# MN4267 Creative Industries Essay

*On Risk in the Creative Industries*

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This paper seeks to discuss, detail and analyse the nature of risk in Creative Industries from an original perspective. I will not refer to any orthodox approach at all, at least in the sense of how it has been traditionally approached by writers in that field. I will attempt via theory, derived from the mathematics of non-linear thermodynamics, to illuminate the true natures of risk and creativity in that rigorously mathematical context. I will not directly use any mathematics, though everything in this paper can be validly written in formal specification. The references I use are entirely from peer reviewed scientific journals, or books written by well-known scientists based on peer reviewed scientific papers – this should offer a highly original treatment of Creative Industries as viewed from within its discourse. No attempt has been made to compare or contrast this paper's concepts with the orthodox ones (it's too confusing as there is considerable shared redefinition).

Before one can talk in any way meaningfully about risk, one must firstly address the thorny topic of Relativity[1] – this being a thermodynamically & logically consistent superset of *relativism* as post-structuralism would define it (Jackson & Carter, 2006). I will explain straight thereafter why and then go on to leverage that in the case examples.

## Relativity

As everyone realises as they age, opinion is subjective. The choice of what approach to take, decisions to make and path to follow have no certain answers even when all parties are being completely unselfish. One can have a perfectly valid argument about what colour to paint one's front door with neither side being 'correct'.

This leads to the paradox of Relativity – where my viewpoint of the world is *relative* to that of my peer group, whose viewpoint is in turn relative to that which surrounds it and so on (Maturana & Varela, 1987). Specifically speaking, cognitive perception is termed in perceived differences from the immediate environment rather than as objective features (Bateson, 1979).

Generally speaking, the more relative a viewpoint, the more true it is to that field of view but less so to a wider view. In other words, no one behaves irrationally according to their point of view though, of course, most people are taught to deny to themselves how they actually

[1] Yes, this is mathematically identical to the Einsteinian kind.

perceive the world and thus one gets neuroses[2] due to multiple points of view conflicting within the same mind.

Hofstadter, in his seminal *Gödel Escher Bach* (hereafter GEB), argues that enduring creative goods happen to be those which *transcend* many fields of view and thus approach (relative) absolutism by being relative to many things at once (Hofstadter, 1979).

This argument, though familiar to readers of Neale Donald Walsh's *Conversations with God*[3], almost certainly made no sense to most contemporary readers, so I will embody it in some examples. Witness the following painting by Hieronymous Bosch, a large copy of which I have hanging on my bedroom wall:

[2] "[Contemporary man] is blind to the fact that, with all his rationality and efficiency, he is possessed by "powers" that are beyond his control. His gods and demons have not disappeared at all; they have merely got new names. They keep him on the run with restlessness, vague apprehensions, psychological complications, an insatiable need for pills, alcohol, tobacco, food – and, above all, a large array of neuroses" (Jung, 1964)

[3] The only non-academic book I have mentioned throughout this paper.

**Figure 1: 'The Garden of Earthly Delights' by Bosch (1505)**

This painting, created around 1505, has something timeless about it. Never mind its strong similarity to the works of surrealist artists some four hundred years later, it somehow affects the cognitive mechanisms in humans independent of culture, social class or creed – indeed, were one to remove the left and right panels, the middle part of the painting could not easily be associated with Christianity nor Europe – note the presence of Black and Asian people and that of elephants and giraffes. Not bad for a Dutchman who barely travelled.

This is an example of something intuitively relative to all kinds of human across all times – and thus it becomes an absolute *relative* to human beings given its dependence on the human visual processing system. As I have often said, "the higher the art, the longer it holds people's attention" and I find few clearer examples than this.

My second example is that of mathematics, and my apologies in advance if this makes no sense. Any formal system requires a *meta-logic* i.e.; a set of rules to define how that system works (Penrose, 2004)[4]. For example, our standard number sequence 0, 1, 2, 3 ... can be defined as the iteration of $x_n = \{ \phi \} + x_{n-1}$ i.e.; 'zero' is the null set, 'one' is two null sets, 'two' is three null sets and so on[5]. However, set theory has its own meta-logic, and of course that meta-logic has a further meta-logic again. In fact, one can aggregate all possible meta-logics via induction and get into some very interesting stuff such as paradox logic[6], and indeed the question of the nature of infinities has been one of the most productive theoretical topics in both maths and physics for many centuries – and it will remain so for many more.

I don't go into any of this to confuse you deliberately for the sake of it. I simply say it because it is so, and to show how Relativity is intimately bound up within mathematics itself and thus all scientific explanations of our world. This was only stumbled upon by Bertrand Russell and Alfred Whitehead in 1913 (Whitehead & Russell, 1911-1913) and only proven by Kurt Gödel in 1931 (Gödel, 1931) so are still coming to terms with it – Hofstadter shows in GEB how the number one is relative to other numbers, how the whole Euclidean number system is relative to that which surrounds it and how the entire of mathematics is relative to *not* itself which is a fascinatingly powerful paradox (Hofstadter, 1979). Yet I think that the power of mathematics is unquestionable in modern society – modernity is exactly the

[4] For reference, this is Penrose's *magnum opus* which, in one book, describes our entire current knowledge of the Universe from first principles. Needless to say, it is very mathematically heavy but it does start with a description of number theory.

[5] Non-mathematicians may wonder why converting the number sequence into a conglomeration of sets is in anyway useful. Think of it this way – you just took an infinite amount of numbers (in other words, an infinite amount of information) and *compressed* them into a very simple rule which you repeat (iterate) an infinite number of times. Thus one has just *transformed* a spatial infinity (size) into a temporal infinity (time). There are different meta-logics for spatiality and temporality, so one can thus unite the meta-logics to create a super-meta-logic which is more powerful.

[6] Graham Priest, one of the inventor's of paradox logic (Priest, 1979), teaches in our own St. Andrews Philosophy Department.

understanding and mastery of mathematics, without which we are cavemen. Yet mathematics is extremely relative, indeed the whole point of pure maths is that it can be relative to many things at once – thus one can see the transcendence.

I am now going to go further and say that those creative goods which are successful depict, or even advance, some mathematical truth, which in itself is also a creative good. Intellectual Property law of course treats mathematical truths as being unpatentable and uncopyrightable because they are innate facts of the Universe. However any mathematician knows that one has to be quite inventive at times when working with mathematics, and indeed as Whitehead and Russell proved, any line you draw between maths and anything else is entirely arbitrary because no matter where you begin, you end up where you started at the same time as you don't (a paradox). I appreciate that this concept is as controversial to the wider public today as when Hofstadter tried to explain it in GEB to the masses in 1979 – even those who have read that book disagree strongly with the idea that art or music are entirely expressions of mathematical truths eliciting emotional states[7]. Yet any scientist or engineer takes it as a given via their praxis, and I would challenge any artist or musician to counter Hofstadter's argument – furthermore, there is substantial empirical evidence supporting him (Capra, 1997).

## Meaning & Risk

The reason we had to wade through Relativity was because it underpins the definition of *meaning* and **entirely** bound up in meaning is risk, because risk is by how we transform uncertainty. Historically, thanks to Cartesianism[8] (Capra, The Web Of Life, 1997), we have put the cart before the horse and thought that with sufficient knowledge and control, risk is eliminated.

That is a very deeply embedded notion within Western culture. Even post-structuralist notions of semiotics and intersubjectively negotiated truths have failed to eliminate the belief in ideals, absolute truths and our ability to order the Universe as we please given sufficient technology. The thing is, there is no shortage of evidence that the old mechanistic ways do work – we have instituted global systems which tick along as well as any clock.

[7] By 'mathematical truths' I mean that they are identically untruths, and through the contradiction one generates what Hofstadter calls a 'strange loop' and thus cognition gives forth to emotive meaning via recursive logic (recursion is when something includes itself as part of its definition). I apologise that I have not summarised GEB better, that book defies easy or short explanation as its author himself noted in the 20th anniversary introduction.

[8] Cartesianism is from Decartes who was the first of the mechanists. Mechanism is the belief that the Universe is a machine and ticks along much like a clock – thus, if you fully understand the machine and its current state, the Universe becomes completely predictable.

The problem with the current way of seeing the world – and I have seen this repeated often during my Management course at St. Andrews – is the implied assumption within the Management theories that if an organisation has the superior structure at the right time, disaster will not follow. There is much talk of core competencies, or superior organisational culture – or even within the music industry of the next "hit record". Post-structuralism inherits from structuralism the mechanistic assumption of a fixed & linear time i.e.; only the linear parts of the process in between the paradigm shifts (Kuhn, 1962) are really ever dealt with rather than the non-linear process of growth which drives the evolution of those structures. For this reason, it gets the nature of risk wrong, and it requires relativistic thermodynamics to put things right (hence all this writing on risk before we even begin with Creative Industries!)

What I am about to explain is far clearer using mathematical notation, but I will try anyway. The key concept throughout is that non-linearity of time is caused by Relativity, and that non-linearity causes contradictions which in turn determine success and failure – and thus riskiness.

As the future is uncertain and therefore unpredictable, we humans[9] try to convert uncertainty into risk by deriving expected futures based on probabilistic analysis of the past. For example, no one can predict whether an individual coin toss will be heads or tails (uncertainty), but we can approximate that there is a 50/50 probability of either (which is risk). Similarly, there is a probability of getting mugged (given one's 'position'), or there being a catastrophic storm (given one's 'position'), or having X children (given one's 'position'). One can already see Relativity at work as denoted by the 'position'.

This is fundamentally an *abductive* process because it involves deriving a simpler rule from a large set of results – which is identical to the fundamental process within the scientific process[10]. Should a simpler rule have very large explanatory power, it tends to become embodied as a mathematical or scientific 'law' – though **only** if the mathematics or science of the time is capable of absorbing it; if not it tends to become a cultural 'law' e.g.; the rather useful, but currently scientifically difficult, notion of God. Thomas Kuhn called this absorption occurrence a paradigm shift.

[9] Actually, all life does that via genetic selection: an animal may grow or shrink a limb based on how useful it is versus the costs within its given environment.

[10] Science likes to think it is being inductive rather than abductive, but induction is only possible in pure mathematics or logic. For example, Newtonian mechanics are *very* close to perfect especially with large masses at low velocities but it required the superset of Relativistic mechanics to explain small masses at high velocities. Furthermore, Relativistic (or Newtonian) mechanics don't work at all well when energy is moving through the object as you get thermoelectromagnetic effects.

From a bootstrapped systems[11] perspective, one sees systems within systems ever constantly evolving into newer, more expressive formulations (Capra, 1997) e.g.; language becomes more powerful, science becomes more powerful, *meaning* becomes more complete – as the expressive power increases, capability rises. After all, the only thing separating us from the stone-age humans living 20,000 years ago is our shared corpus of meaning – we are genetically almost identical (Homer-Dixon, 2007).

Once one has abduced a simpler rule, even if utterly inexpressible by any written or spoken language, it augments the system and thus the organisation which expresses that system (i.e.; it transforms the structure). Thus one sees uncertainty being converted into risk via organisational structures such as insurance, government, information networks, trade, finance and culture. A bad harvest in one region now just means more expensive grain due to increased imports rather than all out famine; a flood shares the cost of rebuilding out over society and across a few years; news of a coming tsunami moves people away from beaches – and so on. Wherever you look, volatility is smoothed out of the local level and directed into giving forth to advancement i.e.; **randomness/uncertainty <u>is</u> food**[12] (Chaitin, 1990).

Note that there are two types of advancement: (i) a whole new rule or (ii) a new/improved application or dissemination of a rule. Note that these rules can, and do, get applied to new fields. Note furthermore that over time, *we cannot fail* as the system is always improving and there is overwhelming evidence supporting this[13]. However, this only works if you learn from your mistakes, and in general all life (that survives) does, which means that *you will mostly fail* even though *we cannot fail* where 'we' is defined as the entire Universe (another contradiction caused by Relativity). As is well known, 99% of all species and 99% of all firms fail (Ormerod, Why Most Things Fail – Evolution, Extinction & Economics, 2005), so once again we see a shift via Relativity from the particular to the wider picture.

[11] A bootstrapped system is one which starts with no fundamental parts i.e.; it bootstraps itself into existence. This requires it to be self-referential in order to generate the feedback effects kicking itself into being.

[12] This is mathematically AND thermodynamically AND biochemically true. This statement is the solution to so many of society's problems I don't know where to begin. The first book that I know of to dedicate itself purely to an application of this principle was Eric Jantsch's *The Self-Organizing Universe*, a book so far ahead of its time that only 10,000 copies were ever printed (Jantsch, 1980). There have since been many, many more – anywhere where chaos theory is deployed (Stewart, 1997) with the most recent that I have read being *The Upside of Down* (Homer-Dixon, 2007).

[13] From every test we have (e.g.; astronomy, the fossil record, ice coring) we know that galactic and planetary biodiversity have been exponentially rising over time. Yes, *exponentially* rising. Even more interestingly, the recent boom of our civilisation exactly matches the overall exponential curve certainly for the last 1bn years with a good match for the last 4-6bn. Ray Kurtzweil bangs on about this a lot, though his reasoning is severely broken.

What I have just outlined is fundamentally different from the standard conceptualisations of risk and creativity precisely because it incorporates non-linear time, thus making it thermodynamically valid. And we have concluded with the very important point that food is equivalent to uncertainty itself.

I am sure you are wondering by now 'so what'?

## Creativity

Well, here's the rub: you can convert uncertainty to risk when you have an organisational structure in place which is capable of such a transformation (think of it like a big enough throat to handle swallowing a really large mouthful of food all at once). In other words, if one has experience of something, and that something has some sort of pattern to its behaviour, one can ameliorate its behaviour. If however one does not have experience of something, how it turns out becomes very unpredictable indeed. One is beginning to see kinds of creativity spring up.

Unpredictability can be very good or very bad with anywhere in between – the key is to ensure you can fail gracefully (e.g.; by not initially investing too much in its success). Generally speaking though, even if a major truly innovative advance is made, the existing organisational structures find it such a shock that they are broken by it and failure results. As noted by Ormerod, 99% of new species fail often not because they were bad at what they did, but because *they were too good at it* – they overloaded their ecosystem and the entire edifice collapsed (as is happening right now with our own species). Of course, failure doesn't care which way round it is because it's all the same in non-linear time – hopefully by now, from the many times that I have contradicted myself and convoluted the English language (which is highly maladapted to describing this sort of stuff), you are getting the picture: it doesn't matter which came first in the case of the chicken and the egg when time is non-linear.

Therefore what becomes *structurally* important is (in order): (i) high quality, timely information (ii) compartmentalisation (iii) fallback systems (iv) checkpoints (v) oversight and (vi) adaptability. This is rather different from the traditional list in Management, but is entirely familiar to an engineer building a ship or bridge. The difference lies in the components of the structure – a creative industry changes itself, whereas a bridge is changed by a creative industry.

To introduce the creativity part, the key differentiating a creative from a static structure are the flows of creative process, and I have drawn together four fundamental kinds thereof:

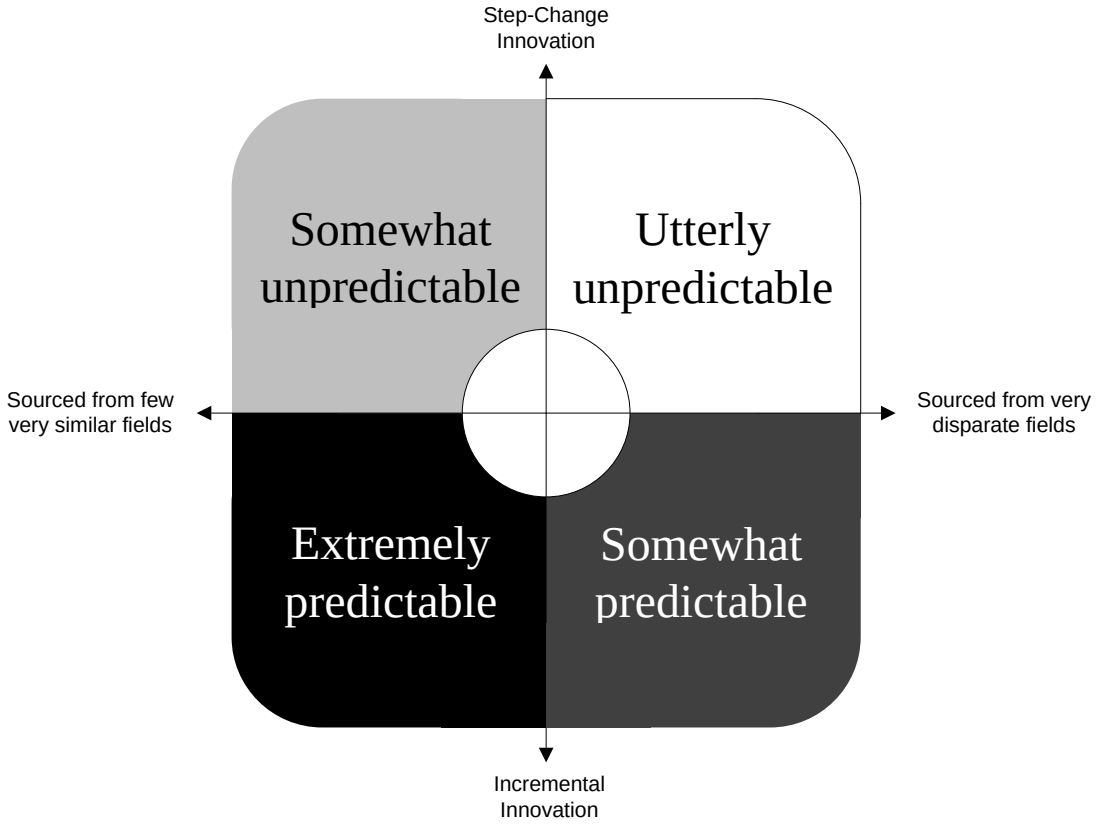


**Figure 2: The four fundamental kinds of creative process**

In a nutshell, if one makes a step-change (i.e.; non-obvious relative to that field) innovation, and the originator of the innovation came up with the innovation by basically plucking it from the air (i.e.; sourced from the originator's entire life experience e.g.; through intuition or a connection with God), then the results are extremely uncertain (= the top right). This corresponds to extremely whacky ideas and generally speaking, only the originator fully understands them as society's language simply cannot transfer the meaning (something you may have noticed earlier on in this paper!). A good example would be quantum physics whose full meaning continues to defy description past Eastern religious description[14].

Now if one field undergoes a step-change innovation, other nearby fields may take that step-change and apply the same transformation to itself (= the top left). One has already witnessed the effects of the step-change transformation on the other field and thus one can infer to some extent what will happen. A good example would be the application of quantum

[14] Much of which is based on *koans*, which are paradoxical poems designed to aid enlightenment. It was realised by the original quantum physicists that Eastern religions such as Buddhism corresponded almost exactly with quantum subatomic particle physics. One of the original physicists, Werner Heisenburg, only wrote about this publicly after retirement (Heisenburg, 1971), Capra dealt with it and nothing else in *The Tao of Physics* (Capra, The Tao of Physics, 1976) which was subsequently extended by Hofstadter in GEB (Hofstadter, 1979) and many more since including (Capra, The Web Of Life, 1997).

physics principles to philosophy which was performed primarily by Derrida and Foucault, yielding post-modernism & post-structuralism, which was anticipated by Bertrand Russell in the final chapter of *A History of Western Philosophy* (Russell, 1946). This is extremely obvious when considering the rejection of reductionism[15], objectivity or absolute truths[16] and binary opposition[17] amongst many others – not that I have seen many people ever say so. Of course, one can conversely argue here that quantum physics was undiscoverable until society had become sufficiently advanced to do so, but I've already shown how non-linear time embraces that contradiction.

Incremental innovation is where obvious improvements are made – this is still innovative as the *application* of the improvement requires original work i.e.; a bespoke solution. Needless to say, because they are obvious, their effects are considerably more predictable. Nevertheless, it makes a huge difference if the improvement is obvious because it is copied from a very close equivalent or rather by drawing together new theories – and it can sometimes be difficult to realise which is which at the time[18]. As an example, consider the difference between a screwdriver and a motorised screwdriver: a normal screwdriver is rotated by the human arm, so a very obvious incremental innovation is to add an electric motor to perform the rotation for you. To have an example of the left/right distinction in incremental innovation, consider the difference between a mains powered motorised screwdriver (= the bottom left) and a battery powered motorised screwdriver (= the bottom right) – the addition of the battery brings in problems of high current flow, recharging mechanism and extra weight – which raises the possibility of unexpected contraindications.

[15] Reductionism being the belief that complex things can be fully understood by breaking them into smaller parts for analysis. This approach, which is highly successful in our macro-world, ceases to work at the quantum world.

[16] Due to the realisation that the observer must affect the results i.e.; how, when and even *why* one observes utterly changes the results of that observation.

[17] Binary opposition is simply dualisms such as male/female. Classical Physics had charge as positive/negative, but quantum physics unfortunately showed that positive charges could quite happily become negative or vice versa. Thus it became the semiology of the relationships which bind rather than the things in themselves.

[18] For example, in the late days of wooden ship building it seemed sensible to use metal rivets to bind planks of oak. Unfortunately, no one then realised that oak emits acids during its lifetime which corrode metal and thus a whole new industry was born dealing with how to replace metal rivets in extremely hard to reach areas. My point is that the use of metal rivets seemed an obvious & safe improvement – unfortunately, it turned out to be extremely expensive in the long run.

## Conclusion

I have spoken at length about the true nature of uncertainty, and meaning and thus risk: Uncertainty is food, Meaning is a logical paradox and thus Risk is a cognitive organisational structure constituted of paradoxes, feeding off uncertainty. All three of these conclusions are not my own – they have been assembled from leading contemporary scientific theorists. I then proposed a framework for analysing the relationship between predictability and advancement, and thus a much improved method for analysing risk in the creative industries by focusing directly on the nature of creative steps being undertaken[19]. My approach certainly beats the CAPM equation in financial economics which simply says that the required rate of return is proportional to the risk of the project – something sadly used ubiquitously in modern financing.

Which brings me to the concluding point of this paper, and precisely why I had to begin it with a more accurate discussion of meaning and organisation. Creative ideas are cheap and plentiful – the really valued thing is **excellence of execution** of any idea at all, good or bad actually. You can have a creative idea which will end all war and cure cancer – but it matters not a jot if it isn't implemented because the person who invented it isn't willing to invest what is required to enable that creative step. And here's another contradiction: implementing change tends to require extremely conservative processes behind it, and the bigger the change the more effort is required. The standard issues of self-sacrifice, wide information dispersion, dedication, perseverance, and discipline are clearly very necessary – few of which are strongly associated with hippy type radical thinkers.

In fact, if anything, it is a strong conservative Protestant work ethic which frees change upon the world – perhaps Milton Friedman was right after all, the left controls and the right frees (Friedman & Friedman, 1980).

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[19] I originally had a series of case studies in television and software development providing empirical evidence of the framework's usefulness in determining risk and showing how much more useful it is than traditional methods. Unfortunately, I was well exceeding 8,000 words by that time and running out of time, I simply chopped it down to the current 4,500.

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