From information mismanagement to misinformation – the dark side of information management

Merlin Stone, Eleni Aravopoulou, and Geraint Evans
St Mary's University, Twickenham, London, UK

Esra AlDhaen
Ahlia University, Manama, Bahrain

Brett Parnell
Pcubed Consulting, London, UK

Abstract

Purpose

This paper reviews the literature on information mismanagement and constructs a typology of misinformation that can be applied to analyse project planning and strategic planning processes to reduce the chances of failure that results from information mismanagement. The aim of this paper is to summarize the research on information mismanagement and provide guidance to managers concerning how to minimize the negative consequences of information mismanagement and to academics concerning how to research and analyse case studies that might involve information mismanagement.

Design/methodology/approach

Literature review accompanied by conceptual analysis.

Findings

Information mismanagement is widespread in organizations, so all those involved in managing and researching them need to be far more aware of the damage that can be done by it.

Research limitations/implications

The research is based upon Western society (Europe and North America). The same research should be carried out in other parts of the world. Also, all the case studies could usefully be investigated in more depth to apply the taxonomy.

Practical implications

Managers should be much more aware of their own and others' tendencies to mismanage information to their own benefit.

Social implications

Stakeholders in public sector activities, including citizens, should be much more aware of the tendency of government and the public sector to mismanage information to justify particular policy approaches and to disguise failure.

Originality/value

The taxonomy on information mismanagement is original, as is its application to project planning and strategic decision making.

Keywords

Misinformation, lies, project management, programme management, strategic planning, bias, denial.

Article Classification

Conceptual paper.

Introduction

There have been many recent examples of what we call "dark side information behaviour" (DSIB), but no reliable studies of its frequency or severity of impact, partly because there is no accepted taxonomy of DSIB or way of measuring it or its impact. However, the increasing focus on the incentives operating on managers, stimulated partly by the rise of organizational and behavioural economics and finance (e.g. Kahneman *et al*., 1991), and related aspects such as agency theory (e.g. Eisenhardt, 1989), has led to the creation of many tools to identify and analyse DSIB. Environmental factors, such as the deregulation of financial markets, the globalization of trade, the collapse of communism and the increasing incidence of outsourcing, have increased incentives to engage in DSIB and the ease of doing so. Meanwhile, insistence of regulators on stronger disclosure has led to many revelations that would not otherwise have taken place.

Academic researchers are hampered in organizational DSIB, compared to, for example, research into consumer DSIB. While consumers may admit to certain kinds of DSIB, or organizations may release information about the DSIB of their consumers (e.g. fraud), it is less likely that managers questioned about their own DSIB will be honest. Those whose DSIB is most extreme may be best at concealing it! However, in the age of the Internet, piecing together case studies of managerial DSIB is easier, due to the many public domain sources readily accessible. Individually, they might not reveal DSIB, but put together, particularly when researchers know what they are looking for, they can present a very different picture.

Known unknowns and the world of Rumsfeld

Before analysing the literature and case studies, we need to explore issues relating to what protagonists (those inside organizations involved in making decisions) and other stakeholders knew – or did not, before, during and after the initiative (plan or project where the DSIB is alleged to have taken place, and what analysts (those viewing the situation from the outside) know or knew. Issues include:

- What was knowable at the time
- Analysts' wisdom in retrospect (what analysts later found out about the situation)
- Protagonists' wisdom in retrospect (what protagonists later admitted or denied about the situation, perhaps in response to others' wisdom in retrospect - their response might range from denial or reengineering of the facts to honesty)
- The balance/contrast between analyst and protagonist wisdom (one's word against another's)

The latter three issues will be explored mainly in the context of the literature and the individual case studies, but the first merits a short section of its own.

Donald Rumsfeld, then US Secretary of Defense, stated at a 2002 press conference that "……we know there are known unknowns; that is to say we know there are some things we do not known. However, there are also unknown unknown – the ones we don't know we don't know." Although he was mocked by some at the time, he was making a serious statement reflecting common issues in risk and project management (U.S. Department of Defence, 2018). In fact, it is more complicated than Rumsfeld suggested. If we take the first "unknown" as referring to protagonists' knowledge of whether there is something to be known i.e. whether there is an area, situation etc. that protagonists need to know about, and the second unknown as referring to what there is to be known about that situation i.e. the details of the knowledge, then there is a third possibility (apart from the obvious fourth, the known known i.e. protagonists know that there is an area or situation that exists and know the details of it). This is the unknown known, an area or situation of which the protagonists do not know the existence or the importance of which they do not understand, but its details and/or importance are known to others - but not to protagonists. They may be known to third parties - analysts, competitors, governments, the people within the situation, but not by protagonists or decision-makers.

This four-way classification is best represented by Table I, as below

Table I. A typology of misinformation

What there is to be known	**Unknown**	Protagonist knows about the area but does not know the data that describes the area or arises from it	Protagonist does not know about the area, nor do third parties

	Known	Protagonist knows about the area, knows the data about it	Protagonist does not know the area exists, but third parties do
		Known	**Unknown**
		Whether known to the protagonist	

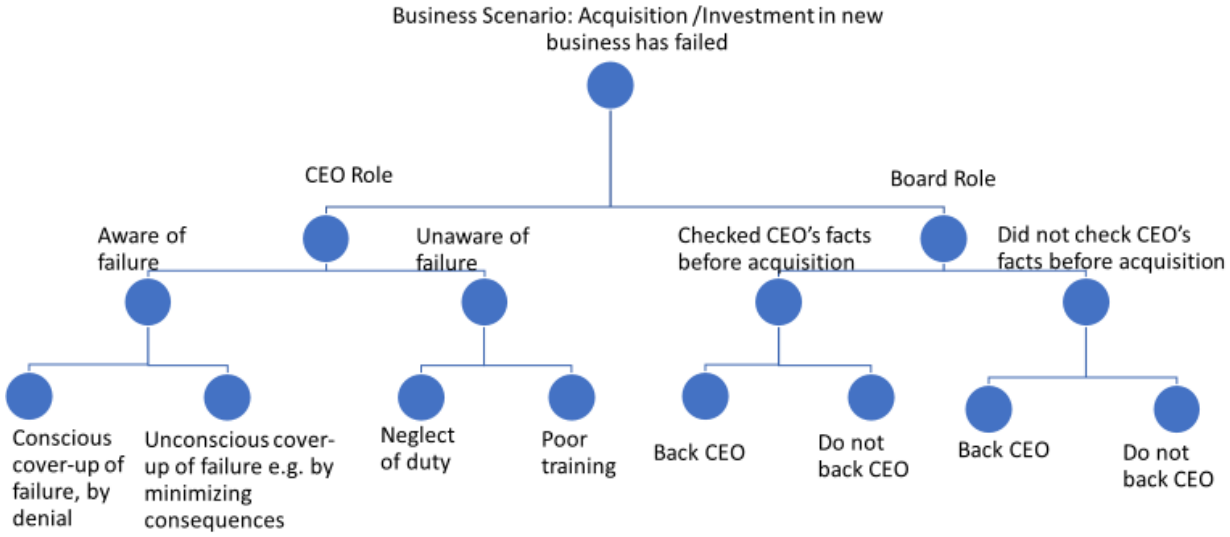
Source: The authors

The unknown known is often the refuge of perpetrators of DSIB, in forms such as "but we had no idea at the time that this was even a problem", "this was a completely unintended consequence, which we did not even consider a risk", or "I was never told about this area, although I discovered later that my people knew about it". In these areas, data mining and artificial intelligence and machine learning may be helpful. For example, if a health service manager might want to find areas of risk, while not knowing what these areas are, systems can be used to identify and learn about possible problem areas, such as high death rates in particular areas or hospitals (e.g. to know them), overcoming the problems caused by health services being assessed using quality standards based on "known knowns" (Beaussier *et al.,* 2016). When this information is communicated to the manager, it then becomes a known known. Using the idea of unanticipated consequences as an excuse has been legitimised by writing about unexpected events, or "black swans" (Taleb, 2007). However, in some cases, a supposed "black swan" is really an example of poor risk analytics or poor risk management (Paté-Cornell, 2012; Aven, 2015).

The situation is more complicated than shown in Table I, for several reasons:

- In practice the known/unknown distinction is rarely binary, but a continuum from completely unknown, to suspected but not known, to part known, to known but not in detail, to known in detail. Some risks may be emerging, perhaps deriving from a new phenomenon e.g. a pattern of behaviour, and so perhaps unknown, partly known or even just suspected by different parties (Renn, 2014; O'Rourke, 2016). Emergent risk is particularly important in the insurance industry, where failure to spot and mitigate emerging risk can threaten profit via an unanticipated claims level.
- When we say that "an organization knows", we commit the sin of personification. An organization does not know, but its people do. So, some may know well, some partly and some not at all.
- Protagonists and analysts may not be clearly separated. They may be in the same organization, or the analysts may be in the pay of the protagonists, as for example in the case of auditors, when their independence and desired scepticism may be compromised by the nature of the commercial relationship, as we explain later in this article. In the case of external organizations in the formal position of analysts, this relationship can be very complex (Stone *et al.,* 2017b; Stone *et al.,* 2003).
- Techniques for analysing complex sets of information are advancing rapidly, transforming how humans relate to data (Slowik and Spinoni, 2018). For example, as we note later, artificial intelligence is becoming essential in analysis of large data sets.
- There may be information asymmetry between protagonists and analysts, and between different categories of protagonists and analysts, so one group may carry out an analysis for which another group has not got the resources to carry out, and depending on the results of the analysis, DSIB may occur. This issue is particularly important in relation to governance (Brennan *et al*., 2016).
- There may be a culture of DSIB in an organization, coming from middle or senior management, usually from leaders (Pfeffer, 2016), conspired in by many members of the organization, so from an independent analyst's point of view, nothing said by protagonists to be known or unknown can reliably be classified as such. This culture may be related to the organization's strategic situation. For example, market incumbents may construct a view of the world that confirms their dominance (Stone, 1984; Stone, 2015).
- Protagonists may change their description of what is known or unknown because of errors made by their leaders or because of pressure from their leaders. Leaders may engage in deliberate DSIB, with middle management are forced to comply with it for fear of dismissal, while middle management may engage in deliberate DSIB because otherwise information would reveal their incompetence, and top management may unconsciously fall in line with the DSIB because they do not know of its existence. Figure 1 shows a simple decision tree illustrating choices faced by a CEO and board after a failure. In a company with a lying culture, the CEO, if aware of the failure, will lie consciously, and the board might back up the CEO's assertion that the problem stemmed from an unknown unknown.

Figure 1. A decision tree of lying



Source: The authors

The taxonomy

One approach to analysing DSIB is to create a taxonomy not just of decision types but of decision situations, classified by their management and academic disciplines e.g. strategic planning, projects, operational. This is because the literature on lying and behavioural economics shows that incentives to engage in DSIB relate not just to individual decisions but are systemic i.e. present throughout a management process. The below taxonomy uses as input previous research (e.g. Scherpereel, 2006). We do not argue that this is the only way of approaching this topic, or even that it is better than the approaches used in other taxonomies e.g. the familiarity or repetitiveness of a decision, but we do argue that it is a fruitful angle.

The taxonomy we use to classify decisions is as follows:

- Business model
- Strategy
- Programme
- Megaproject
- Project
- Operation

Their characteristics are described in the Table below:
Table II. Decision types and their characteristics

Type of decision	**Process involved**	**Main management/ stakeholder involvement – suggestions**	**Examples**	**Timescales**	**Issues**
Business model	Business initiation or transformation	Senior management, corporate investors	Low cost airline New information system Dis/reintermediation	Duration of business – years, decades	Systemic change, with risk of model not working, many unknown unknowns May involve new ecosystem, new platforms, new partners
Strategy	Strategic decision-making process (SDMP), change management	Senior management decisions, middle management analysis	New product line New market	3-5 years	More known knowns, but competitive issues can cause failure Often done with

					existing partners
Programme	Programme management, change management	Senior management governance, middle management accountability	Transformation to achieve major cost reductions Replacement of major systems Merger or acquisition	2-4 years	Significant change in work patterns & responsibilities for most people Should but often doesn't involve change management Consist of multiple projects, so managing connections between them key
Megaproject	Megaproject management	Senior management governance, middle management accountability	New railway line, new aircraft	2-4 years	Many unknowns as may involve breaking new ground (literally in the case of construction)
Project	Project Management	Middle management, specialist project managers	IT system installation Product line extension New office	1-2 years	Few unknowns, but classic failures may arise due to misinformation
Operations	Routine decisions	Middle & junior management, reporting to senior management	Manufacturing Service delivery	Ongoing	Should be handled by routine information systems, but failures can still be covered up

Source: The authors

These types are closely related. There is an intimate relationship between strategic decision-making and business model decision-making, with some arguing that one is a subset of the other, in both directions (Stott *et al*., 2016; Parnell *et al*., 2018). Many strategic and business model decisions require transformation programmes, which can be described as a collection of projects, some of which (for the largest firms) are effectively mega-projects. Such transformations have special information requirements (Stone *et al.*, 2017b; Parnell *et al.*, 2018). Finally, some information input into these decisions arises from operations, so any DSIB applied to operational data (e.g. booking of sales ahead of them taking place, registering that a project action has been completed when it has not) can feed into higher level decisions, and this "infects" them. A special aspect of DSIB is competitive information, which often consists of "soft" information about actual or planned activities of competitors. This kind of information is particularly subject to DSIB (Stone, 2015). The literature on use of information is well-defined in the case of SDMP and project management, and it is on this research that our review focuses.

The types of DSIB that can occur are classified as shown in Table III:

Table III. Types of DSIB

DSIB type	Examples
Deliberate falsification	Deliberate denial Concealment Deliberate individual falsification of source information Conspiracy with others to falsify source information Deliberate individual misinterpretation Conspiracy with others to misinterpret

Sins of omission	Ignorance Unconscious denial Avoidance of information search Unconscious misinterpretation
Sins of commission	Poor prioritisation/weak focus on essentials (risks, benefits) Overconfidence Over-reliance on intuition Over-reliance on existing systems & processes (we have always done it this way) Optimistic interpretation of information that might be regarded as negative or not supporting a particular decision Business case flawed (e.g. benefits exaggerated, costs minimised & information now changed to fit case rather than reality Biased governance – stakeholders with interests that conflict with those of the organization influencing decisions in favour of their own interests
System or process problems	Information incompetence – systems & processes do not deliver required information & situation is tolerated Unconscious or deliberate creation/sustaining of a process/system known to support a particular type of DSIB

Source: The authors

Previous research

In this review, we focus on three areas, as follows:

- The general research on DSIB, particularly on lying and behavioural bias in managing information
- Project management research, focusing on construction and software projects
- SDMP, focusing particularly on the three areas conventionally researched – rationality, intuition and politics, and their implications for DSIB.

The review has been limited to what we consider to be the most seminal research in the area.

Lying and behavioural bias

Amongst the first researchers to signal the general risk of DSIB were Cyert and March (1963), who suggested that members of an organization may have incentives to manipulate information, from lying to presenting data in a biased way, so as to influence decisions. Table IV below gives evidence that DSIB is systematic and widespread in business. The combination of overconfidence and biased governance is particularly toxic!

Table IV. General evidence of DSIB

Reference	Focus	Findings	DSIB implications
Baker *et al*. (2002)	Sources of irrational behaviour	Apparently irrational financial behaviour can stem from investors or managers. When the main source is investors, managers must be insulated from short-term share price pressure, allowing them to take "correct" decisions that may be unpopular in the market, while if it is managers, discretion must be reduced and managers forced to pay more attention to the market.	Managerial discretion may lead to covering up or falsification of information relating to the returns to particular actions, if these are at variance with the market's view. Stronger governance is required to prevent this.
Grover (2005)	Causes and management of workplace lying	Lying is part of every manager's life. People may lie purely for their own benefit, but many lies are associated with competitive and social pressures. People vary in their propensity to lie. Nearly everyone lies in bargaining situations, but only some people lie when faced with	People need to rationalize their lies, and organizational cultures emphasizing honesty do not seem to reduce lying. Rather, they drive lying underground. We should therefore always be on the look-out for lying.

		conflicting expectations.	
Güner *et al*. (2008)	Biased governance	Having bankers on a corporation's board increases financing to firms with good credit and few financial constraints, but poor investment opportunities. Having investment bankers on the board is associated with more frequent outside financing, larger public debt issues and poorer firm performance after acquisitions.	Banker-directors act in the best interests of creditors, so board financial expertise may not be in the best interest of shareholders. The advisory role of directors is affected by director interests that conflict with those of shareholders. Governance needs strengthening to prevent this.
Lovallo and Kahneman (2003)	Delusional optimism	Many business initiatives fail due to "delusional optimism", which includes emphasizing projects' potential benefits, underestimating their likely costs, and creating and promoting success scenarios while ignoring the possibility of errors. This is due to cognitive biases and organizational pressures to accentuate the positive.	Aggressive goals can motivate teams and improve the chances of success, but external forecasts should be used to decide whether to commit. However, this implies that the managers concerned have an interest in realism, although they may not, particularly if the pay-off is distant and the returns are near term.
Malmendier and Tate (2005)	CEO overconfidence	Overconfident CEOs systematically overestimate the return to investment projects. This is confirmed in many other studies of theirs e.g. Malmendier and Tate (2008).	Independent directors may help cure this tendency, but as Güner *et al*. (2008) suggests if these are investment bankers, the result could be just as bad.
Malmendier and Tate (2009)	Superstar CEOs	CEOs who win awards perform worse after winning them. Award-winning CEOs spent more time on public and private activities outside their companies e.g. taking other board seats or writing books. Award-winning CEOs underperform relative to their prior performance and to a matched sample of non-winning CEO. The effects are strongest in firms with weakest corporate governance.	Information relating to the quality of senior management often refers to winning awards, but this is negatively correlated with performance. Weak corporate governance makes the situation worse. Senior managers should be discouraged by their boards from this kind of narcissistic behaviour.
Malmendier *et al*. (2018)	Long run effects of mergers	Where two or more companies had a significant ex ante chance of winning (close contests), companies that failed to take over did better than those that succeeded, when their returns were similar before the take-over contest. Returns from the merger were often exaggerated (perhaps by both parties).	Take-overs are often toxic and should be discouraged, particularly if estimates of likely returns come from the managers who are keen on the take-over.
Schenk (2017)	Rogue trading in a bank	The actions of a rogue trader were driven by seeking individual reputation, while senior executives took no responsibility, nor were they viewed as responsible.	Stronger governance and better information management is required to control the actions of individual managers, particularly when they can take actions that can lead to greatly increased exposure.

Source: The authors

DSIB in Projects

The project literature has very strong coverage of the information management issue, as shown in Table V.

Table V. DSIB in projects

Reference	Focus	Findings	DSIB implications
Clegg (2008)	The need to view project management with a political perspective	Flyvbjerg (1998) identifies that when power and knowledge are entwined, the greater the power, the less the need for rationality. Power dominates rationality. Those with power define the reality of the project to further their preferences, using any strategies and tactics.	Project managers and those responsible for project governance must be alert to this tendency and create sources of information on project progress that are truly independent of those with power.
Flyvbjerg (2009)	Why the worst infrastructure gets built	Biased cost-benefit analyses arise from incentives to promoters of infrastructure projects to underestimate costs and overestimate benefits, to gain approval and funding. Projects made to look best in business cases - often intentionally - generate the highest cost overruns and benefit shortfalls, leading to 'survival of the unfittest', with the projects made to look best performing the worst. Researching intentional deception is difficult, but can be done (Flyvbjerg, 2004; Wachs, 1990).	Use 'reference class forecasting' (examining similar past situations and outcomes) in project business cases (Flyvbjerg, 2004) to reduce inaccuracy and bias, to compensate for cognitive forecasting bias (Kahneman, 1994; Kahneman and Tversky, 1979).
Priemus, Flyvbjerg and van Wee (2008)	Decision-making on mega-projects	Mega-projects are often poorly thought through, with all options not taken into account, benefits systematically overestimated, costs systematically underestimated, and little or no learning from past experiences. Errors for recent projects are often larger than for earlier ones.	More attention should be paid to learning from past projects, from planning through to implementation.
Glass, Rost and Matook (2008)	Lying on software projects	The main forms of lying on software projects are early cost and schedule estimates, status reporting during the project and political manoeuvring. The rarest form of lying was hype. When lying happens, developers often know about lying even when management does not. Estimation and political-manoeuvring lies came mainly from management, status-report lies came mainly from project leads, and hype mainly from marketing.	More focus on trust, control and independence of information provision is required.

Source: The authors

DSIB in SDMP

Although the rapidly growing literature on SDMP has not focused on DSIB, it gives much insight into the nature of the SDMP and hence its vulnerability to DSIB, as shown in Table VI. As we stated earlier, it is harder to research DSIB in SDMP directly, as this may involve managers admitting deliberate deception.

Table VI. DSIB in SDMP

Reference	Focus	Findings	DSIB implications
Thomas and McDaniel (1990)	Effects of strategy and the information-processing structure of top management	Strategy and information-processing structures are partly determined by how business leaders define and analyse	The bias of the SDMP towards the leader's interpretation of strategic situations must be recognised and challenged.

	teams on interpreting strategic situations.	strategic situations.	
Hough and White (2004)	Scanning and information gathering for strategic decision making in situations of environmental dynamism	Environmental dynamism and a manager's functional position explains scanning behaviour. Scanning behaviour may be unrelated to the need for information and is vulnerable to bias by those scanning or managing scanning.	Scanning and information gathering are critical activities and require stronger governance, particularly in situations of environmental dynamism, where it may not be clear which information is most needed for decisions.
Carmeli, Tishler and Edmondson (2012)	CEO relational leadership and strategic decision quality in top management teams, including the role of team trust and the extent of learning from failure	Trust between top management team members had an important influence on CEO relational leadership and the extent of team learning from failures, which in turn affects strategic decision quality.	CEOs can improve the quality of strategic decisions by their top management teams by shaping a relational context of trust and facilitating learning from failures. Where trust does not exist, learning from failures will be weak, so information relating to failures may be suppressed.
Hough and White (2003)	Environmental dynamism and strategic decision-making rationality	Environmental dynamism affects the relationship between rational-comprehensive decision making and decision quality.	A dynamic, unstable environment can pose problems for decision-making rationality and open the door to DSIB, so stronger governance of decision-making is needed in such situations.
Citroen (2011)	The role of information in strategic decision-making	Executives using a rational approach collect and use ample information in a structured multi-phase decision-making process in which information plays a crucial role in reducing uncertainty.	More relevant information on issues affecting choices allows board decisions to be better controlled and more rational However, it is still vulnerable to DSIB.
Aravopoulou *et al*. (2018)	Strategic decision-making process in times of crisis	Rationality is a key dimension of SDMP. Decision-makers use intuition in the form of past experience when making acquisition decisions, whilst their personal judgment and “inner voice” are neglected, and political behaviour is not displayed.	DSIB can be avoided when rationality prevails and there is no or little political behaviour when there is strong focus on identifying and analysing all required information, use of external financial advisors, reliance on many methods of information gathering, and when decision-makers are open with each other about their interests and preferences and there is no bargaining, negotiation or use of power amongst them.
Frishammar (2003)	Information use in strategic decision making	The SDMP starts with soft information (visions, ideas, intuition, cognitive structures, etc.), used to decide which hard information is relevant, moving to hard/numerical information, then back to soft information for the final decision. Internal/close information sources (e.g. staff, customers) seem to be preferred over external ones, while solicited information tends to be preferred to unsolicited information.	Managers may not be sufficiently active in seeking more of the important information they need, and may be biased in their solicitation of information. Tough questions should therefore always be asked about the information gathering and interpretation process that supports SDMP.

Papadakis, Lioukas and Chambers (1998)	The role of management and context in SDMP	The SDMP is influenced by characteristics which are decision-specific, top management factors and contextual factors. Decision-specific ones seem to have the strongest influence on the SDMP. Management may manipulate the meaning or categorization of strategic issues, to influence organizational responses e.g. manipulating information from external to internal systems, such as 'Environmental Scanning' or 'Strategic Issue Management' or 'Boundary Spanning' systems, to serve their own goals.	Management may filter information and manipulate decision-specific characterizations to control rationality, formalization, lateral communication, hierarchical decentralization, and even internal political activity. Strong governance is required to control this tendency.
Dean and Sharfman (1993)	Procedural rationality in SDMP	Environment (competitive threat), organization (external control), and strategic issue (uncertainty) jointly affect procedural rationality. SDMP procedures were most rational when competitive threat and external control were limited, and problems were not uncertain.	When firms are in environments of little competitive threat, when they perceive little external control and are facing well-understood issues, they use rational procedures. DSIB is therefore more likely in situations of environmental turbulence.
Miller and Ireland (2005)	The role of intuition in strategic decision-making	Intuition is a troublesome decision tool.	It is particularly vulnerable to DSIB, so strong governance is required, focusing on monitoring for DSIB.
Abrahamson and Baumard (2008)	The organisational facade	Reputations can be made or lost in a moment, so façades pervade organizations in scale and in scope, perhaps deliberately manufactured to create external support (e.g. investors), when they bear no relation to organizational reality.	Lying behaviour associated with constructing a façade may be infectious, leading to other kinds of DSIB, which can only be controlled by stronger governance.
Eisenhardt (1989)	Strategic decision-making speed in a high- velocity environment	Fast decision-makers use more, not less, information than slow decision-makers, based on more alternatives, leading to superior performance.	Slow decision-making is not necessarily good decision, and may give more scope for DSIB to emerge, so management should be aware of the greater need for governance in these situations.

Source: The authors

Financial DSIB

Financial DSIB, which applies not just to the financial services sector but to all financial issues (such as company reports and accounts), is so serious and widespread that it is the subject of many reports. Much DSIB that originates in other kinds of information is translated into financial DSIB. Exaggerated sales become exaggerated revenues and profits, strategic risks turn into losses and so on.

A serious source of financial DSIB is the existence of many different stakeholders in a company, each pulling in different financial directions and wanting financial figures to tell different stories. We have already discussed the issue of personification of companies – treating companies as if they are unitary entities, when they consist of many individuals and organizational units, each with different attitudes to and involvement in business initiatives – choice of business model or strategy, management of programmes, projects and operations. For example, in banks, just in the area related to risk management, can be found compliance specialists, quality assurers, risk managers, internal auditors, investigators and of course senior and middle management, and this does not include those managing stakeholders who may need to be involved – staff in customer services and sales, in branches and contact centres. As

the last few years have shown, no matter how many such people exist, and no matter how well aligned they may be in principle, it is not easy to manage them together to manage risk, including that generated by the DSIB of staff within the bank.

One issue that allows large companies to get away with serious DSIB is the appointment of seemingly independent non-executive directors who are actually not independent, with their main "duty" being to make a board look impressive rather than to exercise a strong due-diligence function. This pattern is visible throughout industry (and increasingly in the public sector), but can be particularly damaging in financial services, where the risks are so great. In some cases, non-executive directors are members of many boards, giving them little time to focus in depth on each company of whose boards they are a member. This phenomenon is known as "overboarding" (Marlow, 2017).

These and similar problems have led to the emergence of a model-based approach to the management of risk, the three lines of defence model (Chartered Institute of Internal Auditors, 2015), involving separating the functions that a) own and manage risk b) oversee risk and c) provide independent assurance. The first group owns and manages risk and engages with the second group to agree polices and risk limits which match the banks' risk appetite and relevant delegated authorities, using business practices established to meet their objectives whilst managing risk in accordance with these. The second group establishes policies and limits for the first group which match the agreed (and governed) risk and may also control aggregate risks by risk type. Immature of weakness in the first group demands greater scale, capability and strength in the second group. The third group checks the effectiveness of processes and controls from end to end.

This approach should work well in theory, but is not immune to systemic DSIB to which banks and others are prone (e.g. denial, restricted environmental scanning), sometimes accentuated by command lines in which those with overall responsibility can force particular interpretations of risk (e.g. that risk is lower than it actually is) on more junior staff. The main way to avoid this is true independence between groups, perhaps even using external checks, and a healthy dose of scepticism in any auditing (Lherm, 2016).

Each sector has its own particular pattern of DSIB. In one sector of financial services, the patterns were analysed by the Fixed Income, Currencies and Commodities (FICC) Market Standards Compliance Board (FMSB). Nearly every category of the dark side behaviour involved manipulating information, ranging from creating deliberately misleading patterns of information to falsifying information directly. All the categories analysed were entirely deliberate and so akin to lying.

Case studies

Overview

There is not the space to give detailed case studies – instead, we have provided references to where more detailed statements of situations can be found. As our review of research shows, DSIB is common. It is literally almost everywhere. So in analysing an organization, the critical question is not whether DSIB exists, but what was and is the extent of its influence on it– then and now, and whether it reflects a severe underlying problem in terms of how modern society works.

Our case studies cover several sectors (it would be easy to compile a list that is just financial services), including public and private sectors. One weakness of the list is its focus on large organizations, on which information about DSIB is more easily available because they are investigated by analysts, the media and governments and have a larger number and wider range of stakeholder interested in their behaviour and governance. All the cases have been selected from Western developed countries, partly because they reflect the authors' knowledge base, but also partly because if we were to include other countries, particularly developing nations, we would be swamped with examples, as world indices on fraud and governance indicate, for example the Corruption Perceptions Index (2017). We have selected case studies only of project, programme and strategic initiatives, and not other DSIB contexts. The main case study covers the authors' own industry. This is followed by a brief summary of other cases (Table VII).

Higher education SDMP

The problems caused by poor use of information in higher education institution (HEI) strategic decision making were highlighted by Al Dhaen (2017) and Hargreaves and Stone (2017). The latter highlights a particular severe case of information denial, in which senior management in many UK universities refused to take seriously the likely impact of a short-term decline in student numbers caused by a dip in the size of the cohort of university applicants, making investments that drained their cash, so that they were forced to contract, despite clear evidence of a likely upturn a few years later.

Tromp and Ruben (2010, p. 4) state that "there are generally few carrots and sticks available to leaders as incentives (or disincentives) and where the communication and organizational challenges are far from trivial". In the UK, the issue of strategic planning and re-formation of university mission and vision has become an important priority, including meeting objectives of international accreditation bodies and meeting f quality standards, both of which are put at risk by unethical behaviour relating to claims concerning quality (Stone and Starkey, 2011).

Leaders of UK higher education rely on intuition in their decision-making, but should support their decisions with rationality and rely on specific strategic information, rather than plan in an ad hoc and occasional manner (Universities UK, 2011). Rowley (1997) highlight the need for communication and participation in the strategic planning process, specifically during strategic change and mission development, and identify that failure of strategic planning is often due to inadequate information. Strategic plans are often developed in a highly centralized and intuitive manner by senior management (Al Dhaen, 2017; Hargreaves and Stone, 2017). This intuitive planning leads to many HEIs facing challenges in digital transformation, due to poor planning (Ladd, 2016) and in resource planning (Hinton, 2012). Hargreaves and Stone (2017) argue that senior university management sometime confuse excellence of research, teaching and academic leadership with managerial competence. As highlighted in the SDMP literature review, strong governance is often an antidote to DSIB, but it is often absent in universities. In the Gulf Co-operation Council region, lack of transparency and accountability is a serious problem (Gashgari, 2017).

Other industry examples

Table VII: DSIB in other industries

Industry	Issue
Accounting	The accounting industry provides many examples of DSIB, particularly for denial of conflict of interest that results from a strategic focus on developing consulting and other advisory services and selling them to audit clients or from focusing on maximising fees from audit clients, leading to audits becoming window-dressing, as the auditing firm fears loss of the client. This DSIB is usually a direct result of unethical decisions by senior managers (Meckfessel and Sellers, 2017; The Economist, 2018)
Automotive	This industry, once famous for focus on fashion rather than safety (Nader, 1965), has produced strategic cover-ups relating to pollution. These may result from individual middle management DSIB, resulting from attempts to meet targets, subsequently covered up and/or denied by senior managers. (See Leggett. 2018).
Banking	There are many reports about concealed strategic dependence on mortgage markets before the financial crisis, often in the form of banks' off-balance sheet vehicles that governments knew about but were slow to regulate or never regulated. Governments were deeply complicit in what was effectively a cover up, particularly in the UK, Germany and the US. This is nearly always a result of DSIB by senior managers and/or polticians, who created the strategy and lied about its impact (See e.g. Deutsche Welle, 2018; McNeil, 2014; Olson, 2007; Patrick's Blog, 2018; Theil, 2009). There are also many reports of major systems failures when attempts to upgrade systems go wrong, following classic software project patterns, for example BBC (2018).
Construction	A frequent problem is cover-up of delays in one part of a project that leads to delays in other parts because other stakeholders are not informed of delays. This normally starts with middle management denial or cover-up, with senior management then becoming complicit. (See e.g. Construction News, 2014; Construction News, 2018; Sharp, 2018).
Governments	Here, falsification of evidence about military achievements and threats, to justify strategic commitment of resources to conflicts, are very common, e.g. US involvement in Vietnam and US and UK military involvement in the Middle East. Such DSIB nearly always involves conspiracy to lie

	at the highest levels, after information provided by middle-level managers or state employees proves incompatible with the views of the seniors. (See e.g. Beliefnet.com, 2018; Ellsberg, 2001; Marlantes, 2017; McSmith, 2016; Taylor, 2013; The Guardian, 2014).
Information technology	As our summary of work on software projects indicates, one of the most serious causes of failure is simple over-optimism and lying about capabilities and values of assets. This usually involves senior management. (See e.g. Finkle and Leske, 2012; Flinders, 2012; Foss *et al.*, 2008; Fruhlinger and Wailgum, 2017; King, 2010; March, 2006; 0ut-law.com, 2018; Pries and Stone, 2004; The Guardian, 2013, 2016; Wright, 2011).
Pensions	Poor strategic management of assets and involvement in businesses that do not fit with objectives, especially prior to demutualisation, are the main areas cited. Senior management DSIB is often driven by direct financial incentives. (See e.g. Fraser, 2004; Mathews, 2000).
Retailing	Under pressure from changing demographic and behavioural patterns (e.g. Internet buying), many retailers have been caught out with antiquated business models, but are slow to admit this strategic planning failure to their shareholders. Accurate evidence provided by middle managers is often suppressed by senior managers. (See e.g. Espiner and Atkinson, 2016; Heller (2004); Ibitoye, 2017; Moore, 2018; Ruddick, 2013).

Source: The authors

Management implications

Behavioural and managerial factors

Our review of research shows that various behavioural and managerial ways to avoid DSIB. They include avoidance of politics, improved governance, trust, honesty – including awareness of pressures to engage in DSIB, and balancing intuition and rationality. Several relate specifically to information, such as learning from experience, via detailed analysis of past similar situations, admission and investigation of the known/unknown situation and frequent recalibration in line with new information. In situations where DSIB occurs, it makes sense to evaluate these factors to see where improvements are required.

Use of information technology

The advent of big data should have made mismanagement based on any kind of information error (including DSIB) less common, particularly given the emergence of the insight discipline (particularly customer insight), the increased ease of managing and accessing information (Stone *et al*., 2017a) and analysis of how to make insight more effective by ensuring that senior managers understand the story told by the data (Stone *et al*., 2015). However, big data without intelligence and analysis merely leads to a situation of overload, which is why big data and analytics should go hand in hand (Wright *et al.*, 2018).

In "soft" situations (Petkov *et al*., 2007; Hicks, 2004), one problem is knowing where to focus analysis. A report from Tata Communications (2018) suggests that artificial intelligence may help, by offering a counter-opinion, avoiding the problem of false consensus and group-think. This builds on research on the importance of cognitive diversity, which so far has focused mainly on the importance of having different points of views, often from the perspective of different types of individual (Mohammed and Ringseis, 2001). Using artificial intelligence to create a different viewpoint requires conscious admission by management that without such artificial intelligence, they risk making a wrong decision based on DSIB that they may themselves have initiated or conspired to create, including through suppression of cognitive diversity.

Management checklist

Here, we identify questions managers should ask about how information about initiatives (projects, programmes or strategic initiatives) is being managed in their organization. When answers to these questions are weak or absent, it indicates the need to tread carefully! Senior managers who hear that these questions are being asked may try to suppress enquiry and force departure of staff asking the questions, so strong governance is critical in this area, but may itself be resisted by senior managers committing DSIB.

Information quality and analysis

- Does the information we are using to manage the initiative have the right quality –completeness, currency, integrity, accuracy, accessibility, consistency, objectivity, transparency, relevance?
- Is the interdependence between different elements understood – in relation to both quality and value of data items?
- Is their diversity in the sources and interpretation of information?
- Is the information used to plan and estimate the feasibility of initiatives compared with similar information for past initiatives, whether undertaken by the organization itself or by similar external organizations?

Information management and governance

- Do we know what the risks of initiatives? Are we managing them? Are they logged on a risk register related to each initiative? Is the register being managed? Do we have contingency plans?
- Is there proper governance of initiatives and their risks etc? Are the right people involved in governance? Is there a steering group? If so, how well does it function?
- Is there transparent stakeholder management, in relation to information used in planning or executing initiatives?
- Is there proper and focused management of initiatives, in the sense of having clear accountability and structures allocating responsibility for documenting progress and for achieving success?
- Do those managing initiatives have access to the right information?
- Are we sharing and transmitting information about initiatives to all relevant stakeholders?
- Do we know how much of any initiative has been achieved so far, at any stage from planning and resource allocation to actions and measurement?
- Are risks of projects, programmes or strategic initiatives disguised as dis-benefits or vice versa?
- Are consequences that are described as unintended or unexpected actually intended or forecast?
- Have stakeholders developed an exit plan that allows them to look good after an initiative fails? If so, is this affecting their involvement/commitment?
- Are there strong incentives to any stakeholder or group of stakeholders to create misinformation? Are stakeholders motivated to compound misinformation or cover up failures? (This is known as the slippery slope.)
- If there is deliberate information mismanagement, how are those doing it defeating the information systems and processes designed to provide the correct information?

Implications for university teaching and research

The implications are straightforward. Teachers of or researchers into management need to be careful in interpreting statements made by managers about their performance or intentions. They should be particularly alert to the tendency of managers to engage in DSIB and to put up a facade or to window-dress the situation. This approach should be integrated into all management teaching and into training of academic researchers into business behaviour. It is not enough simply to "plug in" courses on business ethics as an afterthought. Teaching in all business disciplines, particularly in finance, project management, strategy, marketing and information systems, should include content and exercises designed to help students explore the incidence and impact of DSIB.

Implications for government and regulators

In most developed countries, government and regulators are now highly alert to the incidence and impact of DSIB, and of the vulnerability to DSIB of organizations of all kinds, whether they be private sector, charities or public agencies. DSIB is a systemic characteristic of organizational behaviour, but also – as we have seen so clearly in the last decade or so – of government and regulators, who like to position themselves as being above DSIB but are often complicit in it. The common elements of remedies to DSIB are transparency and independence of governance. However, these too are subject to manipulation and DSIB, within regulators and governments as well as in other organizations, for example, in the form of claims that transparency and governance existed when those responsible for it were themselves complicit in DSIB. So, our conclusion to this section and to this article overall is – be vigilant!

References

Abrahamson, E. and Baumard, P. (2008), "What lies behind organizational façades and how organizational façades lie: An untold story of organizational decision making", *The Oxford Handbook of Organizational Decision making*, pp. 437-452.

Al Dhaen, E. S. (2017), *Study of the strategic decision-making process in higher education institutions*, PhD Thesis, Brunel University London.

Amason, A.C. and Schweiger, D.M. (1994), “Resolving the paradox of conflict, strategic decision making, and organizational performance”, *International Journal of Conflict Management*, Vol. 5 No. 3, pp. 239-253.
Aravopoulou, E., Branine, M., Stone, M., Mitsakis, F.V. and Paul, G. (2018), “Strategic decision-making process (SDMP) in times of crisis: Evidence from Greek banks”, *Journal of Business & Retail Management Research,* Vol. 12 No. 4, pp. 26-36.
Aven, T. (2015), “Implications of black swans to the foundations and practice of risk assessment and management”, *Reliability Engineering & System Safety*, Vol. 134, pp. 83-91.
Baker, M., Ruback, R., and Jeffrey Wurgler, J. (2002), “Behavioral Corporate Finance: A Survey", in Eckbo, E., (Ed.), *The Handbook of Corporate Finance: Empirical Corporate Finance*, Elsevier/North-Holland, New York.
BBC. (2018), “TSB boss Paul Pester to step down after IT fiasco”, available at: https://www.bbc.co.uk/news/business-45406322 (accessed 5 September 2018).
Beaussier, A.L., Demeritt, D., Griffiths, A. and Rothstein, H. (2016), Accounting for failure: risk-based regulation and the problems of ensuring healthcare quality in the NHS. *Health, risk & society*, Vol. 18 Nos. 3-4, pp. 205-224.
Beliefnet.com (2018), “The Vietnam War and the Father of Lies”, available at: http://www.beliefnet.com/news/articles/the-vietnam-war-and-the-father-of-lies.aspx (accessed 7 September 2018).
Brennan, N., Kirwan, C.E. and Redmond, J. (2016), “Should Non-Executive Directors Know as Much as Managers?”, *Accountancy Ireland*, Vol. 48 No. 2, pp. 66-67.
Carmeli, A., Tishler, A. and Edmondson, A.C. (2012), “CEO relational leadership and strategic decision quality in top management teams: The role of team trust and learning from failure”, *Strategic Organization*, Vol. 10 No. 1, pp. 31-54.
Chartered Institute of Internal Auditors (2015), “The three lines of defence, London: Chartered Institute of Internal Auditors”, available at: https://www.iia.org.uk/resources/audit-committees/governance-of-risk-three-lines-of-defence/ (accessed 26 September 2018).
Citroen, C.L. (2011), “The role of information in strategic decision-making”, *International Journal of Information Management,* Vol. 31 No. 6, pp. 493-501.
Clegg, S. (2008), “Bent Flyvbjerg: power and project management–an appreciation”, *International Journal of Managing Projects in Business*, Vol. 1 No. 3, pp. 428-431.
Construction News. (2014), “The Channel Tunnel: Have we learnt our lessons?”, available at: https://www.constructionnews.co.uk/best-practice/legal/the-channel-tunnel-have-we-learnt-our-lessons/8662983.article (accessed 7 September 2018).
Construction News (2018), “The Channel Tunnel: Have we learnt our lessons?”, available at: https://www.constructionnews.co.uk/companies/clients/crossrail/crossrail-delay-caused-by-fit-out-setbacks/10034742.article (accessed 7 September 2018).
Corruption Perceptions Index (2017), available at: https://www.transparency.org/news/feature/corruption_perceptions_index_2017 (accessed 18 September 2018).
Cyert, R.M. and March, J.G. (1963), “A behavioral theory of the firm”, in Miner, J. (Ed.), *Englewood Cliffs, NJ*, pp.169-187.
Dane, E. and Pratt, M.G. (2007), “Exploring intuition and its role in managerial decision making”, *Academy of management review*, Vol. 32 No. 1, pp. 33-54.
Dean Jr, J.W. and Sharfman, M.P. (1993), “Procedural rationality in the strategic decision-making process”, *Journal of management Studies*, Vol. 30 No. 4, pp. 587-610.
Deutsche Welle. (2018), “Flashback: When the financial crisis hit Germany”, available at: https://www.dw.com/en/flashback-when-the-financial-crisis-hit-germany/a-39841155 (accessed 5 September 2018).
Eisenhardt, K. (1989), “Agency theory: An assessment and review”, *Academy of Management Review*, Vol. 14 No. 1, pp. 57-74.
Ellsberg, D. (2001), “Lying About Vietnam”, available at: https://www.nytimes.com/2001/06/29/opinion/lying-about-vietnam.html (accessed 7 September 2018).
Espiner, T. and Atkinson, E. (2016), “M&S fashion: Why does it miss the mark?”, available at: https://www.bbc.co.uk/news/business-35251415 (accessed 5 September 2018).
Finkle, J. and Leske ,N. (2012), “HP braces for huge loss after $8 billion EDS writedown”, available at: https://www.reuters.com/article/us-hewlettpackard-outlook/hp-braces-for-huge-loss-after-8-billion-eds-writedown-idUSBRE8770RF20120808 (accessed 7 September 2018).
Flinders, K. (2012), “How did EDS lose $8bn in value in four years?”, available at: https://www.computerweekly.com/news/2240161906/How-did-EDS-lose-8bn-in-value-in-four-years (accessed 5 September 2018).

Flyvbjerg, B. (2004), *Procedures for Dealing with Optimism Bias in Transport Planning: Guidance Document*, London, Department for Transport.
Flyvbjerg, B. (2009), "Survival of the unfittest: why the worst infrastructure gets built—and what we can do about it", *Oxford review of economic policy*, Vol. 25 No. 3, pp. 344-367.
FMSB (2018), "Behavioural Cluster Analysis- Misconduct Patterns in Financial Markets", available at: https://fmsb.com/wp-content/uploads/2018/07/BCA_v32_1.pdf (accessed 26 September 2018).
Foss, B., Stone, M. and Ekinci, Y. (2008), "What makes for CRM system success—Or failure?", *Journal of Database Marketing & Customer Strategy Management*, Vol. 15 No. 2, pp.68-78.
Fraser, I. (2004), "A very secret life", available at: http://www.ianfraser.org/a-very-secret-life/ (accessed 7 September 2018).
Frishammar, J. (2003), "Information use in strategic decision making", *Management Decision*, Vol. 41 No. 4, pp. 318-326.
Fruhlinger, J. and Wailgum, T. (2017), "15 famous ERP disasters, dustups and disappointments", available at: https://www.cio.com/article/2429865/enterprise-resource-planning/enterprise-resource-planning-10-famous-erp-disasters-dustups-and-disappointments.html (accessed 5 September 2018).
Gashgari, R. (2017), Exploring the implications of corporate governance practices and frameworks for large-scale business organisations: A case study on the Kingdom of Saudi Arabia, PhD Thesis, Brunel University London).
Glass, R.L., Rost, J. and Matook, M.S. (2008), "Lying on software projects", *IEEE software*, Vol. 25 No. 6, pp. 90-95.
Grover, S. (2005), "The truth, the whole truth, and nothing but the truth: The causes and management of workplace lying", *Academy of Management Perspectives*, Vol. 19 No. 2, pp. 148-157.
Güner, B., Malmendier U. and Tate, G. (2008), "Financial expertise of directors", *Journal of Financial Economics,* Vol. 88 No. 2 pp. 323-354.
Hargreaves, A. and Stone, M. (2017), *The High Costs of Failing to Follow the Data*, Bristol: DataHE, available at: https://www.datahe.uk/2018/01/08/the-high-costs-of-failing-to-follow-the-data/ (accessed 26/9/18)
Heller, R. (2004), "A Difficult Return of Service", available at: https://www.theguardian.com/business/2004/jun/13/theobserver.observerbusiness16 (accessed 26 September 2018)
Hicks, M.J. (2004), *Problem solving and decision making: hard, soft and creative approaches*, Cengage Learning EMEA, London.
Hinton, K. E. (2012), *A Practical Guide to Strategic Planning in Higher Education. Society for College and University Planning*, Ann Arbor, Michigan: Society for College and University Planning.
Hough, J.R. and White, M.A. (2003), "Environmental dynamism and strategic decision-making rationality: an examination at the decision level", *Strategic Management Journal*, Vol. 24 No. 5, pp. 481-489.
Hough, J.R. and White, M.A. (2004), "Scanning actions and environmental dynamism: Gathering information for strategic decision making", *Management Decision*, Vol. 42 No. 6, pp. 781-793.
Ibitoye, V. (2017), "'M&S has failed you for 20 years': Brutal admission from new chairman as retailer begins major shake-up", available at: http://www.thisismoney.co.uk/money/markets/article-5063535/M-S-failed-20-years-claims-new-chairman.html (accessed 7 September 2018).
Kahneman, D. (1994), "New Challenges to the Rationality Assumption", *Journal of Institutional and Theoretical Economics*, Vol. 150 No. 1, pp. 18–36.
Kahneman, D. and Tversky, A. (1979), "Prospect Theory: An Analysis of Decisions under Risk", *Econometrica*, Vol. 47, pp. 313–27.
Kahneman, D., Knetsch, J. and Thaler, R. (1991), "Anomalies: The endowment effect, loss aversion, and status quo bias", *Journal of Economic Perspectives*, Vol. 5 No. 1, pp. 193-206.
King, L. (2010),"HP pays BSkyB £318m in final settlement of CRM lawsuit", available at: https://www.computerworlduk.com/it-management/hp-pays-bskyb-318m-in-final-settlement-of-crm-lawsuit-20593/ (accessed 7 September 2018).
Ladd, L. (2016), "Maturing from adolescence to adulthood: Major factors shaping the sector in 2016", available at: https://www.grantthornton.com/~/media/content-page-files/nfp/pdfs/2016/State-of-Higher-Ed-GT-spreads.ashx (accessed 26 September 2018).
Leggett, T. (2018), "How VW tried to cover up the emissions scandal", available at: https://www.bbc.co.uk/news/business-44005844 (accessed 16 September 2018).
Lherm, F. (2016), "The Jurisdiction of Comfort: Auditing Beyond Auditability. An Investigation into the Use of Professional Scepticism in the Audit of Estimates" available at: https://ssrn.com/abstract=2846963 (accessed 26 September 2018).
Lovallo, D. and Kahneman D. (2003), "Delusions of success. How optimism undermines executives' decisions", *Harvard Business Review,* Vol. 81 No. 7, pp. 56-63.

Malmendier, U. and Tate G. (2005), “CEO Overconfidence and Corporate Investment”, *The Journal of Finance*, Vol. 60 No. 6, pp. 2661-2700.
Malmendier, U. and Tate G. (2008), “Who Makes Acquisitions? A Test of the Overconfidence Hypothesis”, *Journal of Financial Economics*, Vol. 89 No. 1, pp. 20-43.
Malmendier, U. and Tate G. (2009), “Superstar CEOs”, *The Quarterly Journal of Economics*, Vol. 124 No. 4, pp. 1593-1638.
Malmendier, U., Moretti, E., and Peters, F. (2018), “Winning by Losing: Evidence on the Long-run Effects of Mergers”, *The Review of Financial Studies*, Vol. 31 No. 8, pp. 3212–3264.
March, B. (2006), “'Computer says no' to Mr Blair's botched £20bn NHS upgrade”, available at: https://www.telegraph.co.uk/news/uknews/3340457/Computer-says-no-to-Mr-Blairs-botched-20bn-NHS-upgrade.html (accessed 6 September 2018).
Marlantes, K. (2017), “Vietnam: The War That Killed Trust”, available at: https://www.nytimes.com/2017/01/07/opinion/sunday/vietnam-the-war-that-killed-trust.html (accessed 7 September 2018).
Marlow, B. (2017), “Overboarding is corporate governance gone mad”, available at: https://www.telegraph.co.uk/business/2017/04/29/overboarding-corporate-governance-gone-mad/ (accessed 26 September 2018).
Mathews, R. (2000), “Looting the mutuals: the ethics and economics of demutualisation”. *Dissent*, available at: http://www.geo.coop/archives/demutual.pdf (accessed 7 September 2018).
McNeil, R. (2014), “The crimes of Fred the Shred keep adding up”, *Herald Scotland*, available at: http://www.heraldscotland.com/opinion/13163935.The_crimes_of_Fred_the_Shred_keep_adding_up/ (accessed 7 September 2018).
McSmith, A. (2016), “Chilcot report: Blair didn't tell truth about WMDs, the deal with Bush or the warnings of fallout – how Britain went to war in Iraq”, *The Independent*, available at: https://www.independent.co.uk/news/uk/politics/chilcot-report-inquiry-tony-blair-iraq-war-weapons-of-mass-destruction-evidence-verdict-a7122361.html (accessed 8 September 2018).
Meckfessel, M. and Sellers, D. (2017), “The impact of Big 4 consulting on audit reporting lag and restatements”, *Managerial Auditing Journal*, Vol. 32 Issue: 1, pp.19-49, https://doi.org/10.1108/MAJ-02-2016-1321
Miller, C.C. and Ireland, R.D. (2005), “Intuition in strategic decision making: friend or foe in the fast-paced 21st century?”, *Academy of Management Perspectives*, Vol. 19 No. 1, pp. 19-30.
Mitchell, R.J., Shepherd, D.A. and Sharfman, M.P. (2011), “Erratic strategic decisions: when and why managers are inconsistent in strategic decision making”, *Strategic Management Journal*, Vol. 32 No.7, pp. 683-704.
Mohammed, S. and Ringseis, E. (2001), “Cognitive Diversity and Consensus in Group Decision Making: The Role of Inputs, Processes, and Outcomes”, *Organizational Behavior and Human Decision Processes*, Vol. 85 No. 2, pp. 310-335.
Moore, J. (2018), “Marks & Spencer: With 100 stores slated to go staff are paying price for the failure of successive CEOs”, available at: https://www.independent.co.uk/news/business/comment/ms-marks-spencer-store-closures-job-losses-high-street-retail-internet-shopping-a8363801.html (accessed 5 September 2018).
Nader, R. (1965), *Unsafe at Any Speed*, Grossman Publishers, New York.
Olson, P. (2007), “Germany's Landesbank Losers”, available at: https://www.forbes.com/2007/08/21/germany-landesbanks-subprime-markets-equity-cx_po_0821markets20.html#55889262533 (accessed 7 September 2018).
O'Rourke, M. (2016), “Emerging risks for the insurance industry”, *Risk Management*, Vol 63 No. 6, p. 44.
Out-law.com. (2018), “BSkyB and EDS settle IT dispute for £318 million”, available at: https://www.out-law.com/page-11089 (accessed 7 September 2018).
Papadakis, V.M. and Barwise, P. (2002), “How much do CEOs and top managers matter in strategic decision-making?”, *British Journal of Management*, Vol. 13 No. 1, pp. 83-95.
Papadakis, V.M., Lioukas, S. and Chambers, D. (1998), “Strategic decision-making processes: the role of management and context”, *Strategic management journal*, Vol. 19 No. 2, pp.115-147.
Parnell, B., Stone M. and Aravopoulou E. (2018), “How leaders manage their business models using information”, *The Bottom Line,* Vol. 31 No. 2, pp 150-167.
Paté-Cornell, E. (2012), “On “Black Swans” and “Perfect Storms”: risk analysis and management when statistics are not enough”, *Risk Analysis: An International Journal*, Vol. 32 No. 11, pp. 1823-1833.
Patrick's Blog. (2018), “RBS – My Part In Its Downfall…”, available at: https://patrickhadfield.wordpress.com/2015/03/16/rbs-my-part-in-its-downfall/ (accessed 5 September 2018).
Petkov, D., Petkov, O., Andrew, T. and Nepal, T. (2007), “Mixing Multiple Criteria Decision Making with soft systems thinking techniques for decision support in complex situations”, *Decision Support Systems*, Vol. 43 No. 4, pp. 1615-1629.

Pfeffer, J. (2016), “Why Deception Is Probably the Single Most Important Leadership Skill”, available at: http://fortune.com/2016/06/02/lying-leadership-skills-expectations-communication/ (accessed 26 September 2018)
Popovič, A., Hackney, R., Coelho, P.S. and Jaklič, J. (2012),” Towards business intelligence systems success: Effects of maturity and culture on analytical decision making”, *Decision Support Systems*, Vol. 54 No. 1, pp. 729-739.
Priemus, H., Flyvbjerg, B. and van Wee, B. eds., (2008), *Decision-making on mega-projects: cost-benefit analysis, planning and innovation*, Edward Elgar Publishing.
Pries, C. and Stone, M. (2004), “Managing CRM implementation with consultants—CRM or change management?”, *Journal of Change Management*, Vol. 4 No. 4, pp.351-370.
Renn, O. (2014), “Emerging risks: Methodology, classification and policy implications”, *Journal of Risk Analysis and Crisis Response*, Vol. 4 No. 3, pp. 114-132.
Rowley, D. J. (1997), Strategic Change in Colleges and Universities: Planning to Survive and Prosper. Jossey-Bass Higher and Adult Education Series, Jossey-Bass Inc., San Francisco, CA.
Ruddick, G. (2013), “Former Tesco boss Lord MacLaurin criticises 'sad' legacy of Sir Terry Leahy”, available at: https://www.telegraph.co.uk/finance/newsbysector/retailandconsumer/10149242/Former-Tesco-boss-Lord-MacLaurin-criticises-sad-legacy-of-Sir-Terry-Leahy.html (accessed 7 September 2018).
Schenk, C. (2017), “Rogue Trading at Lloyds Bank International, 1974: Operational Risk in Volatile Markets”, *Business History Review*, Vol. 91 No. 1, pp. 105-128.
Scherpereel, C. (2006), “Decision orders: a decision taxonomy”, *Management Decision*, Vol. 44 No. 1, pp. 123-136.
Sharfman, M.P. and Dean Jr, J.W. (1997), “Flexibility in strategic decision making: informational and ideological perspectives”, *Journal of Management Studies*, Vol. 34 No. 2, pp. 191-217.
Sharp, C. (2018), “So why is Northern Rail in chaos? Here are 11 reasons”, available at: https://www.citymetric.com/transport/so-why-northern-rail-chaos-here-are-11-reasons-3952 (accessed 7 September 2018).
Slowik, M. and Spinoni, E. (2018), “Augmenting or Substituting? How the Workforce Should Tackle the Fear of AI”, available at: http://blog-idcuk.com/category/artificial-intelligence/ (accessed 26 September 2018).
Stone, M. (1884), Competing with Japan - the rules of the game, *Long Range Planning*, Vol. 17 No. 2, pp. 33-47
Stone, M. (2015), “Competitive marketing intelligence in a digital, data-based world”, *Journal of Direct, Data & Digital Marketing Practice,* Vol. 17 No. 1, pp. 20-29.
Stone, M. and Starkey, M. (2011), “The possible impact of university corruption on customers’ ethical standards”, *Journal of Database Marketing & Customer Strategy Management,* Vol. 18 No.3, pp.154-170.
Stone, M., Laughlin, P., Aravopoulou, E., Gerardi, G., Todeva, E. and Weinzierl, L. (2017a), “How platforms are transforming customer information management”, *The Bottom Line*, Vol. 30 No. 3, pp 216-235.
Stone, M., Machtynger, L. and Machtynger, J. (2015), “Managing customer insight creatively through storytelling”, *Journal of Direct, Data & Digital Marketing,* Vol. 17 No. 2, pp. 77–83.
Stone, M., Parnell B., Stott, R., Aravopoulou, E. and Timms, L. (2017b), “Business model innovation, strategic information & the role of analyst firms”, *The Bottom Line*, Vol. 30 No. 22, pp 151-162.
Stone, M., Woodcock, N. & Starkey, M. (2003), The role of academics & analysts in misleading businesses – the case of CRM, *Journal of Database Marketing & Customer Strategy Management* Vol. 11 No. 2, pp. 121-132
Stott, R., Stone, M. and Fae, J. (2016), “Business models in the business to business & business to consumer worlds – what can each world learn from the other”, *Journal of Business & Industrial Marketing,* Vol. 31 No. 8, pp. 943-954.
Taleb, N. (2007), The black swan: the impact of the highly improbable, Random House, New York.
Tata Communications (2018), *Cognitive Diversity: AI and the Future of Work*, Tata Communications, Mumbai.
Taylor, P. (2013), “Iraq war: the greatest intelligence failure in living memory”, available at: https://www.telegraph.co.uk/news/worldnews/middleeast/iraq/9937516/Iraq-war-the-greatest-intelligence-failure-in-living-memory.html (accessed 7 September 2018).
The Guardian. (2013), “Abandoned NHS IT system has cost £10bn so far”, available at: https://www.theguardian.com/society/2013/sep/18/nhs-records-system-10bn (accessed 6 September 2018).
The Guardian. (2014), “When presidents lie to make a war”, available at: https://www.theguardian.com/commentisfree/2014/aug/02/vietnam-presidents-lie-to-wage-war-iraq (accessed 6 September 2018).
The Guardian. (2016), “Autonomy's former finance chief charged with fraud over Hewlett-Packard deal”, available at: https://www.theguardian.com/business/2016/nov/12/autonomys-former-finance-chief-charged-with-over-hewlett-packard-deal (accessed 5 September 2018).
The Economist. (2018), “KPMG is caught up in scandals but its woes are not existential”, available at: https://www.economist.com/finance-and-economics/2018/08/30/kpmg-is-caught-up-in-scandals-but-its-woes-are-not-existential (accessed 26 September 2018).

Theil, S. (2009), “German Banks Worst Hit By Financial Crisis”, available at: https://www.newsweek.com/german-banks-worst-hit-financial-crisis-80463 (accessed 7 September 2018).
Thomas, J.B. and McDaniel Jr, R.R. (1990), “Interpreting strategic issues: Effects of strategy and the information-processing structure of top management teams”, *Academy of Management journal*, Vol. 33 No. 2, pp. 286-306.
Tromp, S. A. and Ruben, B. D. (2010), *Strategic planning in higher education: A guide for leaders*, NACUBO, Washington, DC.
U.S. Department of Defence. (2018), “DoD News Briefing - Secretary Rumsfeld and Gen. Myers”, available at: http://archive.defense.gov/Transcripts/Transcript.aspx?TranscriptID=2636 (accessed 5 September 2018).
Universities UK. (2011). Efficiency and effectiveness in higher education A report by the Universities UK Efficiency and Modernisation Task Group. London: Universities UK.
Wright, L-T, Robin, R., Stone, M. and Aravopoulou, E. (2018), “Adoption of Big Data Technology for Innovation in B2B Marketing”, *Journal of Business to Business Marketing* (In press).
Wright, O. (2011), “NHS pulls the plug on its £11bn IT system”, available at: https://www.independent.co.uk/life-style/health-and-families/health-news/nhs-pulls-the-plug-on-its-11bn-it-system-2330906.html (accessed 7 September 2018).