



“The Science Behind D4”

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Why AOD just works....

..... it has *inside*
D4



Outcome
Delivery
Network

BACKGROUND

INTRODUCTION

Purpose of the paper

This note has been written to describe the science within a method called D4, the originating approach on which Assured Outcome Delivery, or AOD, is based. D4 is short for Dimension Four®, which is an assembly of concepts, insights, techniques and case histories of applications combined together in the form of a re-usable method for the purpose of designing and delivering futures.

The note sets out the way in which insights from a range of scientific disciplines form the basis on which D4 was constructed. In doing so, it explains *why* the approach brings about change radically better than conventional programme and project management practice.

The note does not describe the method or its techniques and tools but it does refer to how the science is deployed in the method in the boxes headed “Implementation with AOD”. You can learn about that by talking with some of the several authorised organisations that use and promote AOD within their methods and services - see the “D4 Inside” website <http://www.D4inside.com> for more details.

What is “D4”?

The reference in the name Dimension Four is to *time*, sometimes called the fourth dimension¹. Time is a theme that runs throughout the development and construction of D4, and subsequently of AOD.

Origin

The origin of D4, the forerunner to AOD, is in research carried out in 1987-91 into how people, organisations and businesses manage concurrent processes². It developed through 1992-2002 in response to criticism of project management processes’ failure to deliver desired outcomes and benefits reliably. This story is described in a separate note, “The History of D4”.

How does it differ from traditional tools for making changes happen, such as programmes and projects?

Whilst founded in and based on science, the AOD approach to making change happen also consists of common-sense and some concepts familiar from different contexts. On encountering the method for the first time some people feel “But that’s what I do already.” That reaction lasts until they start to understand exactly how and why AOD works and what that implies for how they presently manage portfolios, programmes and projects.

Taken overall and fully understood, AOD is a radical departure from traditional change management practices. It differs from them in that:

¹ In reality time is indivisible from the dimensions of space [Minkowski H. (1907-1909 ‘Raum und Zeit’ (Space and Time), *Physikalische Zeitschrift* 10: pp75-88)]. For the purposes in business it is practical to focus either on space or on time rather than space time, whilst not forgetting that this is an artificial simplification. The indivisibility of space time does have consequences for how episodes, a fundamental concept in AOD, work in projects and everyday life, but not in a way that people recognise.

² Fowler A K, Franks D J and Currie K (1990), ‘The Application of Parallelism in Commercial Dynamic Information Systems’, in *Proc. of the First International Working Conference on Dynamic Modelling of Information Systems*, TU Delft and Fowler A K, Franks D J and Currie K

1. Instead of working forwards in time, from left to right, it works from the outcome back to the causes, from the future backwards, from right-to-left.
2. Instead of focusing on programmes and projects and their outputs and focusing on changing what can be measured in numbers, it is business-centric and delivers qualitative change as well as number targets.
3. *Delivering the expected business outcomes* takes precedence over *delivering the process* of change. This is fundamentally different from traditional approaches' focus on the outputs of programme or project management.
4. Instead of starting by setting up a budget, plan and resources for a programme or project and ending with a handover to the business, it starts with what the stakeholder of the change, the payee, wants and ends when the stakeholder recognises that their needs have been met.
5. Instead of being done by a programme or project manager and team on behalf of the organisation, it is done by the organisation for the organisation.
6. Although it achieves numerical targets and out-performs traditional methods in achieving them, it rejects the imposition of number targets as a device to make change happen.

AOD is scalable. Although it originated and is largely applied in corporate business both in the private and public sectors, it has also been successfully implemented by Organisations and used for management of individuals' careers and lives and for cultural change in social communities. It is important to note that it includes detailed and integral processes for the identification and achievement of both the cash benefits and cash costs of change and achievement of outcomes.

Relationship Between AOD and Science

It is important to point out that AOD is a method, not a science. No new science is created in AOD. AOD is derived from the practical implications of already-established sciences. There are many references given in the note that attribute and acknowledge the work on which AOD is based.

Structure of the Note

The note covers four main topics: **Episodes, Networks, Dynamic Instability and Cultural and Behavioural Change.**

Notes are added at relevant points in the document, to explain how the insights from sciences are implemented in AOD.

References are given as footnotes on each page and a Bibliography is included at the end.

Time runs as a golden thread through AOD. Not only the sequence of events in business, but way in which parallel streams of events in organisations impact each other is fundamentally a matter of how time works.

In order to enable time to be managed the method uses a fundamental concept of an **episode**. An episode is a string of causes connected together with the outcome to which they are connected. Once the concept is applied, connections between episodes can be established in such a way as to make their complex interactions a gateway to valuable techniques for achieving desired futures.

The concept of an episode is introduced first in the note because it is a structure to which everything else can be related. Identification of outcomes and episodes is the fundamental enabler of AOD.

(1992), 'The Dynamics of Commercial Processes: Concurrency of Events and Episodes', in *Proc. of the 3rd International Working Conference on Dynamic Modelling of Information Systems*, TU Delft.

The connectedness of episodes introduces the subject of **networks**. Network Theory has implications for how individuals' brains and collective thinking in whole organisations and societies interact with constant real-time change in the external world. AOD uses insights from Network Theory to help manage the interactions involved in steering an individual, organisation or society through change.

The network of interactions in an organisation is a system that normally exhibits **dynamic instability**. AOD builds on insights from Catastrophe Theory, Critical Mass and Chaos Theory to produce practical techniques that enable an individual, organisation or society to bring about changes to itself.

Since 1970, organisations and communities have progressively delegated large parts of their functions to information technology and mechanical processes. Organisations and communities are still, however, created by and for humans. Consequently **cultural and behavioural change** is the most powerful lever in the “people, process, technology and assets” quartet that tips dynamically unstable organisation systems into required change.

AOD connects selected techniques from cultural and behavioural science as practical means to act upon insights about change from episodes, networks and dynamic instability and so to achieve qualitative and quantitative – both cash and performance – outcomes.

EPISODES: THE CORE CONCEPT

EPISODES

The psychologist Endel Tulving³ differentiated semantic, or factual, memory from episodic, or time-sequenced, memory. For example, a recollection of the fact that William the Conqueror invaded Britain in 1066, consisting of three things, “William the Conqueror” “Britain” and “1066”, and two relationships between them, “invaded” and “in”, is an example of *semantic* memory. On the other hand, a recollection of being taught by a teacher in a primary school classroom on a hot summer afternoon that William the Conqueror invaded Britain in 1066 is in the form of a time-sequenced story and is an example of *episodic* memory. When in the 1960s Wilder Penfield stimulated points in the cerebral cortex of a conscious patient, the person described seeing and hearing experiences that had durations – episodic fragments of their history and of music - not stand-alone semantic facts⁴.

An episode is thus about something happening in linear time. It has a beginning, middle and an end. It is a set of events, which are causes, related to a particular outcome.

The episode is the core concept behind AOD. It provides a framework in which all the science on which AOD is based can be placed.

³ Tulving E. (1972), ‘Episodic and Semantic Memory’, in *Organisation of Memory* pp 381-403 Ed Tulving, E. and Donaldson, W. and Tulving E. (2002), ‘Chronesthesia: Conscious Awareness of Subjective Time’, pp 311-25 in Stuss, D T and Knight, R (eds), *Principles of Frontal Lobe Function*. Oxford, Oxford University Press.

⁴ Penfield W. and Perot, P. (1963) ‘The Brain’s Record of Visual and Auditory Experience: A Final Summary and Discussion’, in *Brain* 86: pp 595-696.

To understand what an episode is in personal terms, consider what you are doing at present as you read this note. The fact that you are reading it at all is an outcome of a sequence of the events, some of which you can recall, that have led up to it. Taken together, the outcome and the events leading up to it are one episode of the very many within your life.

The events in an episode change the state of things as they are at the start of an episode (for example, the state of things when you were not even thinking of reading the note) to the state of things as they are at the end of the episode (for example, the state of things as they are now as you are reading the note). The end-state – your *now* - is the outcome.

The outcome can be measured in terms of the new values of the attributes of objects at the end of an episode. For example, if the episode was an electro-mechanical one going on within a set of traffic lights, the new values of attributes at the end of it are the new states of the lights. The end-state combination could be red; red-and-amber; green, or amber. These new states are the outcome of “the traffic lights episode”. Note that the outcome of the traffic lights’ episode may also be an event within another episode, for example that of a car engaged in a journey. Depending on the state of the lights, red; red and amber; green, or amber, the car driver makes a choice of the next episode in their journey based on the outcome of the traffic lights’ episode.

An episode may involve many objects, each with attributes that will have states at the end of the episode. It follows that the permutations of states that constitute the outcomes of episodes can be large. Decision Tables⁵ (and see discussion later under “Causation”) provide a powerful means to drive out all the permutations and set out the combinations of actions – i.e. the next possible episodes – that are triggered by each permutation.

The observation that the outcome of one episode triggers the start of one or many other episodes led to AOD’s identification of a decision-point as the marker for the termination of one episode and the commencement of another.

The observation of the permutational nature of end-states and their execution of consequential episodes led to AOD’s application of Decision Tables to model and manage the connections between shared outcomes.

EPISODES AND CHANGE

Events, tasks, projects and programmes are all *changes*. The state of things before a change is different from the state afterwards. Hence all changes are episodes and all episodes are changes.

Episodes (changes) happen all the time everywhere and concurrently⁶. Every change affects every other change. This happens everywhere in the universe and at all scales from the personal to the scale of an entire organisation and whole societies, and in all things from the sub-atomic to cosmic level.

⁵ For a short definition and simple examples see https://en.wikipedia.org/wiki/Decision_table. There are many other links on the internet to excellent descriptions of the nature and use of Decision Tables.

⁶For practical purposes episodes happen simultaneously. But in reality, every event happens within its own time frame, so that in another sense nothing at all is simultaneous. See again Minkowski H. (1907-1909 ‘Raum und Zeit’ (Space and Time), *Physikalische Zeitschrift* 10: pp75-88, and for contrary views, Skow, B. (2015), *Objective Becoming*, Oxford: OUP.

The result is a network of cause and effect so Vast⁷ that it is beyond comprehension. The far-reaching consequences of it are famously encapsulated to in the title of a talk presented by Edward Lorenz in 1972: “Does the flap of a butterfly’s wings in Brazil set off a tornado in Texas?,” to which the answer is “yes.” Edward Lorenz was talking about Chaos Theory⁸, more of which later.

Challenged by the incomprehensibly large scale of this network of cause and effect, humans and at least some other animals have developed episodic memory and imagination. Karl Popper famously described the significance of this ability of animals to have “hypotheses that die in our stead” in his lecture “Natural Selection and the Emergence of Mind”: “While an uncritical animal may be eliminated together with its dogmatically held hypotheses, we may formulate our hypotheses, and criticise them. Let our conjectures, our theories, die in our stead.”⁹

For example, we might consider crossing a road in front of an oncoming lorry. We would hypothesise that we would almost certainly be struck and killed by the lorry, and therefore we would not start to cross until after it had passed. Similarly, if planning to start a job that has a deadline, we might hypothesise that we could not complete it on time and might choose not to undertake the job without first changing the expectations and terms. Notice that to hypothesise we have to be able to imagine an episode, an outcome together with the events that would have caused it. Also note that we have no difficulty whatsoever in doing this. It is so natural that we do it all the time without particularly thinking about it.

Indeed the odd thing is that whilst people normally use the highly-evolved skill of hypothecation to enable day-to-day survival and domestic living – for example, when planning to catch a scheduled plane or a train – they *normally do not use it* within traditional approaches to planning and executing change in collective enterprises, for example when planning a business project or programme. Instead of using the mental capacity that we, along with animals, have evolved to plan backwards from an outcome, people working together in organisations use more or less the opposite approach and plan forwards from the present state.

It is extremely common to find that far more effort is put into the start-up tasks of a business project or programme, such as obtaining a budget and resources, than is put into pinning down the precise and tangible outcomes (as opposed to number targets) wanted by its stakeholders. As a result, people find themselves unable to plan backwards from the hypothesised future nor to prepare for the constant re-planning during the journey that will be needed in the face of unforeseen and unforeseeable events. This sub-optimal behaviour is deeply embedded in organisations. It is embodied in the “best practices” of project management today and maintained at severe cost to customers and investors.

There may be good reasons for this. In “Thinking Fast and Slow” Kahneman explains how in order to react quickly enough to respond successfully to rapid external events we have to think fast using shortcuts, in effect thinking in a lazy manner. We tend to carry over this laziness into situations for which complex, careful and effortful “slow” thought is essential to have any chance of a successful outcome¹⁰.

⁷ “Vast” as used with a capital V in this note has specific meaning vividly described by Dennet, D C. (1996), *Darwin’s Dangerous Idea* pp 107-113, London: Penguin. It refers to a huge number of possible states of things, “huge” being on a cosmological scale of time and space, far beyond human capacity to conceive.

⁸ Gleick, J. (1998), *Chaos*, pp 11 – 31, London: Heinemann

⁹ Popper, K (1977). “*Natural Selection and the Emergence of Mind*” delivered at Darwin College, Cambridge, November 8, 1977

¹⁰ Kahneman, D (2012) *Thinking Fast and Slow*, pp 59-70 London: Penguin

The observation that humans have evolved to be able to hypothesise future states led to the creation of the D4 device of "Recognition Events" (in AOD - Assured Outcome Delivery - which is a "D4 Inside" method, they are called "Show-Me Events") to be able to describe the outcomes of episodes in a binary, personal and tangible manner. This is in order that they can (1) act as a consistent script for videos, rich pictures, model offices and text to visualise and communicate future states, (2) provide a simple basis for planning from the outcome backwards into the past and (3) be used as a benchmark to identify in an absolute manner when the expected outcome has been reached.

The Show-Me Events device also enables identification of the granular cash benefit impact of achieving an outcome.

TWO TYPES OF EPISODES – PRESCRIPTIVE AND ASCRIPTIVE

In our work in 1987-1991 we observed two distinct types of episode. One is *prescriptive* and associated with inductive reasoning, arguing a predicted outcome from the present state. The other is *ascriptive* and associated with abductive reasoning, arguing backwards from a hypothetical outcome.

Prescriptive episodes

Prescriptive episodes are embodied in rigid, unvarying mechanical disciplines such as machine processes, computer program code or mathematical formulae. In a prescriptive episode, as long as the process, code or formula is unchanged, the outcome will always be the same every time the episode is repeated for any given input at the beginning of the episode. Once the circumstances at the beginning of the episode are set, the outcome is inevitable and predictable. In other words, events and causes are *prescribed* to the outcome. Instruction manuals and recipes also present themselves as prescriptive episodes on the premise that if people follow them exactly and precisely the outcome will be guaranteed.

When we operate together in groups to bring about complex changes, the traditional and current approach is to assume that a strategy, portfolio, programme or project – an episode - can be treated as if it were prescriptive. It is wrongly assumed that the plan we have laid down can (a) be followed exactly and precisely and (b) nothing can or will happen that will require any deviation from it. It is as if people lay down a railway line of events towards the outcome.

When unforeseen or unforeseeable events occur and derail the train traditional planners attempt to pull the enterprise back onto the track. They do that by negotiating changes in the scope or quality of the outcome or by increasing the cost or delaying the outcome, and often all of these together. The investor and customer experience this as disappointment of the expectations for which they are paying.

For example, during the early stages of development of AOD a Council sought help when one of their elected Councillors prematurely promised the electorate that a new IT-based system for allocation of Council Houses to applicants would be launched to the public nine months before the project had been scheduled to deliver. The reaction of the Finance and IT Departments was to say that it would be impossible to meet this expectation

without a drastic increase in funding and resources. (It is worth noting that in the event the application of the AOD right-to-left planning technique, so identifying the tipping-points and dependencies, enabled the project to be commenced immediately and to deliver the system just one month later than the promised date within the existing Council resources.)

Ascriptive Episodes

Plans, strategies, programmes or projects do *not* behave as if they are prescriptive. It is impossible to have enough information about the future to make a plan that provides for all eventualities. There is an explosion of detail to be discovered out there in the future. Unforeseen and unforeseeable events – Black Swans - *will* happen that make the original plan invalid¹¹. The exact set of events that will have caused the outcome are known only when the outcome is reached and not before. For example, if I asked you what events led to the outcome that you are presently reading this text, you are now able to tell me the ones you happen to believe, with hindsight, caused it. In other words, these are the events you choose to *ascribe* to the outcome. Notice, “you happen to believe” and “you choose”. Other people might ascribe different causes to the same outcome, so the set of events that caused the outcome is not prescribed. The set of events is a matter of your opinion and selective recall. It is what you ascribe.

It is possible that if we knew enough information about an apparently ascriptive episode we should find that it is actually prescriptive. That is the deterministic view of the universe (the Block Universe¹²), which proposes that everything that will ever happen is already prescribed. This *deterministic* view suggests that the reason that things appear to be due to chance or probability is that vastly too much information would be needed for the determination to be understood. In effect, therefore, episodes that are actually prescriptive only seem to be ascriptive.

The alternative, non-deterministic, view of the universe is that starting from the sub-atomic level where quantum physics is evident, objects have a probable rather than a fixed relative identity, location or velocity in space-time. This uncertainty ripples upwards into the larger-scale world in which we operate, so that things really do occur by chance and choice and not because they are pre-ordained¹³. As a result, we can only know the causes of an episode after the outcome has occurred. In this view, non-mechanical episodes are truly ascriptive.

Whether you adopt the deterministic or the non-deterministic view, the fact is that every perception each one of us has of the outside world starts for us as an imaginary ascribed episode. This is essential, because nothing can be communicated to our senses faster than 299,792,458 m/s¹⁴ (the cosmological constant *c*), which is also the speed of light. As a consequence *nothing* you perceive is exactly in the same state as it was by the time you can start to process it in your brain. In order to respond successfully and survive, your brain has to create an imaginary outcome and ascribe an episode to it with imaginary hindsight. This is nicely demonstrated in an example quoted by Oliver Sacks from work by A A Brill¹⁵, which describes the experiences of a man who

¹¹ Taleb, N. N. (2007), *The Black Swan* pp xvii-xxii, London: Penguin.

¹² Skow, B. (2015), *Objective Becoming*, Oxford: OUP.

¹³ For evidence of non-determinism, see the result of Aspect and Klausner's experiments with Bell's Theorem [Aspect, A. Grangier, P. Roger, G. (1982), 'Experimental Realisation of Einstein-Podolsky-Rosen-Bohm Gedankenexperiment: A New Violation of Bell's Inequalities', *Physical Review Letters* 49 (2): 91-4]

¹⁴ This is the maximum limiting speed of any communication of information across space-time.

¹⁵ Brill, A. A. (1932), 'The Sense of Smell in Neuroses and Psychoses' in *Psychoanalytical Quarterly* (1932) 1: 7-42, quoted in Sacks, O. (2015), *The Man Who Mistook His Wife For A Hat*, London: Picador.

permanently lost his sense of smell following a head injury. He later recovered his ability to smell familiar things he could see, such as his pipe smoke and coffee. Neurologists confirmed that his olfactory function was still destroyed and their conclusion was that he had become able to create the sensation of the correct smells using visual triggers and a different part of his brain. Examples of this “imagined hindsight” process are in fact common - see further discussion of this in the section “Networks and Brain Function”.

The process of constructing an outcome and predicting what is most likely to have led up to it is therefore the way we naturally think, certainly for the purposes of all very short-period responses. We also use it for much more delayed responses. As mentioned above, we routinely use it for planning journeys to a deadline, where we start by envisaging arriving at the destination at a specific time and then schedule backwards from it.

In 1988, my colleague David Franks extended this insight into a key observation. He pointed out that we do not know the causes of almost all episodes in business and domestic life until after the outcome has happened. For example, once the World War 1 had happened, collective opinion became that the firing of a pistol at Archduke Ferdinand on June 28th 1914 in Sarajevo was one of its causes. Until the war had happened and been labelled “World War 1”, however, no-one could know the whole significance of the assassination, so could not predict – *prescribe* – WW1 from it. Historians could only *ascribe* the shooting as one of the causes of the outcome after the war “episode” was complete. It is also the basis of plot of David Nicholls’ fascinating novel “One Day – Twenty Years, Two People”¹⁶, which describes a series of pre-anniversaries of a highly-significant day in the lives of the two protagonists.

Episodes perceived by sentient things¹⁷ are therefore ascribed, not prescribed. They are a matter of post-facto selection, not pre-determined outcome.

This observation led to AOD’s prioritisation of the use of Right-to-Left Planning (backcasting, future-to-present) above Forecast Planning (left-to-right, present-to-future). In Right-to-Left Planning the stakeholders’ required outcome is defined and dated first and appointments are made with the future.

Following this, imaginary or “prospective” hindsight is used to find how the outcome will have been caused. The concepts needed for this and the AOD techniques derived from them are described under “Episodes and Time”, “Causation” and “Practical Use of Dynamic Instability”.

EPISODES ARE BOUND TOGETHER BY INCLUSION¹⁸

Any one episode is an event within larger episodes. For example, a project is one of many within a programme and a programme is one of many within a strategic change. In the opposite direction, any one event within an

¹⁶ Nicholls, D. (2014) *One Day*, London: Hodder & Stoughton.

¹⁷ By sentient things I mean animals, including humans, whose brains are capable of observing themselves to be thinking, [Ramachandran, V.S. (2011), *The Tell-tale Brain* pp 245-250; 278-282, London: Random House] and have a capacity for imagining future and past episodes (chronesthesia; Tulving (1972)).

Plants, sticks, stones, planets and stars, of course, also ‘experience’ episodes but they do not have a neural network capable of observing themselves thinking and of chronesthesia. We can read back an episode from, for example, examining conglomerate rocks made up of fragments of stones, clay, sand and red mud, which is evidence of the long-past objective reality of a desert flood.

¹⁸ Meaning literally *all* episodes in the universe.

episode is itself an episode of smaller, more detailed events. For example, a programme consists of many projects and a project consists of many milestones, each of which is a smaller project in its own right. Each milestone is likely to consist of many tasks, each of which is a micro-project in its own right; and so on¹⁹.

Episodes are thus inextricably bound together by including, consisting of and sharing each other. This has the fortunate result that the large body of knowledge and tools available in Network Theory²⁰ can be used to understand and manage episodes in planning and delivery (see the section in this note headed “Networks”.)

EPISODES ARE CONNECTED BY SHARING

Besides being bound together by inclusion, episodes are also connected together by sharing *things*. These “things” are objects²¹. In language, things are the nouns in sentences (objects and subjects). Things that episodes share include resources, ranging from particular people and particular competencies to machines and real estate, and physical objects ranging all the way from sub-atomic particles to galaxies.

Any thing or object can be involved in more than one episode. For example, two projects may compete for using the same meeting room at the same time. The result might be a deferral of a meeting in one of the projects and thus delay of a key decision so as to profoundly affect its progress. One project can thus have a critical impact on a process of another entirely unrelated project. This connection through sharing of things that are common to more than one episode is what gives rise to the familiar problem of contention between projects for a shared resource.

The connection of episodes through shared resources has much wider consequences than those experienced in projects. For example, the author has been involved in an incident where nurses in the UK National Health Service were not paid refunds of their pension contributions one week because of an error in the processing of European Union subsidies to UK hill sheep farmers. Any connection between these two episodes seems extraordinarily unlikely until you know that a shared resource between them was a block of processing time on a single mainframe computer that was being simultaneously used by these and several other central government systems.

In another example, all flights into and out of Manchester airport were once halted for a number of hours because a metal tine broke off a tractor-mounted hedge trimmer and travelled hundreds of yards through the air before falling through the roof of a restaurant. Initially no one could know where the piece of metal had come from. The most probable hypothesis at the time was that it was a piece of metal fallen from an aircraft. Until the real cause had been identified, therefore, flights from the airport could not resume. Consider the consequential impact that spread out through travellers’ missed meetings around otherwise unconnected international businesses.

¹⁹ You might think this continues to infinity, but that might not be necessarily so. It is possible that a smaller episode could include a larger episode *within which it is itself included*, constructing a manifold in space-time. We have called this “autoktesis” or “self-creation”. Think of particles of matter and antimatter, which continuously pop out of the vacuum in space and then annihilate each other.

²⁰ For a comprehensive resource on this subject, see Estrada, E. (2012), *The Structure of Complex Networks*, New York: Oxford University Press.

²¹ By “object” this note means an identified collection of matter with a boundary in space-time; a member of a class defined by commonality of utility.

Episodes are also connected together by shared *events*, which are transitions from one state to another (causes). In language, transitions are the transitive verbs in sentences. A transformation of state is itself an episode and a step in another episode.

Since episodes are so intimately connected by inclusion and sharing, happenings involving competition for things and events shared by more than one episode are universal.

ALL EPISODES ARE JOINED BY DEPENDENCY

Episodes are also joined by shared dependency on others' outcomes (or results, goals or objectives). In language outcomes are signalled by the verb "to be" which, together with an adjective in sentences, describes the state of something; a noun; a subject or an object in a sentence.

A single episode will be just one of several events within a larger episode. The single episode is therefore a step on whose outcome the next event depends. Sometimes the next event depends on just one outcome and sometimes it depends on several outcomes, which might sometimes be simultaneous and might sometimes be sequential.

For example, you may have heard people in business using saying "I can't until ... such-and-such has been done." In other words, they cannot commence their episode until another has achieved its outcome, such as when you cannot commence a journey episode that follows upon the clearance of a flooded road until the episode of the draining of the flood is completed.

The understanding that episodes are tightly and universally connected by inclusion, sharing and dependency is used in AOD to apply Network Theory and Right-to-Left planning, so that the smallest, lowest-effort, lowest-cost moves can be identified which cause large achievements of outcomes.

At the same time large, high-effort, high-cost diversions can be continuously identified for removal from current plans.

EPISODES AND TIME

In order to identify episodes in business, AOD has developed a fundamentally important enabling concept of *Show-Me Events (SMEs)*.

This crucial tool provides a means to define the outcome states of episodes in a binary, tangible and personal way, so enabling people to set up an equally binary, tangible and personal definition of a future state that they want. It enables an organisation to construct a future that is *as if* it already exists, an imagined present set in the future. This is critical if an organisation is to use prospective hindsight²² and be able to plan backwards from the future as if the future had already happened.

²² Russo, J. E. and Schoemaker, P.J.H. (1989), *Ten Barriers to Brilliant Decision Making*, New York: Doubleday.

To explain the importance of this step it is necessary to pause to define what the “present” actually is. For practical purposes, the present is the point at which the uncertainties of the future become the certainties of the historical past. Consider a simple electric light. At various times in the future it may be on and off. At the present it is *either* on *or* off. At a present moment it cannot (unlike an electron in a quantum system) be both on and off. Furthermore, in history the light was, at any nominated time, *either* on *or* off. Thus the future is uncertain but the present (and the past) are certain.

While there is an almost certainly a present happening “now” on Alpha Centauri, the limitation of the cosmic constant (e.g. the speed of light) means that there is no way that your present here on earth now can *simultaneously* communicate any information with the present on, say, Alpha Centauri. Just as the light we see from Alpha Centauri started out 4.367 years ago, so any light received on Alpha Centauri coming from earth will also be 4.367 years out of date²³. This is “local reality” is a fundamental principle of Relativity. As the previous paragraphs describe, however, the state of things at an outcome of an episode (such as the electric light being on rather than off) is connected to every other episode in the universe. As a result, when we look at evidence of the outcomes of past episodes, we can measure that some of them happened at the same time relative to our present. For example, I have two fossil trilobites that have been measured to the same time in geological history. One of the trilobite had the episode of its life terminated in death in North Africa whilst another died - met the end of its episode of life - in Mongolia, two places well-separated in space. Nevertheless their deaths can have taken place at the same “past-present” moment. This past-present, like the now-present, can be viewed as a surface joining places equal in time, or an “isochron”²⁴. The universal connection of the states of things on an isochron means that they are consistent and congruent with each other.

Establishing a set of Show-Me Events for the post-change state of an organisation AOD creates a future-present. To understand what a future-present is, imagine creating a snapshot of how something might be like the future. The human imagination is able to create futures that seem much like snapshots. In the many applications of the AOD method it has been found that, counter-intuitively, a small number of Show-Me Events is enough to imply the details of a consistent and congruent future state. This is perhaps because people’s minds base their imagination of future states on their lifetimes’ experience of isochronous reality.

The present, and therefore any future-present, is singular and any present state has a singular history of causes that led to it. The fact that a particular electric light is “on” at the present has only one history of causes. The same is true of a future-present. It has a singular past. It follows that a future-present defined in the simple, personal terms of Show-Me Events predicates a complete, consistent and congruent “future-past” which accords with the future. The gap between the future-present and the present is filled with a chain of causes that can be imagined with prospective hindsight. This chain of causes is a story and a plan, but a plan that is driven from the future backwards rather than from the present forwards. AOD calls this a *right-to-left plan* in contrast with normal, *forecast plans*.

²³ Communication of information across space is limited to the cosmic constant, the finite speed of light. Instantaneous change of spin states between entangled electrons, as seen in the phenomenon of Non-Local Reality, is not the same as communication of information, since the state of one electron is random until observed and cannot be deliberately chosen.

²⁴ “A line joining points of equal time or age, such as contours in an Isochron map”; Schlumberger’s Oilfield Glossary.

This observation helps to explain why, when Show-Me events and right-to-left plans have been used in AOD, the right-to-left planning process does not lead to contradictory consequences. For contradictory outcomes to occur, the imagination of the people involved in the process have to be irrational or delusional – which is possible, of course, during illness or after trauma²⁵.

CAUSATION

As described earlier, episodes consist of a chain of causes belonging to an outcome. Where the causes absolutely dictate the outcome, the episode is prescriptive. When, by contrast, the causes that belong to the outcome cannot be known until after the outcome has occurred, the episode is ascriptive (compare with inductive and abductive reasoning²⁶). What of the causes themselves? As we have seen, each cause is just the outcome of a sub-episode within the parent episode. The connection to following episodes depends on the states of objects at the point of outcome. In other words, what is *caused* to happen next in time depends upon the outcome states.

Causes are sometimes *mechanical*, meaning that they consist of a transfer of energy from one object to another. If someone kicks a ball, the energy of the kick will transfer from their body through their boot into the ball. The ball will fly away, perhaps to score a goal, and their boot will slow. If a molecule in hot water bumps into your finger it will warm your skin up. If there are thousands of molecules hitting your finger there will be enough transfer of energy to your skin for you to sense heat. These consequences follow from the law of conservation of energy. This is the fundamental principle of physics that energy can neither be created nor destroyed but instead is transferred or transformed from one type of energy to another.

Causation can alternatively be *counterfactual*, meaning that a pre-existing state of something dictates what can and cannot happen next²⁷²⁸. For example, if you cement a ball to the ground and someone kicks it, the ball will be “caused” to remain stationary. It cannot fly away and a goal cannot be scored. The energy is still conserved, of course - the ball will distort and heat up slightly and the person will get a pain in their toes, but the point is that the outcome of stationary-ball-and-no-possible-goal is dictated by the prior state of the ball as “cemented down”. For another example, if you drive along a route that uses a road that was once open but has now been closed, you will be “caused” to use a different route. In counterfactual causation, a prior condition – a prior outcome - dictates what can and cannot be next episodes.

Counterfactual causation is the more obvious and important type of causation for the purposes of making change happen. When people use forecast planning (i.e. present-to-future, left-to-right) they are counting on being able set up constraints in the present that will restrict what can happen in the future so as to produce the outcome they want. It is akin to choosing a road to a destination and assuming that you have catered for *all* the eventualities that might block it. It is an attempt to build a prescriptive episode by anticipating now and pre-empting now *everything* that might deflect progress from achieving the outcome.

In anything much larger than a short computer program or a piece of engineering the anticipation of *all* the future events that have to be pre-empted is not realistic. It requires a Vast amount of information. For example,

²⁵ Sacks, O. (2015), *“The Man Who Mistook His Wife For A Hat”*, pp 59-62, London: Picador.

²⁶ For a definition of counterfactual causation, see <http://www.livescience.com/21569-deduction-vs-induction.html>.

²⁷ Hitchcock, C. (2010) ‘Probabilistic Causation’, *Stanford Encyclopaedia of Philosophy*.

²⁸ Menzies, P. (2008), ‘Counterfactual theories of Causation’, *Stanford Encyclopaedia of Philosophy*.

despite all the immense preparation and care taken beforehand, the first moon landing required the pilots to handle unforeseen problems in the lander-module's systems on the final approach to the moon's surface.

IMPLEMENTATION IN AOD

This observation led to the principle that the plans produced in right-to-left planning from Show-Me Events cannot be final. Every time unforeseen events occur during the change a fresh right-to-left plan is prepared, always working backwards from the Show-Me event. This process constantly accommodates not only unforeseen but unforeseeable events, in the same way that a GPS adapts to unexpected obstructions and diversions during a journey. Obviously, the more quickly a plan is delivered the less opportunity there is for unforeseen events to occur. Short battles (like the 1967 Arab-Israeli War) with clear and widely shared outcomes tend to be more decisive. Large programmes with aspirational and mixed agendas tend to fail.

The AOD process constantly seeks new shorter paths to the Show-Me events and tends, therefore, to bring about acceleration. It does this using a management process called the "Benefits Control Process", which reacts in real-time to the identification of blocks to progress in delivering an outcome (Show-Me Event). Using a table that connects outcomes ("Show-Me Events") to the cash benefits of attaining the outcomes ("CashPoints"), it triggers a radical re-plan of the project with write-off of sunk costs covered by securing the value of achievement of the cash benefit.

Mechanical and counterfactual causations, marshalled into episodes by their outcomes, give rise to the logical relationships that can be modelled using the Decision Table technique referred to under "Episodes" above. Just as episodes are reflected in the constructions of language and thought, so are the logical relationships of causation. Pinker (2007)²⁹ classifies them into:

Epiphenomena: Associative. For example, that analysis of data from an expedition in the Middle East showed a strong correlation between the incidence of Ground Squirrels and the dip of rocks in the underlying geology. It was thought highly unlikely that there was any causal connection.

Preconditions: For example, for a match to light after being struck requires oxygen to be already present.

Transitivities: For example, once President Kennedy had been shot he could not subsequently be re-elected.

Pre-emptions: For example, two assassins both fire at the same victim, but one bullet will get to the victim before the other, so that only one of the assassins can be responsible for the victim's death.

Over-determinations: For example, when a person is shot by a firing squad they will be hit by many more bullets than are needed to kill them.

²⁹ Pinker S, (2007) *The Stuff of Thought*, pp 212-215, London: Penguin.

These observations led AOD to show that the finish point of an episode can be defined as the point at which the states of variables are evaluated so as to direct which episodes are invoked next. The complete permutations of states of the variables can be set out in the question stub of decision tables. For each permutation the executable actions (in the case of a computer program, the executable routines) can be specified in the action stub and used to trigger the following episodes. The technique precisely and logically defines the causal relations between episodes.

In the early history of AOD this technique was used to design and code a suite of programs (episodes) to batch-process the examination results of the Institute of Chartered Accountants of Scotland. The resulting system was able to pause at any unforeseen data permutation (outcome), invite additions to the logic, re-compile and resume processing having learned how to manage the new circumstances with a different permutation of actions from a library of executable routines. Contrast this with applications that simply produce an "Error" message, which impede all business until fixed in some way. In the same way, in AOD a plan is constantly updated to learn from unforeseen events instead of being paused at, say, a Programme Stage Gate meeting to be "fixed" by changing the scope and /or the delivery date and/or the resource/cost (i.e. changing the outcome).

NETWORKS

NETWORKS AND LANGUAGE

Earlier in this note it was pointed out that episodes, such as strategies, projects and programmes and even simple tasks are connected by inclusion and sharing into a network. This enables us to apply Network Theory to the interaction and management of episodes in change. Network Theory has been widely researched³⁰ and gives many useful concepts and tools and for change management.

Humans use natural language to describe everything in their world. Computer programs have been written for networks that enable natural language text to be parsed and translated into semantic³¹ networks. As a result we can map the network of relationships of the things around us that we communicate with each other through language.

For example, take an episode of "The bank shut the branch," of which the outcome is "The bank branch is closed." In our minds the thing (object, noun) "bank" is connected with countless other occurrences of banks in our memory, together with countless occurrences of the syllable "bank" occurring in other words such as "bankable", "embankment", "mountebank", "Bankside Power Station" and so on. Similarly, "branch" is

³⁰ For an authoritative and comprehensive source, see Estrada, E. (2012), *The Structure of Complex Networks*, Oxford: OUP

³¹ Words, meanings and the relationships between them.

connected with occurrences of branches and other words such as “brandish”, “branch line”, “branching”, “bran” and through these with “dish” “line”, “linear”, “ching”, “chink” and so forth.

Within this same simple episode the transition (change; transitive verb) “shut” is connected with countless other occurrences of the transition (i.e. episodes) “shut” in your memory, such as “the man shut the door”, “her account was shut down”, “Shut up!” Not only that, but the syllable “shut” is connected with occurrences of other words/ideas containing it, such as “shuttlecock”, “space shuttle”, “shattered”, and “shutdown”. Then there are less direct connections, such as the partial alliteration in word/ideas such as “hushed”, “shunned”, “rushed”, “stuck” and “rust”. It is easy to see how this networking process readily enables recollection, insights and imagination.

Language is what we use to describe, communicate and manipulate the reality in which we find ourselves. It is a model of the reality of things³². In other words, the reality we want to manage when we set out to create new futures and attempt to manage using programmes and projects consists of objects, episodes of causation and changes of state of objects. And all of that is connected in Vast networks.

NETWORKS AND BRAIN FUNCTION

The scale of connectivity in the neural network in the human brain can be hinted at by considering that each brain has in excess of 50 trillion connections between its neurons. Once again, we encounter this concept of “Vast”; there are, after all, a mere 50 billion stars in an average galaxy. The nerve system of the brain is both one of the largest and the most compact networks known to us.

The network connections we can see in language and its episodic structure are the stuff of our conscious awareness, enabling us to not only create the model of the “real” world in which each of us lives and moves, but to be aware of and observe ourselves doing so. To bowdlerise Descartes, “My brain is able to observe my brain thinking, therefore I am”³³. The Vast scale of the connections and associations means, however, that the overwhelming majority of this activity in the network has to be unconscious. If it were not so we would be overwhelmed with uncontrollable recollections and thoughts.

Not least, the brain network enables us to very rapidly create images of what the world around us is *just about to be*. Why is this necessary? Consider the time lapses in the process of responding to something within our range of sight. There is a time lapse between light leaving the object and arriving at our retinas, because light travels at a finite speed of about 3.3 ns per 10m. There is a time lapse while we process the image into streams of digital-like signals that travel along the optic nerve to transmit it from the retina to the visual cortex, because the nerve signals travel along the optic and brain nerves at about 8m per 10cm. There is a time lapse while we process the signal in the visual cortex plus the time needed to combine the signals with information from our accumulated past experience of the world, perhaps 500ms. We then create an *imagined* but highly probable view of the world, all before the update of the *actual* view arrives from our other senses. What we see (or sense with our other senses) is always what the world was like milliseconds ago and not what it is like at the present. A player of very fast tennis, such as Andy Murray, is constantly anticipating where the ball will be by creating the

³² Pinker S, (2007) *The Stuff of Thought*, pp 124-151, London: Penguin

³³ Human brains, at least, are capable of observing themselves to be thinking because they unconsciously process many streams of thought concurrently – see again Ramachandran, V.S. (2011), *The Tell-tale Brain* pp 245-250; 278-282, London: Random House – producing an emergent sense of self and consciousness.

location of the next impact in their minds before the visual information of the actual event reaches their visual cortex and can be translated into motor action.

There are rare occasions when we can notice this process happening. Momentarily we misconstrue what we should be seeing. We might see what appears to be an apple but we quickly reconstruct that it is a peach; or a goalkeeper might see an incoming ball arriving from one direction before hastily reconstructing that it is arriving in another; or, more bizarrely, see a large dog apparently driving a car, before almost instantaneously reconstructing the view as a driver with long shaggy hair.

When AOD sets up Sow-Me events in the future and plans backwards from these events that are likely to have caused them, it is simply widening the gap between the present and the “created” future. It expands the time lapse between the “now” and the imagined future from some three milliseconds to the months, years or decades required of a change project or programme.

DEGREES OF SEPARATION

Fortunately for the Vastness of the real-world episode network (“so Vast that it is beyond comprehension”) and the brain network (“in excess of 50 trillion connections”), the structure of these networks is what is known as *small-world* (as opposed to *random*)³⁴.

In small-world networks the average path length of a connection is relatively small in comparison with the size of the network. The connectivity in a small-world network follows a power law. A power law is a relationship where a change in one quantity gives rise to a proportional relative change in another quantity. For example, the area of a square is the product of multiplying two of the sides of the square. A 2cm x 2cm square has an area of 4cm². If the length of the sides is doubled to 4cm x 4cm the area of the square is multiplied not by 2 but by 8, so the area becomes 16cm². The important point is that the factors in the power law do not depend on the size of the square (or anything else that follows a power law).

A result of this in a network is that nodes in the network are connected by fewer steps from each other than you might intuitively expect. A familiar example of this occurs in semantic networks, where we find that everything is connected with everything else within only six (or some say seven) degrees of separation³⁵.

The result of this for episodes is that they are unexpectedly closely connected, so that the involvement of one object, one transition or one outcome, readily triggers a cascade of effects (assuming the system is dynamically unstable – see next section). Hence the answer to a question “Can the flap of a butterfly’s wings in Brazil set off a tornado in Texas?”³⁶ is “Yes”. As Gladwell says in the subtitle of his book “The Tipping Point”³⁷, in a small-world network “Little Things Can Make a Big Difference”.

³⁴ Estrada, E. (2012), *The Structure of Complex Networks*, pp 49-50 Oxford: OUP.

³⁵ Steyvers, M and Tenenbaum, J (2005) *The Large-scale Structure of Semantic Networks*, Cognitive Science 29.

³⁶ Lorenz, E (1972) ‘Does the flap of a butterfly’s wings in Brazil set off a tornado in Texas?’ *Predictability*, AAAS Meeting 1972.

³⁷ Gladwell, M. (2000) *The Tipping Point*, London: Little, Brown & Co.

Our practical experience of this phenomenon is what we perceive as “recall”, “intuition” and “imagination”. It is what Tulving (1972) labelled “chronesthesia” and what Russo and Schoemaker (1989) are referring to in “prospective hindsight”.

The capacity to conceive a very specific and certain outcome to an episode in the future is no more than our *normal* approach to thinking, which requires us to create an image of a state slightly ahead of the actual present so as to allow for communication and processing time. Notice, however, that a system has to be in a special state for us to use this capacity further to cause change to happen. This is the subject of the next section.

It is the natural, although extraordinarily powerful, capacity of human brains that is being used when people applying AOD create “Show-Me events”.

The small-world nature of the network of episodes means that when in right-to-left planning in AOD we engineer or seize upon sometimes small and low-effort/low-cost events we often precipitate large-scale effects, or outcomes.

DYNAMIC INSTABILITY

WHAT IS DYNAMIC INSTABILITY?

A network of interconnecting parts – such as the network of a functioning organisation – is a system. Systems or parts of systems can be in one of two states; stable or unstable. Consider a pencil standing upright and balanced on its point. It is in an unstable state. From that position it must fall onto its side. It cannot continue in its upright, unstable state. It will change (fall) to a stable state. Once in a stable state it will take an input of new effort to change it into another state.

When a system is in an unstable state, or has other more stable states available within it, it is said to be “dynamically unstable”.

E.C.Zeeman (1976)³⁸ gives a simple example of dynamic instability. A rat is trapped by a dog in a corner between two walls. The rat both wants to fight and to flee. It has two more stable states than in the “threatened” state it is currently in; it can be in a fight or it can have run away. As the dog advances *both* the rat’s urge to fight and its urge to run away increase. The dynamic instability of the rat-system is increasing. There is a cusp between two paradoxical actions – fighting and fleeing – which becomes increasingly strong as time passes and the dog moves forward. If the dog advances far enough, the rat-system will undergo a “catastrophe”. It will flip to one of the two opposing states. Either it will fight or it will run away.

For a more familiar example, consider a work colleague who persistently grumbles to you about their job, but do not seek another employment. The more time passes, the more their complaints accumulate. They are in a dynamically unstable state. They can stay, accept the downsides of the job in return for the remuneration and

³⁸ Zeeman, E.C. ‘Catastrophe Theory’, *Scientific American*, April 1976 pp 65-70; 75-83.

any other benefits it has for them (status, location, etc.) or they can leave for another employment. Their problem is that *both* options are attractive to them. Eventually they are likely to flip either into taking a more upbeat view of their present employment or into leaving. That abrupt transition from a dynamically unstable state into a stable state is the subject of the next theme – Critical Mass.

CRITICAL MASS

At the point of the cusp of the catastrophe it takes a very small trigger to tip the rat into one of the two actions. A small change is multiplied into a large effect. This is the basis of the theory of Critical Mass³⁹. There are countless examples of catastrophe and critical mass in action. The last additional snowflake that starts the avalanche; the firing of the gun in Sarajevo that triggered World War 1; the falling piece of metal of the hedge-trimmer that causes countless missed meetings around otherwise unconnected international businesses.

What is happening at the point of catastrophe is that the energy that is bound up in the dynamically unstable state is released on transition to the more stable state. This energy is freed and transferred to other systems.

When AOD creates a future state described in Show-Me events and creates right-to-left plans from them, it is describing a future stable state and a stable history that led to them. AOD then specifies that the right-to-left plan should be overlaid on current forecast plans so as to highlight the dynamic instability between present plans and projects relative to the required future state.

Any superfluous work that is not going to deliver the necessary future state can then be cancelled so as to bring the concatenated plan into stability. This process normally saves and frees-up considerable (heuristically, between 40% and 60%) cost and effort. It is a systematic process for “working smart”.

PRACTICAL USE OF DYNAMIC INSTABILITY

Each event is an episode. One small episode can trigger many much larger episodes, cascading through a part of the network that is dynamically unstable. Notice that the converse is true. If a part of a network is stable, it requires a lot of input effort or work to make a change happen. It follows that, in order, to make a large change happen with little effort, it is necessary to find or create a dynamic instability. Great leaders, both good and evil, know this explicitly or instinctively.

This observation originally led AOD to the hypothesis, confirmed in AOD case studies, that small low-cost/effort changes identified in right-to-left planning are often enough to bring about large scale changes; which is what Gladwell⁴⁰ observed when studying how historical changes have come about.

³⁹ Ball, P. (2004), *Critical Mass; How One Thing Leads to Another*, pp 101-102, London: Arrow.

⁴⁰ Gladwell, M. (2000) *The Tipping Point*, pp 15-29, London: Little, Brown & Co

When Malcolm Gladwell came to analyse histories of large-scale social change he identified *tipping-points*⁴¹. According to Gladwell, a tipping point is “that magic moment when an idea, trend, or social behaviour crosses a threshold, tips, and spreads like wildfire”⁴².

We can also see that it is a catastrophe cusp in a dynamically unstable system. When Gladwell⁴³ reports that the crime rate in New York, having risen year on year for 30 years fell back to its original level in just five years, the alternative low-crime-rate state must have been already present and possible. The high-crime-rate-state cannot have been a stable one. When it “spread like wildfire”, that will have been through the interconnection of episodes over things, transitions and outcomes in a small-world network.

This is helpful, because it means that the three factors he identifies from history that are most powerful in bringing about change are factors that can be practically applied to bring about change in the future. They are:-

1. Communicators

It appears from work supported by the Army Research Laboratory in the USA that “...the prevailing majority opinion in a population can be rapidly reversed by a small fraction of randomly distributed committed agents who consistently proselytise the opposing opinion and are immune to influence ... when the committed fraction grows beyond a critical value $\approx 10\%$, there is a dramatic decrease in the time taken for the entire population to adopt the committed opinion”⁴⁴. Gladwell distinguishes three types of Communicators⁴⁵ who are good candidates for “committed agents”:

1. Mavens: people who accumulate knowledge and tend to tell other people about what they learn.
2. Communicators: people who have large and active networks.
3. “Salesmen”: persuasive people who are perceived as trend-setters and opinion-leaders.

It follows that if you can identify people who are communicators *and* are likely to become committed agents and then get the outcomes, which AOD enables to be defined as “Show-Me events”, communicated to those people, they will propagate the message relatively quickly across the whole community.

These observations have led AOD to specify that to help make change happen Communicators who are also likely to become committed agents should be identified and that the Show-Me Events (the specific, tangible, binary outcomes of the change episode) should be communicated to them.

2. Sticky Messages

⁴¹ Gladwell, M. (2000) *The Tipping Point*, pp 7-9, London: Little, Brown & Co

⁴² Definition on the home page of gladwell.com/the tipping point

⁴³ Gladwell, M. (2000) *The Tipping Point*, pp 8, London: Little, Brown & Co

⁴⁴ Xie, J. et al (2011) ‘Social Consensus Through The Influence Of Committed Minorities’ in *Physical Review E* 84(1) 011130 July 2011

⁴⁵ Gladwell, M. (2000) *The Tipping Point*, pp 38-80, London: Little, Brown & Co

People often complain of difficulty in recalling things from memory. We tend to overlook how hard it is to *forget* things that are forcefully imprinted on our memory. Memories attached to images and that involve actions and emotions are particularly hard to remove and have been described as “sticky”⁴⁶. Consequently, if the outcomes of change are defined in language that is hard to forget the message is likely to propagate across the community. Eloquence⁴⁷ is the skill of using such language and great leaders – again, both good and evil - are almost always masters of eloquence.

Of most practical value in bringing about change is that sticky messages influence the conscious and unconscious reactions of people focused on the day-to-day work of business as usual. As a result they help to harness an existing investment, the cost of the existing work force, in bringing about change. A good example is Donald Trump’s use of provocative and therefore unforgettable assertions during his election campaign of 2016. Note that it didn’t matter to the attainment of his objectives whether he meant what he said or not – only that they were unforgettable.

The “sticky messages” insight is used for military purposes. Senator Hiram Johnson is remembered for having said, in 1918, “The first casualty when war comes is truth”. It would also be true to say that “The second casualty of war is communication”, and “The third casualty of war is the plan”. Since before 1965 military doctrine and practice in the armed forces of Canada, Israel, Sweden, the USA, Britain and NATO has been for the commander of a war or a battle to communicate the end goal of an operation in one “sticky” message to *all* of the sometimes thousands of personnel involved, from the Commander to the bottle-washers. This is so that when truth, communication and the plan are lost, every individual still knows the objective they have to accomplish and tend to function and make decisions, autonomously if necessary, to achieve it.

These observations have led AOD to specify that the Commander’s Intent should be defined in eloquent language at the outset of a planned change and then communicated widely and repeatedly. Sometimes it may consist of using or adopting the aspirational part of a Vision Statement.

Certainty about outcome, when communicated, tends to be self-fulfilling. Russo and Schoemaker (1989) showed that when a future state is communicated in the past tense as “has happened” rather than “might happen”, people have a 25% more ideas of what has to have happened to achieve the outcome.

This observation has led AOD to specify that Show-Me events should be expressed in the future tense and as actions, such as “I meet ...”, “I talk with ...” “I am shown ...”, “I see that ...”, as if the future is already happening. It specifies that tipping points should always be expressed in the past tense, such as “We did ...”, “We implemented ...”, “They changed ...”, “We installed ...”.

⁴⁶ Heath, C. and Heath, D. (2007) *Made to Stick; why some ideas take hold and others come unstuck*, pp 15-19, London: Random House.

⁴⁷ For a comprehensive and readable resource on Eloquence, see Forsyth, M. (2013) *The Elements of Eloquence; How to turn the Perfect English Phrase*, London, Icon Books.

3. Context

Research by Kees Kieser⁴⁸ and many others has shown that our choice of actions is strongly influenced by cues in our environment. Gladwell observes how a change in the context in which a community lives profoundly alters how it behaves. For example, the prompt repair of damaged windows and constant painting out of graffiti on the New York subway was an important factor in the reduction of frequency of crime⁴⁹. The practical value of this observation is that by changing the physical arrangement, environment and appearance of an organisation we can strongly and quickly change how it operates.

These observations have led AOD to recommend that participation in model “offices of the future” and making and viewing videos of the future post-change state, built from scripts based on Show-Me Events, is an effective way of accelerating and ensuring achievement of outcomes.

*Whilst AOD promotes knowledge of the many techniques available to help cause tipping-points to occur in dynamically unstable systems of people, it is acutely conscious of the need to avoid the accusation of social engineering when bringing about change. **It is a fundamentally important principle of AOD that the process of identifying Show-Me events enables and reinforces the principle of democracy by ensuring that the outcome is defined by the stakeholders (i.e. the payees; investors, customers, taxpayers, regulators and in some circumstances employees) and not by an oligarchy, plutocracy, autocracy, technocracy or demagogue.***

BEHAVIOURAL AND CULTURAL CHANGE

Attempts to change behaviour in *prescriptive* episodes have often used the introduction of information technology to carry out routine processes previously done by people. Thus information technology in an organisation fulfils a similar function to the autonomic part of a nervous system. On receiving a given stimulus, a response is generated that does not involve any processing or decision-making in the higher nervous system.

Consider the difference in what happened between when you tried to drive a car for the first time and what happens now when you are an experienced driver. Your struggles with simultaneously managing gear lever, clutch, accelerator and steering are replaced by a smoothly-integrated flow of actions of which you are largely unconscious. The processes have been delegated to your autonomic nervous system. Like autonomic processes, IT in an organisation or society represents learned procedures that have been delegated to a lower level function.

For the very reason that they have been transferred into unconscious processes, however, embedded habits are very hard to change, as anyone who has had to correct their driving behaviours during a course in Advanced Driving, or anyone who has tried to change the behaviours of a business or entire community, will testify!

⁴⁸ Keizer, K. et al (2008) “The Spreading of Disorder”, *Science* Vol 322

⁴⁹ Gladwell, M. (2000) *The Tipping Point*, pp 142-143, London: Little, Brown & Co

Changes in behaviour in *ascriptive* episodes, on the other hand, are not easily replaced with information technology. This is because they require a considerable degree of creative thought and judgment based on private experience and emotional responses. This is the province of behavioural and cultural change, although artificial intelligence is making progress into this territory.

Besides the lessons from history described by Gladwell (2000) about how large scale changes in society have come about, there are many non-technological techniques available to help people to achieve behavioural and cultural change. These techniques largely belong to less formal sciences. Some of them are deployed in the AOD method, as follows.

UNDERSTANDING BEHAVIOUR IN THE FACE OF CHANGE

The Change Curve

Elizabeth Kübler-Ross identified five stages of grief in those facing and undergoing bereavement⁵⁰. These same stages have given valuable insight into how we deal with change, too.

Despite the assertion beloved of macho managers that everyone should welcome change, the truth is that change is very rarely good news for anyone in the short term. It makes skills we have learned useless; it renders knowledge that has given us status irrelevant; it requires effort to learn new behaviours and know-how; it makes work harder and not easier until we have learned new habits, and it may even threaten family stability with changes of location affecting others' schooling and jobs.

The stages identified by Kübler-Ross are Denial, Anger, Bargaining, Depression and Acceptance. When people become aware of changes that are going to happen that will affect them personally their initial inclination is to deny or hope that it is actually going to happen. Once it is clear that it is going to happen and will affect them, they are apt to become angry. Following from this they often try to see if they can bargain their way out of the change. When all efforts at evasion have failed, people usually become depressed and may even cash in their chips by leaving the organisation and/or by taking aggressive action. The need to protect an organisation from the results of mischief is one of the reasons why people being sacked are often made to leave the organisation's premises immediately. Finally, if the victims of change stay around, they have to accept the change. Eventually it will become the new norm for them.

These observations have led AOD to specify that the change curve is best managed by inviting people at the outset, when they are still in the denial stage, to look at model offices, videos and rich pictures of the future state (built from the scripts provided by Show-Me events) so that they see immediately what it might be like for them to live in the post-change Acceptance state. They then have the maximum amount of time to think, plan and act for themselves before the change actually starts to affect them.

In effect, AOD creates a bridge across the change curve. This enables people involved in change to minimise any traumatic stress to themselves.

⁵⁰ Kübler-Ross, E and Kessler, D (2005) *On Grief and Grieving*, New York: Scribner.

The Behaviour Iceberg

Many practitioners at the popular end of the field of behavioural psychology use an iceberg as an image of behavioural analysis. This model views results in change – the outcomes of episodes - as the interaction between external events and the way in which individuals, groups and organisations respond to the external events; in other words, their behaviours. This interaction is the part of the “iceberg” visible above the surface of the water.

The model establishes a chain between levels of response. It suggests that the way a person, group or organisation behaves in response to a change, which is what produces the visible results, depends on how they feel about the event that is happening to them. Their feeling is caused by how they perceive the event, which depends on what they believe the event to be. What they believe about the event depend on their past experience of it and knowledge about it.

For example, a person might be presented with an interview in which they are told that, as a change has made their post and role superfluous, they are being made redundant.

In the first case of this example, the individual *behaves* positively and focuses on what deal the organisation is going to offer. The manager is relieved and impressed so the *result* is that after the person has left the interview their redundancy is rescinded. Instead this “positive and constructive member of staff” is offered a different and better post. The reason that the person responded positively was that they *felt* pleased with the prospect of leaving an organisation they did not particularly like, taking a valuable cash package with them to go on to another company. The reason that they felt pleased is that they *believed* that they could get another job and still retain some of the value of the redundancy deal, so end up better off than they would have been if they had remained. The reason that they believed that this positive outcome would happen for them is because they had the *experience* of it happening to them before, at which time they had readily gained another job, so that the redundancy experience had stepped them up into a better financial position.

In the second case of this example, the individual *behaves* angrily and has a bad meeting with the manager. As a result, the manager feels that the decision to make the person redundant was the right one, so the *result* is that the redundancy takes place and the individual leaves the company. The reason that the person responded angrily was that they *felt* worried and upset with the prospect of leaving the organisation and losing their income, despite the value of the redundancy deal. The reason that they felt worried and upset is that they *believed* that they would not easily get another job and would have to use up all the value of the redundancy deal and face financial hardship. The reason that they believed that this negative outcome would happen for them is because they had the *experience* of it happening to them before and they had not been able to get another job until they had got into difficult financial straits.

The point to notice is that in both cases the event – the redundancy interview – was the same, but the outcomes were opposite. The difference lay in the individuals’ previous experience; hence their beliefs, hence their feelings, hence their behaviour and hence the results. This is why the solution to conflict so often turns out to have been communication, the sharing of experiences, between the parties in conflict. As Winston Churchill succinctly put it, “To jaw, jaw is always better than to war, war.”⁵¹

⁵¹ Remarks at a White House luncheon, June 26th 1954.

The message of this model has led AOD to suggest that expanding peoples' knowledge of what the outcome is to be – their “experience” – in personal, tangible and specific terms, again using Show-Me events as the script, can totally change their beliefs, feelings and behaviours, and hence the results.

This willingness to change in the light of more information is encapsulated in familiar phrases such as “If only I had known ...”, “If only you had told me ...”, “Ah, in that case I will ...”. It is another reason why AOD uses Show-Me events and uses them as a script for model offices, video and rich picture communication of the future.

Immunity to Change

Robert Kegan and Lisa Lahey have identified that people who accept the need to change and even desperately want to change their behaviours sometimes find it impossible to do so⁵². They are locked into a “script”⁵³, or a pattern of behaviours that repeats every time a certain trigger situation occurs. Kegan and Lahey call this “immunity to change”. It is necessary to understand why this happens and to have a technique that is likely to help them to overcome their immunity.

A summary of the steps involved is to assist the person to:

- Define the behaviour that they want to have in response to the particular event that triggers the problem (not the behaviour they want to avoid).
- Identify what they actually do instead when the event occurs.
- Tease out what they fear will happen if they do the new behaviour that they want to do in response to the event.
- Analyse what defensive actions (excuses, etc.) they take in order to avoid doing the new behaviour.
- Sort out what assumptions they are making on which the fears and defensive action is based, e.g. “When x happens y always follows”.
- Visualise what it would be like if the assumptions didn't actually happen and feel what it would be like if they had successfully done the behaviour they want.
- Go back through history to try to find the first experience that led to the assumptions.
- Design, prepare, run and interpret tests to explore what happens when the new behaviour is used.
- Notice carefully and thoroughly what actually happens when the new behaviour is tested.
- Keep preparing, running, interpreting and analysing the results of tests until the new behaviour becomes the norm.

This approach does not question the person's perception of the issues that are preventing them from making the change they want to make. It starts from their understanding of the problem and then gives them a process by which they are able to explore the blockage for fears that are driving it. It has similarities with the AOD process of Gamechanging, which are discussed in the next section.

⁵² Kegan, R. and Lahey, L. (2009) *Immunity to Change*, Boston: HBS Publishing Corp.

⁵³ Berne, E. (1974) *What do you say after you say “Hello”?* pp 5--84 Beverley Hills: Andre Deutsch.

The insights in the works described in this section have led AOD to recommend the Immunity To Change approach, the Behaviour Iceberg and the Change Curve to people (and groups and whole organisations) for them to use as tools to help themselves understand what is blocking behavioural and cultural change and to apply the techniques to get past the blocks.

ENABLING BEHAVIOURAL CHANGE

Applying Psychiatry to the Organisation

In 1974 the cybernetician Stafford Beer wrote a book called “The Brain of the Firm”⁵⁴ which viewed an organisation as if it were a person. Taking this analogy forward, AOD identifies that any organisation has attributes of an individual that are usually clear to a visitor and to someone who has newly joined the staff. It has:

- A Personality – behaviours, attitudes, language, myths and legends
- Self-Perception – posts, responsibilities, departments, skills, knowledge
- Habits, embedded in procedures, processes, IT Systems, production, machinery
- A Physique – buildings, locations, transport, communications, environments
- Relationships, with customers, suppliers, markets, products, brand

In order for a person to change themselves into a specific new state it is necessary for them to be able to visualise what that new state will be. The more clear, tangible and specific the description is the easier it will be for them to achieve it and for them and others to recognise when it has been achieved.

Neuro-Linguistic Programming⁵⁵ suggests that what a person believes is likely to be self-fulfilling. If a person has a clear, vivid and action-based view in their minds of a future state of themselves that they want to come about, they will consciously and unconsciously select from the millions of daily events they encounter that will achieve that state, particularly if the future state is written down at the outset.

AOD’s case studies suggest that if the future of the “person” that is the organisation is documented in Show-Me Events and those Show-Me events are widely shared both within the organisation and to its customers, the conscious and unconscious choices made by the very many individuals involved in and with the organisation have the effect of “pulling” the organisation into the expected future state.

This is yet another reason why AOD uses Show-Me events and right-to-left planning. The more realistic and vivid the medium used – for example video, model office, rich picture – the more powerful the pulling effect.

⁵⁴ Beer, S. (1974) *The Brain of the Firm*, London: Penguin.

⁵⁵ There are very many books on this subject but they are of variable quality. The “safe” reference is to the originators of NLP - see Brandler, R. and Grinder, J. (1979) *Frogs Into Princes; Introduction to Neuro-Linguistic Programming*, Moab: Real People Press.

Gamechanging

Given NLP's suggestion that what a person believes is likely to be self-fulfilling, it follows that negative beliefs can also be self-limiting. It is no surprise, therefore, that NLP talks of "self-limiting beliefs" and stresses the value of challenging them. You can see here the connection with Kegan and Lahey's (2009) treatment of immunity to change.

In an organisation facing change the people most likely to have self-limiting beliefs are those who say that the change is not practical or will make the future worse and not better. Often they are also the people who know most about the details of the business and how it works in practice, as opposed to the visionaries who often have a poor grasp of the details of reality and who don't want to be distracted by reasons why their vision might not work. The sceptics' knowledge of "the devils in the detail" is essential, yet left alone they will build fortresses of resistance to the change that the stakeholders want and need.

A technique is needed that captures the devils in the detail, addresses them and converts the people who are sceptical of change into proponents of change. On the face of it, this is a big ask, but it happens that an approach based on a CBT (Cognitive Behavioural Therapeutic) technique for OCD (Obsessive Compulsive Disorder) is scaled up in AOD to meet the needs remarkably successfully.

AOD uses insights from CBT to create a technique it calls "Gamechanging". Gamechanging gathers together the people sceptical of change and asks them to voice their concerns, frustrations and doubts. It takes them through a process in which they, the sceptics, translate their concerns into opposite, positive outcomes (Show-Me events) and then into their causes (tipping points) and so into a state beyond their "self-limiting beliefs" which they, not the facilitators, created.

Note that the positive statements are Show-Me Events representing the solution of the "devils in the detail" and that the outcome is an actionable plan owned by the sceptics.

The technique, which is very similar to one used by psychiatrists can CBT therapy in the treatment of OCD, has been widely used by people applying AOD to resolve apparently impossible face-offs with great success.

COERCING BEHAVIOURAL CHANGE

AOD strongly advocates that change should be pulled from the future and not pushed from the past. It firmly asserts that the future should be set by democratic processes. It takes the view that people should make change because they want to and they can, and not because they are coerced. The behavioural and psychological techniques that enable and reinforce all of these principles are described in the preceding part of this note.

The following section of the note sets out the other side of the coin, which is that of coercive techniques. Though manipulative, these techniques are very widely used in traditional change management, so it is important to be aware of them.

Nudge

Routine procedures that are used by large numbers of people in a community, such as form-filling, usually require choices to be made between alternatives. The choice can be left open, or one of the possible answers can be presented for the chooser to accept or alter.

For example, when booking an airline ticket there is some common sense in checking that your journey is insured against cancellation or accident. Of course, the airline would like you to buy an insurance service through them so that they can add to their revenue. Most airlines therefore provide the option to buy insurance as part of the process of booking your flight. Once upon a time this was offered as a “yes” or “no” choice but nowadays the choice is initially made for you as a “yes” and you are invited to change it to a “no” if you wish. Taking no action therefore causes you to buy the insurance – a good example of counter-factual causation. Provided you do not already have insurance for the flight and provided that you do not want to take any risk, this is a fail-safe default. Of course, it also helps to maximise the airline’s revenue!

Thaler and Sunstein⁵⁶ discuss this thoroughly in their seminal book “Nudge”. This book has been influential not only in the design of private and charitable companies’ systems but also in central and local government, particularly in the USA and Europe. The UK Government, for example, set up a Government unit specifically to help guide the UK population’s behaviour in the direction considered sensible. An interesting example that highlights the moral issues involved in use of the nudge technique to make change is the consideration being given in the UK for it to be assumed that all people consent to donate their organs for use by others after their death, unless they specifically request otherwise.

Wise Psychological Interventions

This debate has recently been lifted to a higher level by discussion of what are known as “WISP” (Wise Psychological Interventions)⁵⁷. These are informed interventions based on an analysis of the psychological situation.

For example, if individuals are reacting to a situation asking *why* they are responding as they are is likely to direct their attention to emotional reasons for their behaviour and so intensify an emotional response. If on the other hand they are asked “*what* is it that is making you respond as you are?” then their attention is directed to an agent external to themselves and so to an objective response. Other examples include the impact of change of context on criminality already quoted under *Practical Use of Dynamic Instability* and the phrasing of questions to direct peoples’ attention to the fact that their experience is not novel.

Practices within NLP and CBT seem to overlap with WISP, the chief difference being that WISP starts from a careful identification of the psychological context. What is “wise” is therefore variable and the WISP approach is not prescriptive.

Measurement and Targets

Many organisations use only one tool to make change. They set and measure numerical targets. There is no question that this approach is very effective at causing change to happen, provided that there is strong inspection of progress towards the targets and a culture of fear of loss and punishment about failure to attain

⁵⁶ Thaler, R. and Sunstein, C. (2009) *Nudge*, London: Penguin.

⁵⁷ Walton, G. (2014) ‘The New Science of Wise Psychological Interventions’ in *Current Directions in Psychological Science* Vol 23(1) pp73-82

them. The approach has the merit that it is very simple and requires very little effort or cost to implement. There is no wonder that it has been the mainstay of methods for change and for managing programmes and projects since time immemorial.

As a method of driving change, however, it has a fatal flaw, which has caused and continues to cause enormous cost and pain. Setting numerical targets and measuring progress towards them attains the targets, but it *normally* causes behaviours and results that are unwanted.

For example, in 2004 the UK Department of Health implemented a target for acute hospitals in the NHS (National Health Service) that 98% of patients admitted to Accident and Emergency departments must be seen, treated and admitted wards or discharged within four hours. This target was not achieved. Yet it has had some bizarre and unintended effects, which by 2017 were causing crises right across the NHS. In order to try to meet the numerical target, patients began to be held back from admission to the A&E department by keeping them in ambulances and patients are being moved out of A&E departments and kept on wheeled beds in hospital corridors pending admission to wards.

Meantime the behavioural changes that some hospitals have successfully used to meet or exceed the target are neither widely prescribed nor practised and the UK Government has not succeeded in changing the situation. Examples of behavioural changes that can achieve the service expected by the public are: triage and redirection of non-A&E cases at A&E reception; return of Primary Care (GP medical practices) to offering 24/7 services (which was abandoned under a new GP Contract in 2004-06 but being considered for reintroduction in 2017); gearing of GP funding to appointments instead of registered number of patients; transfer of funding from A&E to Social Care to relieve bed-blocking; and education of the public to take more responsibility for care of their own health and minor ailments so that they reduce their visits to GPs nor hospital A&E departments. Instead, the solution is seen as the provision of more money and resources, in which context it is interesting that at the same time as GP Medical Practices were permitted to cease out-of-hours services, the cost of GP services rose from £5.6bn in 2003-04 to £7.7bn in 2005-06.

In 2005 the Social Market Foundation published an exhaustive report into the UK Government's use of numerical targets in the public service to bring about delivery of policies⁵⁸. Despite its title, the document contains many case descriptions that make a systematic indictment of the use of number targets to deliver what is wanted in public services.

Where all the objectives of a job can be measured in terms of numbers, then the job is likely to be automatable and automation is likely to improve productivity. If qualitative and non-metric values are important parts of the objective, however, then using numerical targets to drive change and performance are almost certain to produce unintended consequences. The metric targets become *toxic incentives*.

Of course organisations must have numerical targets, but the AOD case studies have shown the way to achieve them is to change how the organisation operates in order that they happen.

It is essential to have and to use a different means from numerical objectives to cause the changes that will realise the targets. The means used to drive change must be able to cause specific, recognisable outcomes right across the organisation – in its “personality” (behaviours, attitudes, language, myths and legends); “self-perception” (posts, responsibilities, departments, skills and knowledge); “habits” (procedures, processes, IT Systems, production and machinery; “physique” (buildings, locations, transport, communications and

⁵⁸ (2005) *To the Point; A Blueprint For Good Targets*, London: The Social Market Foundation.

environments), and “relationships” (with customers, suppliers, markets, products and expressed in its brand). Devising such a means – Show-Me Events - as the outcome of studies of episodes was one of the first breakthrough steps in the history of AOD.

AOD uses Show-Me Events in place of numerical measures to “pull” change towards the future. Show-Me Events are binary has-or-has not happened states, so they are as absolute as numbers but avoid the problems of numbers. In AOD they enable absolute measurement of outcomes that cannot be measured in numbers.

They evidence the achievement of what the payees for change want but they do not dictate how the change is to be achieved. They enable the definition of the intended consequences, so preclude the possibility of unintended consequences.

Psychological Compulsion

In Unconscious Branding⁵⁹ Douglas van Praet describes how successively more highly evolved parts of the brain exert different types and strengths of compulsion to take a course of action.

The most primitive part of the brain is thought to be the amygdala. This part drives primitive urges required for survival, primarily fear of pain, loss and shame. Compulsions arising from appeal to this part of the brain are the most powerful by an order of magnitude and are nearly irresistible because they are about self-preservation in the face of the most absolute threats.

It follows that any proposed change that enables an individual facing to avoid personal pain, loss, shame or embarrassment is almost certain to result in co-operation. Changes that are positioned and perceived as helping to avoid physical pain, threats, “egg on my face”, public opprobrium, loss of money, loss of something people treasure or dismissal from a post are all the most compelling. That is not to say that this is morally a good way to go about making change happen.

The limbic system in the brain is thought to be more highly evolved part of the brain than the amygdala. Broadly speaking, the limbic system manages emotional responses. A simplistic way of thinking about it is in terms of compelling change by appealing to one of more of the Seven ‘Deadly’ Sins:

- **Pride** - Propositions that offer status, knowing something others don’t, belonging to an exclusive group or being envied by others.
- **Greed** - Propositions that offer more money and/or power or something that looks, feels or smells good (think of the feel and smell of a brand new car).

⁵⁹ Praet, van P. (2012) *Unconscious Branding*, New York: Palgrave MacMillan.

- **Sloth** - Propositions that offer to make things easier to do, particularly where they appear to take away the threat of having to make physical or mental effort.
- **Envy** - Propositions that suggest they can give you what others have and you want, or that you are missing out unless you buy what is offered or that your peers have something you don't.
- **Gluttony** - Propositions that sell food have to play on what makes people feel hungry. For example, it has been shown that people find food with an equal mix of fat and sugar, such as ice cream, very hard to resist.
- **Anger** - Propositions that create a sense of grievance and then offer to resolve it are persuasive. Think of how some politicians persuade people to support them.
- **Lust** - Marketing people often connect propositions with sexual images, for a good reason!

Psychological persuasion happens between people all the time, sometimes for good and sometimes for bad purposes. What matters is the intention of the persuader and their respect for the interests of the people they are persuading – consider, for example, persuading a child not to cross a busy road in front of oncoming vehicles - and degree to which the people being persuaded are aware of the persuasion and their consent to what is going on – consider, for example, the manipulation of documentary photographic images to bring about a false conclusion.

RATIONALISING INVESTMENT IN CHANGE

The cerebral cortex is thought to be the most highly evolved part of the brain. Unlike the amygdala and the limbic system it handles, amongst other things, reasoning and rational thought.

Strangely enough, appealing to rational thought is the least compelling pressure that makes people buy. Whilst the emotional responses of the limbic system may be an order of magnitude less persuasive than the visceral fears of the amygdala, the rationalizing of the cerebral cortex is another order of magnitude less persuasive than the temptations of the limbic system.

An unexpected message appealing to visceral fear is therefore many times more compelling than appealing to emotions, but appealing to emotions is many times more compelling than appealing to reason. This explains why it is surprisingly common for people and organisations to make very big investments even when there is strong rational case *not* to invest. Yet making a reasoned case and offering rational justifications are often held up as the right way to make a buying decision! This insight explains why how a company or individual that relies on a value-case for buying their product can find that they are strangely unsuccessful in selling it.

What a rational financial business case can do is to reduce reluctance to buy by giving *permission* to the buyer to give in to a compulsion to buy that has already been generated by visceral fear or strong emotions. In order to enable permission to make investment in change, great store is rightly placed on providing business cases in advance of clearance to proceed with organisational changes. As you might expect from the preceding paragraphs, however, business cases are commonly massaged to make the case for change appear rational. In particular, cash *benefits* as opposed to cash *costs* are almost always assessed after the costs have been added up. They are frequently thinly researched, seriously overestimated, weakly substantiated and tend to neatly exceed the pre-determined costs.

In response to this, AOD offers systematic and rational processes, firstly to find the extended set of candidate cash benefits that will result from achievement of the Show-Me events; secondly to enable cash values can be put on benefit changes that might otherwise be written-off as unquantifiable, and thirdly to enable both benefit and cost estimating to produce numbers that are possible, probable, factored for risk and double-counting, substantiated and challengeable. This addresses the criticisms of estimating thoroughly set out in Kahneman⁶⁰.

The procedures for doing this and how it works can be learned from the several authorised organisations that use and promote AOD within their methods and services. They are enabled by having AOD Show-Me events as their start point, but otherwise use straightforward reference to an organisation's Chart of Accounts, business and accounting knowledge and simple arithmetic applied in an innovative way. The science element of this part of AOD is confined to use of a simplification of Monte Carlo Simulation coupled with Fermi's approach to estimating using collateral data⁶¹, in a form of Bias-Free Estimating.

SUMMARY

The sciences of physics and psychology are continuing to be explored for further insights that will make AOD continue to be more and more effective as a tool to design and deliver futures. The fact that D4 has been commoditised means that it is constantly in use by individuals, organisations and in social contexts, so that new developments from the explorations of sciences can be immediately applied, tested, refined or discarded in the real world.

It is expected that this note itself will be revised from time to time to take account of new and improved understanding and practical experiences.

Applying AOD to itself, a key Show-Me event happens every time people say to each other "Of course we always start by agreeing what the outcomes are in terms of tangible, binary events that our investors and customers personally recognise. Of course we always plan back from the future as well as from the present forwards. Of course we do not use numerical targets as the drivers of change. That's just how we do things these days. Anything else would not be common sense. Isn't that how we always did it?"

⁶⁰ Kahneman, D (2012) *Thinking Fast and Slow*, pp 138-145, London: Penguin

⁶¹ Los Alamos National Laboratory (2005) 'Eyewitnesses to Trinity' *Nuclear Weapons Journal*, Issue 2 2005 p45; for many entertaining examples of Fermi estimating see https://www.mathcircles.org/files/Fermi_Estimates_Lesson_Plan.pdf

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