD) |
|---|---|---|---|---|
| Boston Spotlight | Church | Feudal | Pastoral care | Child abuse scandals |
| Covid care homes | Gov't Dept | Civil Service | Caring for the vulnerable | Unnecessary Deaths |
| Grenfell cladding | Gov't Dept | Civil Service | Maintenance of building standards | Cladding Fires |
| Visas backlog | Gov't Dept | Civil Service | Immigration Control | Afghanistan deaths |
| Post Office prosecutions | Gov't Agency | Pseudo Corporate | Delivering a profitable Mail service | Innocent employees convicted of fraud |
| NASA Shuttle Losses | Gov't Agency | Pseudo Corporate | Maintaining leadership in Space | Unsafe launch vehicles |
| Ockenden Midwives | Gov't Department | Pseudo Corporate | Ensuring safe deliveries | Unnecessary baby deaths |
| Valproate misinformation | NHS | Pseudo Corporate | Providing essential medicines | Drug side effects ignored |
| MMR take up | NHS | Pseudo Corporate | Promoting vaccine take up | Insensitivity to parental concerns |
| Contaminated Blood | NHS | Pseudo Corporate | Ensuring safe supplies of transfusion plasma | Unnecessary suffering |
| UK Pandemic Response | Gov't | Pseudo Feudal | Protection of society against Pandemics | Utilitarian life / death choices |
| Manchester Arena Response | Gov't Department | Pseudo Corporate | Responding to Civil Emergencies | Failure to respond promptly |
| Ambulance crisis | Gov't Dept | Pseudo Corporate | Responding to emergencies | Inability to ensure adequate response |
| Testing Laboratories and PPE Supply | Gov't Dept | Civil Service | Purchasing vital supplies of emergency supplies | Equipment / services Incapable of performing safely |
| Grenfell fire response | Gov't Dept | Pseudo Corporate | Responding to emergencies | Unable to respond adequately |
| Regulatory independence | Gov't Agency | Corporate | Enforcing Regulations | Water company breaches |
| Child abuse | Local Gov't | Local Civil Service | Child care | Ignoring of abuses |
| Chernobyl miscalculation | Gov't Agency | Civil Service | Keeping Nuclear Reactors running | Unauthorised, unsafe procedure resulted in meltdown |
| Fukushima | Gov't Agency | Corporate | Utility management | Failure to allow for known environmental hazards |
| Bank Crash | Gov't and Agencies | Corporate | Ensuring Financial stability | Ignoring of clearly risky and probably fraudulent mortgage lending practices |
| Hudson River landing | Gov't Dept | Corporate | Specifying safe performance criteria | Bird strike takes out both engines |
| Boeing 737 max 800 | Private | Corporate | Ensuring reliable safe aircraft | Unsafe modification |
| Flixborough work arounds | State Owned Companies | Corporate | Maintaining Nylon monomer production | Unaware of consequences |
| Rogue Trader | Private | Financial Inst. | Making money by investing funds legally | Unaware or condoning of illegal trading |
| 3 Mile Island | Private | Corporate | Producing power | Operators confused |
| Bhopal work arounds | Multinational joint venture | Corporate | Manufacturing agri-chemicals | Tolerance of degraded safety systems |
| Longford missing expertise | Multinational joint venture | Corporate | Processing offshore gas | Local operators unaware of design constraints |
| Macondo remote responsibility | Private | Multinational Corporate | Exploring for new oil reserves | Substandard services result in loss of platform |
| Queensland Mine | Private | Corporate | Selling Coal | Failure to observe safety standards |
| Herald of Free Enterprise | Private | Corporate | Running Ferries | Refused requests for safety interlock resulting in the loss of ship |

| Children's Hospital, Boston | Private | Corporate | Caring for sick children | Failed to intervene |
|---|---|---|---|---|
| Friendly Fire | Military | Agency | Waging war | Failed to identify own helicopters |
| Columbia imagery | Gov't | Agency | Ensuring launch vehicle safety | Failed to flag up damage to shuttle tiles |
| Exxon Valdez | Private | Corporate | Transporting crude oil safely | Ran onto the rocks |
| Seveso | Private | Corporate | Producing fine chemicals | Poor design and operation poisoned the Italian countryside |
| Grangemouth | Private | Corporate | Safely producing refined petrochemicals | Fires and explosions |

The chosen selection is however, limited by the availability of authoritative details and hence somewhat arbitrary and confined to highly visible events, which, by default, tend to be in the public sector. Details of similar private sector events and near misses are less well documented and often unreported on confidentiality grounds. Nevertheless some 40 incidents are included as representative of a range of organisational types and application. A more detailed summary of these cases studied is given in Appendix 1 Of particular interest is the rationale behind the structures involved and their demonstrable performances/ effectiveness.

For each incident therefore, the, what happened, how and why are inferred from public domain publications, accepting, not reinvestigating the details. The aim is to classify the underlying reasons as illustrative of one or other of the postulated theories in Table 1. It also attempts to identify any critical behaviours in a particular level in the organisation, (Micro, Meso, Macro), although in a complex sociotechnical system such as a public sector, or commercial organisation, it is inevitable that the behaviour in any one layer is interactively affected by activities in the others.

The research question then is to see what a fresh 21st century view can shed light on, or can find patterns in, or correlations between, the different approaches developed to date, perhaps by spreading the scope still wider to include the contemporary political nuances as well as social and technological considerations.

**Results**

The Appendix Table 2 lists the case studies and flags the competing concepts highlighted in the LeCoze review. The first result of note then, is to recognise the frequency with which each of the key elements of these competing theories occur, bearing in mind that in each case, a number of these interpretations apply. The results are shown below in Figure 1.
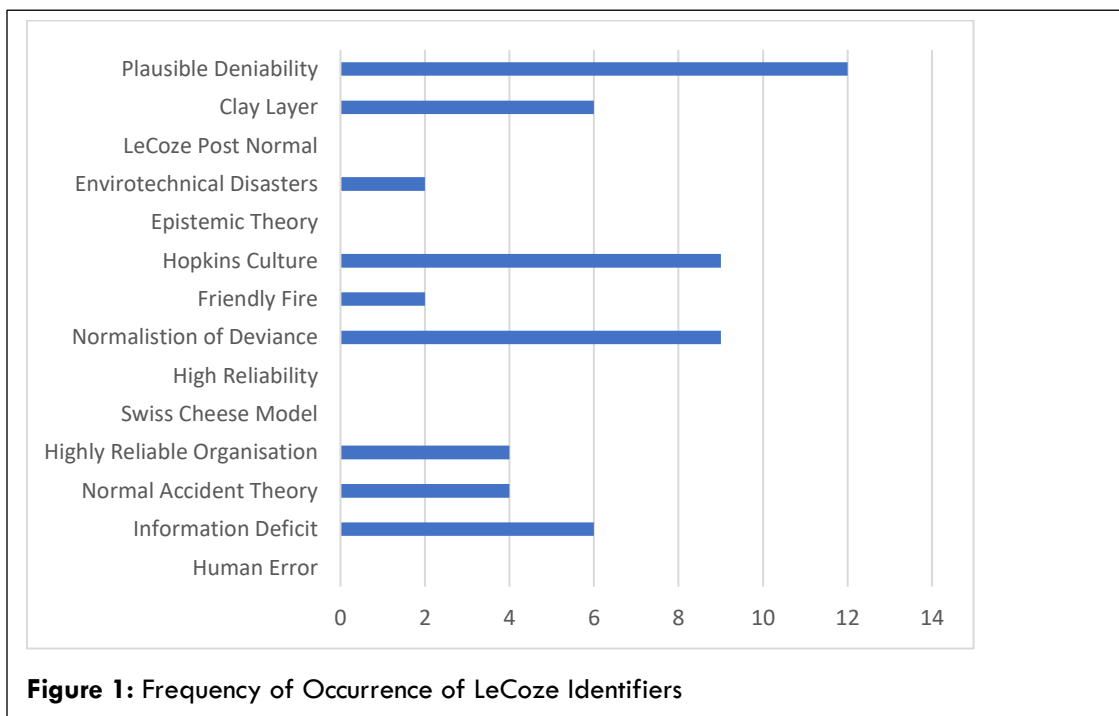


**Figure 1:** Frequency of Occurrence of LeCoze Identifiers

The table shows also that there were only really two types of structures involved. These are Feudal and Pseudo Feudal (i.e., Civil Service Departments) and Corporate and Pseudo corporate (i.e., Government Agencies).

The second point noted was that almost all the organisations studied here had the classic 3-layer structure typified by the NASA organisation (Figure 2)



**Figure 2.** NASA 3-layer structure for the: Go No go Decision to launch Challenger
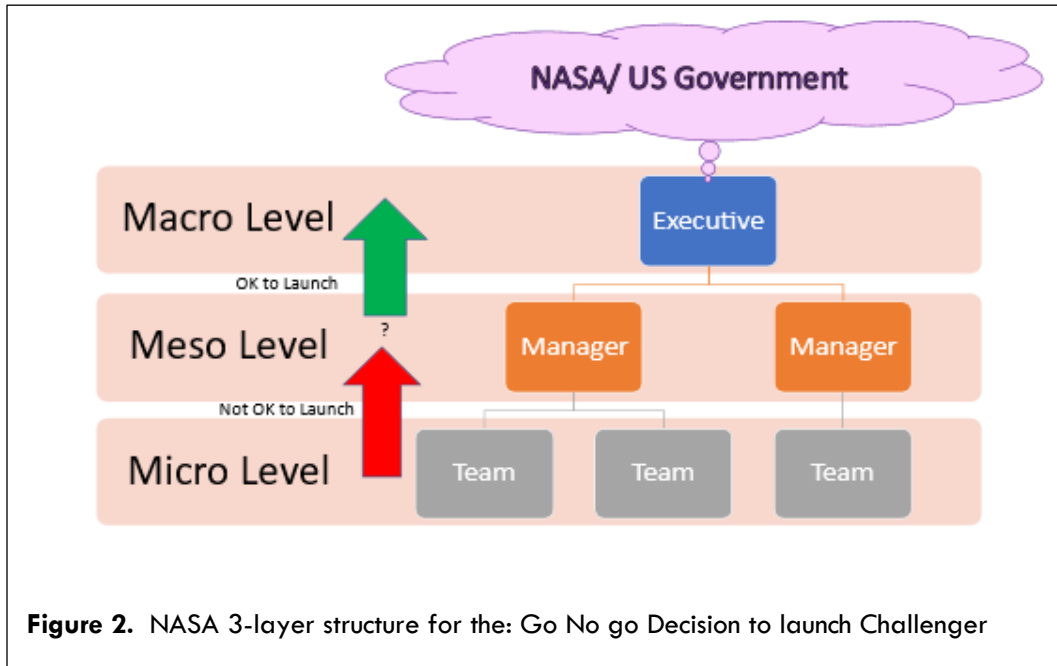
These, as will be discussed later, are multi (-typically three) layer "Peter" pyramids, consisting typically, of Micro (coal face), Meso (management level) and Macro (Executive oversight) layers respectively. This structure has a number of drawbacks that are identified in the different themes.

To operate as a "Highly Reliable Organisation", an organisation needs to empower and trust its expert and adaptable teams to ensure continuing successful operations. However, as Hopkins points out, in some of the accidents it is clear that the organisation needed a more centralised control over what was happening. So, there are clear examples of tensions which need to be recognised and reconciled in designing the shape of organisation best suited to that application.

Common themes

These theoretical "causes" of organisational failures, (Figure 1) also appear to fall more conveniently into groups which attempt to summarise the debates which the LeCoze review highlights.

For example: -

- **"Human Error"**, rationalised here as genuine mistakes made in relatively straightforward applications in complicated, but not incomprehensible systems, happen and are often presented as contributory "causes" of the incidents.

- On the other hand, there were very few examples of what could be regarded as genuine Perrow **"Normal" accidents.** Perhaps the 3 Mile Island meltdown (although disputed by Hopkins) and Chernobyl could count as representative.

These examples have been counted together as **system induced errors**.

The opposing solutions urged by Perrow and the HRO espousers, which are, on the one hand, **decentralisation**, and Hopkins' cultural **centralisation** on the other, are also incompatible and the case studies illustrate examples where each would be an appropriate model.

- The Flixborough, Bhopal, Longford and Macondo well blow out, are examples where clearly the centre was not fully aware of what was happening, and Hopkins must be right in calling here, for an organisational culture requiring better awareness and control from the top.

- Unfortunately, there are other examples from the public sector in particular, (Contaminated Blood, Manchester Arena, Grenfell fire response, Ockenden Midwives), where there is clearly too much centralisation; and where the local personnel's natural common-sense instincts were overridden.

On the 3-layer model there is a clear conflict for the middle layer in these contexts.

- Do they empower their operating teams as an HRO, or
- do they have to have clear lines of centralised veto control and authority, which need to be satisfied before action can be contemplated?

The choice again requires a clear knowledge of what the organisation is designed to achieve. (Can they have both?) This grouping has been categorised, perhaps too vaguely, after Hopkins, as Organisational **Culture (with two subdivisions Centralisation and Decentralisation)**

Making the management layer too dominant can have other effects on the organisation. Turner's **Information Deficit** and Vaughan's **Normalisation of deviance** are key contributors to the kind of Rasmussen drift that can happen when complacent organisations push the limits of their competences. It could also be argued that more centralisation could increase the density of the Meso level; and this is perhaps why Hopkins is keen to ensure that the "culture" of the organisation is as responsive and responsible as possible. These over dominant meso cases have therefore been counted together as a separate new category.

Similarly, one can lump together, the various theories which illustrate the difficulty, by design, or default, of transparently enabling the whole organisation to appreciate exactly what's happening in the real world. Thus, we can group, Vaughan's Normalisation of Deviance, and Clay Layers[1] into the useful catch all phrase (courtesy Farjoun[20]) of *Systemically Induced Inaction.*

Another aspect which emerges as an issue, is that in some of these Normal Deviation / Systematically Induced Inaction cases, there are examples, where the different layers could be thought to be focussed on delivering different objectives. This is exemplified by the situation, often found in private corporates, where the frontline is assured by the management that "Safety is our number one priority". This is despite the executive assuring the Board and shareholders that their fiduciary duties naturally take precedence. So, if there is a conflict, which really takes precedence?

Also, in public sector healthcare organisations, on the frontline, the physicians are supposed to be bound by the Hippocratic oath to safeguard the individual patient's best interests. At Government or State level, budgetary and funding realities impose utilitarian ethics to guide policy makers[21]. So, in local life or death decisions, do organisations override the physician's obligatory deontological ethics? And is that policy accepted or acceptable? Cases where this kind of conflict was apparent have been grouped together as *Conflicting Layer* cases.

Lastly it is seen that a common feature of many of the public sector inquiries, (Grenfell[22], Contaminated Blood)[23] is that although the inquiry will often unambiguously identify mistakes at the operational level, it seems that no one at the top of the organisations feels it necessary to accept responsibility or concede that they should have had knowledge of what was going on. As this is very convenient and seems to be a common pattern, it is treated as yet another special and useful case of categories such as Clay layers, SII etc. For purposes of this analysis, this extra category is termed *Deliberate Design.*

Figure 3 lists these amalgamated groupings suggested above, together with the observed frequency of occurrence in the case studies chosen. This with the breakdown between the public and private sectors shown in Figure 3. Although we should note that by far the dominant feature when you include all these last 3 subgroups together is this systematically Induced Inaction, or the design flaw is having this supposedly impenetrable Meso level to produce the effects observed or desired.

20. Starbuck WH, Farjoun M. Organization at the limit: Lessons from the Columbia Disaster. Oxford: Blackwell Publishing; 2005.
21. Ale BJM, Slater DH, Hartford DND. The ethical dilemmas of risky decisions. *Risk Analysis*: 2022;1–15. https://doi.org/10.1111/risa.13893.
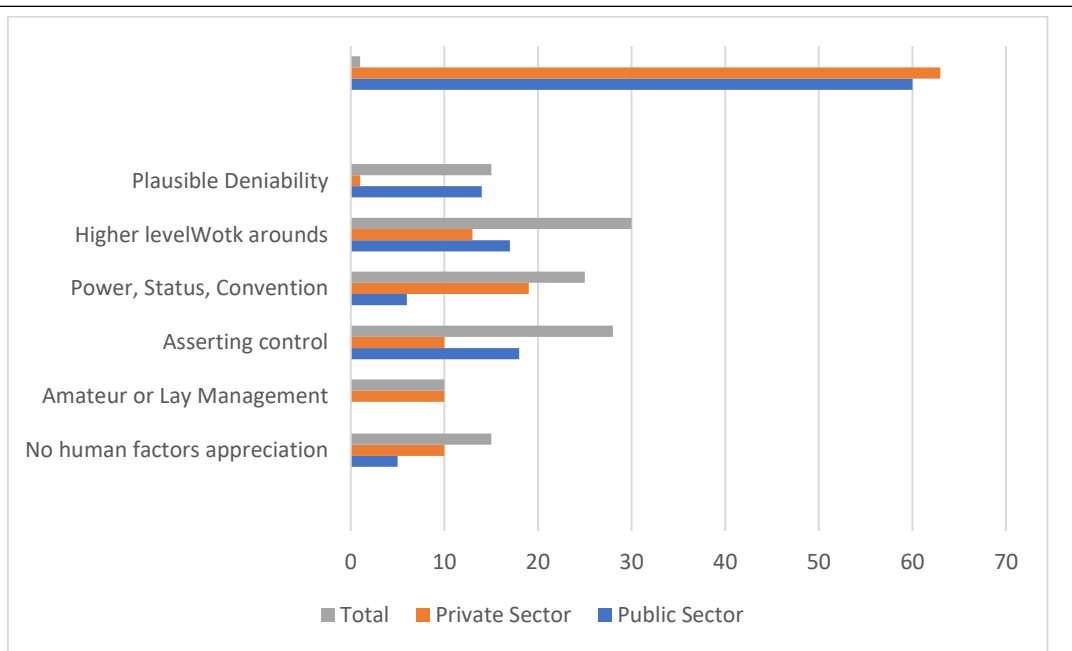
22. Moore-Bick M. Grenfell Tower Inquiry Phase 1 Report. REPORT of the PUBLIC INQUIRY into the FIRE at GRENFELL TOWER on 14 JUNE 2017. Crown Copyright; 2019. ISBN 978-1-5286-1602-7.
23. https://www.infectedbloodinquiry.org.uk/: infected blood inquiry (as per 03/12/2022).
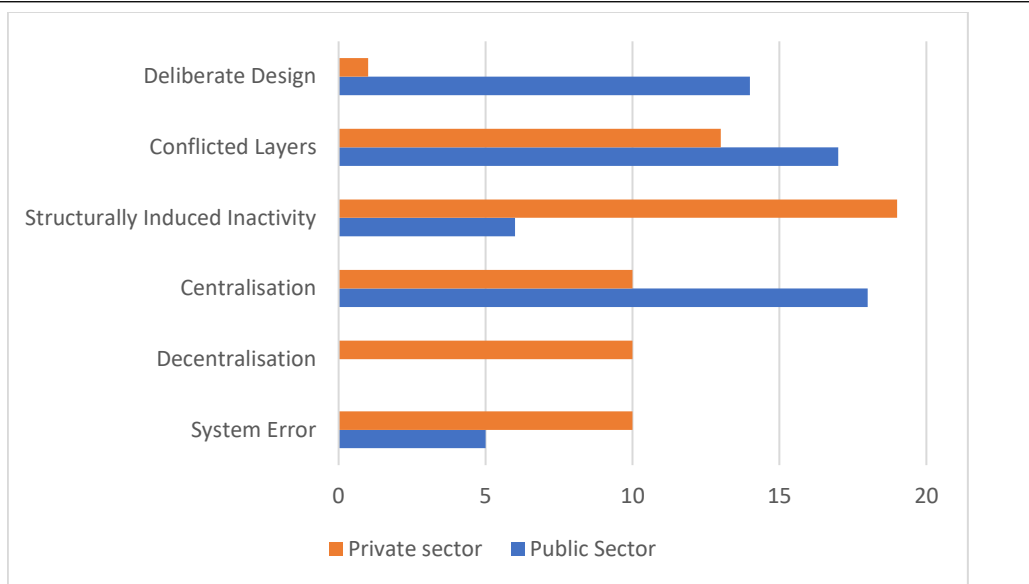
**Figure 3:** Observed Contributing Factors % Breakdown by Sector



**Figure 4:** Reasons for adopting structures

A further inspection of the case studies then suggests a range of reasons why the particular structures that caused the problems observed, were instituted. (Figure 4)

The final result which is of interest is to see if there is any pattern as to the involvement of individual levels in the organisation, or particularly culpable layers involved. Figure 5 shows that the organisational layers identified as "responsible"

are somewhat evenly spread and shows breakdown in the public and the private as well)!

Summarising these results, suggests that the underlying "causes" then, seem to fall into three broad categories.

1. Where the lack of centralisation, control and management awareness was an issue
2. Where over centralisation caused an insensitivity in the meso layer, whether by

culture, inertia, or conflicted demands from above and below, and

3. Where an organisation was apparently deliberately designed to provide insulation, or plausible deniability for the "controlling minds" (ref)

From the analysis here, the dominant characteristic of the majority of incidents, (some 80%), lies is in category 2 – they were due to the behaviour of the meso layer.

Inspection also suggests that in some 10% of these cases, (primarily in the public sector), it could be thought of as due to deliberate design.

Finally, cases of "rogue" operators and credible human error explanations of incidents seem, perhaps contrary to current expectation, noticeably less frequent (some 20%).

But in all cases, it was felt that the design of the organisation in question, was the major factor. The implications of these findings are discussed more fully below.

**Discussion**
*History – social constructs /power / survival / evolution*
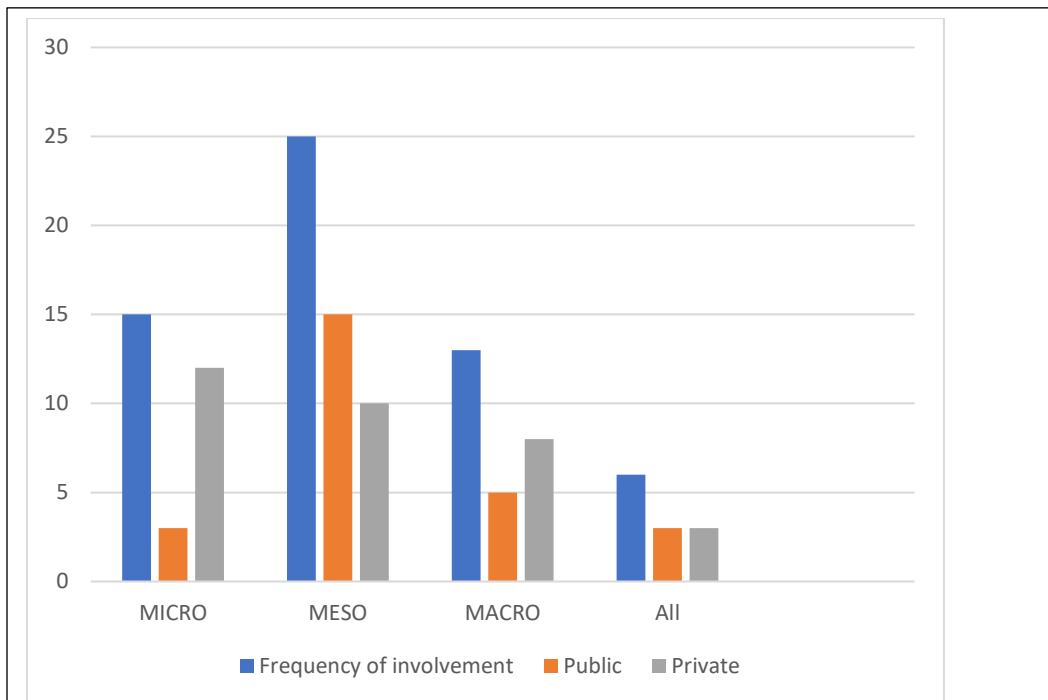


**Figure 5:** organisational layers identified as "responsible"

Ever since humankind started to form social groupings of any size, there has always seemed to be a "natural" way that they organised themselves into sustainable societies. These tended to depend on clearly defined roles for leaders, elders, and actual implementers. (Or leaders, acolytes and followers). Many examples could be given to illustrate this, from tribal structures, to modern organisations. This has underpinned many of the feudal, class and caste systems that developed worldwide; both in primitive and more advanced societies. The Chinese model of emperor, mandarins and people is of this type. The ubiquity of this model

testifies as to its robustness and the necessity of these functions for survival and the human psyche.
This structure illustrates the stability of the base and the efficiency of a single point of decision making and responsibilities. But another aspect of this structure is the possibility it offers for advancement from lower to higher levels, as far as opportunity, or competence allows. Thus, the middle layers tend to get clogged with passed over, frustrated, or defensive "mediocre" performers, possibly promoted to their level of incompetence (the well-known Peter Principle[24]). But the stability of the pyramid depends on the quality of the top-down

24. Peter LJ, Hull R. The Peter Principle. New York: William Morrow & Co Inc; 1969. ISBN: 0062092065

direction and the object of the system is to preserve and maximise the ability of the leader to perform. The viability of the whole system thus depends on the leader's effectiveness. Thus, this is the centre of power, patronage, and status, rewarded accordingly by the beneficiaries.
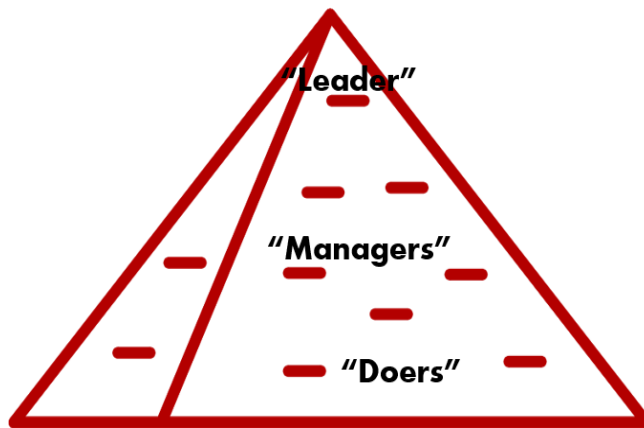


**Figure 6:** Pyramidal organization model

This then begs the question of what is an organisational structure for? Is it to deliver the objectives of that society, or to service the leadership in the hope of achievement? In most of these examples it is difficult to separate these objectives as they tend to be mutually complementary; and if they are effective then there is no need to distinguish them.

But Dr Peter suggests that perhaps this model should be inverted – and leaders feel less like Pharaohs. ( (Peter)ref). If achieving an objective is the goal, then in finding the most efficient way possible to achieve specific goals, the performance of the base is more important. In organisational terms what role should a "CEO" perform. Is he a Pharoah, or an Emperor, or should he be more of an orchestral conductor, or a Premier league football manager? In these latter cases the quality of the results produced, is achieved by the team as a whole and the status of the manager is dependent on performance, not position. This is the opposite of the conventional pyramid structure and is inverted so that the needs of the team to perform successfully as a team, are paramount. In this structure, the leader and support functions service the needs of the teams, (not the other way round?), who are thus empowered to get the job done. Perhaps this is best represented as an inverted pyramid (Figure 7)[25]. Military training and operational structures often reflect this more focussed approach.

25. Peter LJ. The Peter Pyramid: Or, Will We Ever Get the Point? New York: William Morrow and Company; 1986. ISBN 978-0688053802.

**Figure 7:** The "Premier League" Pyramid
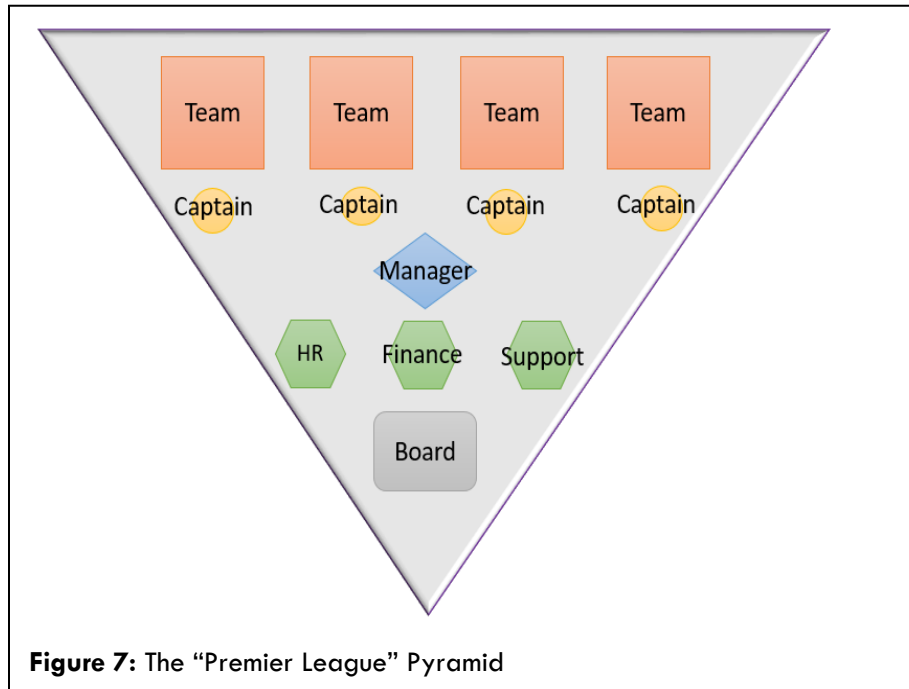
Finally, considering the performers / operators/ team members – are they, should they be, best empowered, or constrained, Robots, or Problem Solvers? In the inverted pyramid, the adaptability of the teams is as important as its formal expertise. It does not rely solely on top-down instructions.

Unfortunately, there seems to be problems of scale in the viability of these more focussed, structures. There seem to be limits to the size of the teams that can be orchestrated, above which, they become unmanageable and unstable. This is most common in organisations transitioning from entrepreneurial start ups to established companies. On the other hand, there seems to be no limit to the size of normal pyramidal structures that can be stably constructed: other than the implications of the corresponding increase in volume and density of the middle levels. Some would quote the example of the excessive number of layers deemed responsible for some of the problems (not least cost effectiveness) of the UK's National Health Service and its seeming inability to control costs and meet targets[26].

Another issue arising is that these conventional, multi-layered pyramids can result in the intervening "clay layers" becoming exclusive societies; selfish, closed shops. The mid-level positions also seem to provide a common career path across a range of areas. These are then a pool of professional, generalist, middle managers, not particularly experienced in the details of different contexts, but expected to lead or participate in key organisational activities, regardless of context[27].

This culture then seen from the bottom of the pyramid would seem to be somewhat opaque, perhaps amateur, alien, and confusing. Could this be deliberate or by default? But one thing this structure certainly adds, is inertia. This slows down response times and impedes transmission of learnings and the building of organisational resilience.

Perhaps because of the complexity and socio-political aspects of this ubiquitous type of management structure, early attempts at analysis focussed, like early safety studies, on identifying failures in components and isolated sub systems. They then necessarily missed the full interactions and interdependencies of these management functions and layers. But almost more importantly they missed the crucial sociological input necessary, as these are archetypal sociotechnical and thus almost by definition complex systems.

So, to try to analyse the behaviours from this more holistic point of view, we need to put it in the much broader context of what any particular organisation is set up to do. What is its objective? What's it for? What is it supposed to be doing, overtly or covertly: to rule a kingdom, to deliver a

26. Syed M. Clapped out: Is the NHS broken? Channel 4 Documentary, https://www.channel4.com/programmes/clapped-out-is-the-nhs-broken-dispatches/on-demand/72600-001 (as per 03/12/2022)

27. Rezvani Z. Breaking the clay layer: The role of middle managers in safety management. PhD Thesis. Delft: TU Delft; 2018. ISBN 9789461868855, https://doi.org/10.4233/uuid:2e988560-de75-4933-8b6b-f52b31289423

service, or to run a professional or commercial business?

But these organised groups have other more subtle, unadmitted objectives. Perhaps, as a power base, or personal wealth generator; as a status symbol, or an advancement ladder. So, on this basis, how does it reward its operators, how does it discipline or train its people? Is the system designed to deliver, or designed to protect and promote its leadership? If the latter, then does this imply that some failures are normal, necessary, expected, and tolerated? The reaction of the organisation to these normal excursions will be telling.

**The insights gained from this study**

On first inspection, it might be concluded that a common theme emerging from studying the results of this set of organisational behaviours might be that there is a slavish conformance to the kind of historically "acceptable" or expected "institutionalised" structures described above. These encourage impenetrable layers of middle management between the "sharp end" teams and the responsible executives and their governing Boards. This so called "clay layer" has been highlighted as a major factor in the incidents such as Challenger, Columbia, Chernobyl, Longford, Macondo blow out, etc. There are, as has been reviewed helpfully (leCoze, loc. cit.), a wide range of speculative theories as to what is responsible for the revealed shortcomings of high-profile organisations in high profile incidents. Paradoxically, Hopkins' centralisation, or "culture" model is designed to encourage the authority of the "normal" pyramid structure; while HRO, decentralisation and empowerment initiatives to improve adaptability and resilience, would seem to argue for the more unconventional "Premier league" model (Figure 7). The differentiator as to which was successful and which caused problems, appeared to be clear. It was revealed by identifying which layer had the core, critical expertise and necessary resources (the Meso layer in the "Centralised" structure, or the Micro or subcontractor levels in the fully "Decentralised" structures). In cases like Flixborough, Bhopal, Longford, Texas City, Chernobyl, Macondo, etc. there was clearly too much decentralisation, while in the responses to the Manchester Arena bombing and the Grenfell Tower fire the centralised "culture" meant that the "sharp end" was not empowered enough to adapt to unexpected circumstances and complications.

It quickly became apparent on inspection, however, that the theories are not mutually independent or exclusive. Human Error as envisaged by Heinrich[28] is always identified and blamed and so is omitted as a significant differentiator of observed effects. Similarly, Turner's Information Deficit, Vaughan's Normalisation of deviance and Farjoun's[20] Systemically Induced Inertia, are all symptoms of the impermeability of the Meso or Clay layer? As to whether this is by default, or design, is an interesting debate. It is then a question of whether this supposed impermeability is unconsciously culture driven (the way we do things around here!), or consciously designed (a comfortable buffer).

However, on closer examination, there are other examples of corporate failures such as in the cases of the Post Office and the Metropolitan Police) which suggest that this "clay layer" in fact, serves another purpose; to allow credible "deniability" for the controlling minds in difficult areas. In the UK's Health and Safety at Work Act 1974 the person who was the 'controlling mind' of the organisation is held personally and criminally responsible for the offence. The results are clearly seen in the now acceptable reaction of CEO's and Ministers refusing to take responsibility and resign, or even apologise in some cases.

This paper had set out to scrutinise whether these interpretations can be inferred and borne out in practice. The results of the analysis have suggested that such design motives,(e.g. plausible deniability), could be thought to force opaqueness and the level of ambiguity necessary to resolve impossible conflicts in practice – such as the duty of Boards to have the shareholder interests - maximising profitability – as their number one priority, while the duty of middle management appearing to assure the teams that their safety is really their (the organisation's number one priority.

Similarly, the front-line healthcare professionals consider themselves bound by Hippocratic principles, the so-called deontological approach, whereas their management superiors are tasked to make judgements for the greater good, the utilitarian approach. The clay layer provides this necessary, convenient and encouraged buffer to enable the illusion that either is paramount depending on political context.

Hence these organisations seem consciously, or unconsciously designed to inhibit communication and awareness in both directions. In the examples, such as the UK Post Office scandal, this can lead to tragic and inexcusable outcomes.

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28. Heinrich H, Cranniss E. Industrial Accident Prevention, a Scientific Approach. New York: Graw Hill Book Company; 1959.

## Conclusion

From the overall pattern of the events studied in this paper, it is clear that most, if not all, of the contributing factors and features identified by different authors over the past 100 years, are present to a greater, or lesser extent in the observed behaviours of conventional organisations, whether appearing to operate quite successfully, or experiencing very public setbacks. These are often identified as specific issues centred on key functions, sub systems and levels in the organisation. But what is too often neglected in historical speculation on the "causes" of organisational failures, is the overall social environment in which these sociotechnical systems are operating. These sociological considerations of Power, Status seeking, Risk — Reward and ethical issues, provide the underlying drivers for the choice and adoption of particular architectures, and contextual behaviours. The authors though not sociologists, have attempted to identify where such sociological approaches can be seen to add this much-needed overall system behaviour dimension required. Vaughan's work on the situations at NASA that failed to adapt to diagnosed behaviours, so that the tragedy repeated itself, is an excellent illustration of the need for this extra dimension.

To quote Farjoun[20]:

"The Columbia disaster resulted from complex interactions of technology, organisation, policy, history, environment and production pressures. Such complexity is not unique to NASA. Mason and Mitroff[29] argued that "organised complexity" is an ordinary property of policy and other real-world problems. and a key characteristic of interconnected systems. Unlike "tamed" problems that can be bounded and managed. "wicked" problems have no identifiable root causes, and they involve uncertainty, ambiguity, conflicts and social constraints[30]. "Wicked" problems resist attempts to tame them. Thus, although complexity elicits our curiosity, we should be modest about our ability to comprehend and manage it".

These sociological factors are well known and have always been dominant, often conflicting issues in human behaviour. Even to the lay person, the Peter principle and Pyramid models explain much of the current structures and behaviours in society.

Explaining why such systems and organisations fail is definitely a "wicked" problem. These, less than perfect, organisational structures must provide perceived "social" benefits, that seem to more than offset the occasional mishaps and frequent inefficiencies and setbacks consequent on their adoption.

There have been attempts to design organisational structures that address some of these issues. The Buurtzorg[Error! Bookmark not defined.] approach to organising healthcare and some of the examples (mainly military) of Highly Reliable Organisations point the way. If the objective is performance of the teams, (e.g., orchestras, football teams), the leadership approach needs to be very different to that of the typical government minister, or CEO interested in personal poll ratings, or stock values.

The conclusion one is forced to draw, is that many large organisations are not designed to maximise overall performance and are not necessarily constructed to single-mindedly achieve the required objectives most effectively and efficiently. The social needs of stakeholders, executives and society result in an almost selfish priority for other, more personal, needs of those who decide how to go about it.

Put in these terms, it is difficult to see the current managers, executives, shareholders, public servants and politicians foregoing the benefits bestowed by classical three-layer, class, feudal or Peter Pyramid structures involved in these incidents. On this basis it might even be expected that with these structures, incidents are bound to be inevitable, even if not admitted as Perrow's "Normality". So, if we want to improve the observed pattern of (mis)behaviours perhaps we should insist that organisations should be (re)designed for effectiveness and efficiency (profitability), such as in the "Buurtzorg" example, rather than to provide the, no doubt much appreciated, but unforgivable, insulation in case of failure.

It will take time to restructure these services to be less focused on intensifying managerial constructs, but a refocus on what the organizations are supposed to do and create circumstances in which the professionals can do their job rather than satisfying the control needs of the managerial layers is necessary to assure that the health system can cope with future winter strain and the unavoidable reoccurrence of pandemics.

29. Mason R, Mitroff I. Complexity: The nature of real world problems. In Bob de Wit B. Ron Meyer R. Eds. Strategy Synthesis. Stamford: Thomson Publishing; 2003: 26-36.
30. Rittel HWJ; Webber MM. Dilemmas in a General Theory of Planning. *Policy Sciences*: 1973; 4 (2) 155–169. doi:10.1007/bf01405730. S2CID 18634229. Archived from the original on 30 September 2007.Reprinted in Cross, N., ed. Developments in Design Methodology. Chichester, England: John Wiley & Sons; 1984: 135–144.

APPENDIX 1
*Table 1*

| Factor | LeCoze Acronym | Frequency of citing |
|---|---|---|
| Human Error | HE | 0 |
| Information Deficit | ID | 6 |
| Normal Accident Theory | NAT | 4 |
| Highly Reliable Organisation | HRO | 4 |
| Swiss Cheese Model | SCM | 0 |
| High Reliability | HRT | 0 |
| Normalisation of Deviance | ND | 9 |
| Friendly Fire | FF | 2 |
| Hopkins Culture | CEN | 9 |
| Epistemic Theory | BS | 0 |
| Envirotechnical Disasters | ED | 2 |
| LeCoze Post Normal | PN | 0 |
| Clay Layer | CL | 6 |
| Plausible Deniability | PD | 12 |

| Contributory Issues | Needs | Reasons for adopting | Public Sectc | Private Sectc | Total |
|---|---|---|---|---|---|
| Human Error | HRO, SII | No human factors appreciation | 0 | 1 | 1 |
| Decentralisation, Anarchic | Centralization Hopkins Culture | Amateur or Lay Management | 1 | 7 | 8 |
| Centralisation, ID, | Direct links through layers, | Asserting control | 14 | 12 | 26 |
| Structural Induced Inactivity | Overcome ID, ND,CL, | Power, Status, Convention | 9 | 20 | 29 |
| Conflicted Layers | Resolution of Policy, Integrity mismatch | Higher level Work arounds | 15 | 9 | 24 |
| Deliberate Design | Transparency of accountability | Plausible Deniability | 11 | 1 | 12 |
| | | | 50 | 50 | 100 |



Frequency of Occurrence of LeCoze Identifiers



Observed critical features of outcomes



Reasons for adopting structures



Observed Contributing Features % Breakdown by Sector

Table 2

| | Case Studies Examined | Public Sector | Issues | | | | | | Layers responsible | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | SE | DCN | CEN | SII | CON | DD | | |
| 1 | Boston Spotlight | x | | | 1 | | 1 | 1 | Me | Institutional denial of abuses |
| 2 | Covid care homes | x | | | 1 | | 1 | 1 | Me | Deliberate decision to release untested patients into care homes |
| 3 | Grenfell cladding | x | | | 1 | | 1 | 1 | Ma, Me | Issuing unsafe safety standards |
| 4 | Visas backlog | x | | | 1 | | 1 | 1 | Ma, Me | Unable to process visas in time (Afghanistan) |
| 5 | Post Office prosecutions | x | | | 1 | | 1 | 1 | Ma, Me | Knowingly prosecuting innocent people |
| 6 | Challenger Launch | x | | | 1 | 1 | 1 | | Me | Ignoring seal warnings |
| 7 | Columbia Imagery overlook | x | | | | 1 | 1 | | Me, Mi | Failing to follow up on prior insulation damage warnings |
| 8 | Friendly Fire | x | | | 1 | 1 | | | Me, Mi | Confusion between units through fatigue |
| 9 | Ockenden Midwives | x | | | 1 | | 1 | 1 | Me | Responding to pressures to reduce expensive C section operations |
| 10 | Valproate misinformation | x | | | 1 | | 1 | 1 | Me, Mi | Withholding vital information on hazardous side effects |
| 11 | MMR take up | x | | | 1 | 1 | | 1 | Me, Ma | Insistence on multiple vaccinations against perceptions of side effects |
| 12 | Children's Hospital, Bristol | | | | 1 | | 1 | 1 | Me | Inadequate monitoring of post operative outcomes |
| 13 | Contaminated Blood | x | | | 1 | | 1 | 1 | Me, Ma | Purchase and continued use of contaminated blood for transfusions |
| 14 | UK Covid Pandemic Response | x | | | 1 | | 1 | 1 | Ma | Failure to prepare and delays in reacting to global warnings |
| 15 | Manchester Arena Response | x | | | 1 | 1 | | | Me, Ma | Applying inappropriate preplanned response |
| 16 | Ambulance crisis | x | | | 1 | | 1 | 1 | Me, Ma | Ambulances kept tied up as temporary solutions to under resourcing. |
| 17 | Testing Laboratories and PPE Supply | x | | | 1 | | 1 | 1 | Me, Ma | Billions spent on contracting inappropriate suppliers, too little, too late |
| 18 | Grenfell fire response | x | | | 1 | 1 | | | Me, Ma | Inappropriate preplanned response |
| 19 | Regulatory ineffectiveness | x | | | 1 | | 1 | 1 | Ma, Me | Environment Regulator unable to clean up river pollution |
| 20 | Child abuse | x | | | | 1 | 1 | 1 | Me | Continued patterns of failure to protect children |

Table 2 continued

| | Case Studies Examined | Public Sector | Issues | | | | | | Layers responsible | Comments |
|---|---|---|---|---|---|---|---|---|---|---|
| | | | SE | DCN | CEN | SII | CON | DD | | |
| 21 | Chernobyl miscalculation | x | | 1 | | 1 | | | Mi | Local workforce unknowingly causing catastrophic plant failure |
| 22 | Fukushima safety case | | | | 1 | | 1 | 1 | Me | Tsunami hazards underestimated |
| 23 | Bank Crash | | | 1 | | | 1 | 1 | Me | Implication of dubious practices unappreciated and uncontrolled |
| 24 | Hudson River landing | | | | 1 | 1 | 1 | | Me | Safety standards for bird strikes unrealistic |
| 25 | Boeing 737 max 800 | | | | 1 | 1 | 1 | | Me | Inappropriate delegation of authority to approve a commercial fix |
| 26 | Flixborough work arounds | | | 1 | | 1 | 1 | | Me | Local workforce unknowingly causing catastrophic plant failure |
| 27 | Rogue Trader | | | 1 | | 1 | 1 | | Mi | Inadequate supervision of trading activities |
| 28 | 3 Mile Island confusion | | | | | 1 | 1 | | Mi | Local workforce unknowingly causing catastrophic plant failure |
| 29 | Bhopal work arounds | | | 1 | | 1 | 1 | | Me | Local workforce unknowingly causing catastrophic plant failure |
| 30 | Queensland Mine complacency | | | | 1 | | 1 | | Ma | Management ignores safety issues |
| 31 | Longford missing expertise | | | 1 | | | 1 | | Ma | Local workforce unknowingly causing catastrophic plant failure |
| 32 | Macondo remote responsibility | | | 1 | | 1 | 1 | | Ma | Over reliance on delegating operational responsibilities to contractors |
| 33 | Texas City contractor management | | | 1 | | 1 | 1 | | Ma | Inadequate coordination of multinational acquisitions |
| 34 | Piper Alpha safety case | | | | 1 | 1 | 1 | | Me | Desiggn of platforms ignored riser hazards. |
| 35 | Buncefield safety case | | 1 | 1 | | 1 | | | Mi | Consequences of knock-on effects of explosions unappreciated |
| 36 | Brazilian Dam complacency | | | | | 1 | 1 | | Ma | Inspection criteria not commensurate with the hazard. |
| 37 | Herald of Free Enterprise pressures | | 1 | | | | 1 | | Ma | Management ignores request for safety interlocks, or warnings |
| 38 | Exxon Valdez risk analysis | | 1 | 1 | | 1 | 1 | | Me | Management decision to run single hulled tankers through known hazards. |
| 39 | Seveso design issues | | | | | 1 | 1 | | Me | Consequences of safety valve operation unappreciated. |
| 40 | Grangemouth FCCU explosion | | | | 1 | 1 | 1 | | Me | Previous review warnings not followed up |

ACRONYMS: SE: System Error; DCN: Decentralization; CEN: Centralization; SII: Structurally Induced Inactivity; CON: Conflicting Layers; DD Deliberate Design; Ma: Macro level; Me: Meso level; Mi: Micro level