Chapter

# Systematic e-Service Innovation

*Darrell Mann*

## Abstract

Most service innovation attempts end in failure. Systematic e-Service Innovation is the result of a twenty-year program of research to reveal the 'DNA' of the successful attempts. The research shows: 1. Most service innovation attempts fail on their first day because they begin from a false understanding of what customers want. Organisations know they are supposed to listen to the 'voice of the customer', but, despite massive amounts of digital data capture, they still have little idea what to listen for. 2. The number of service challenges is very finite, and guaranteed that someone, somewhere has already solved your service problem. 3. The most powerful solutions are the ones that successfully eliminate the compromises and trade-offs conventionally viewed as inherent to service operations. 4. There are only a small number of possible strategies for overcoming such contradictions. 5. Service industry strategy, business and market evolution trends follow highly predictable paths.

**Keywords:** first-principles, big data, TRIZ, intangibles, experience economy, contradiction, s-curve, Hero's Journey

## 1. Introduction

In 2016, the digital economy worldwide was worth US$11.5 trillion, or 15.5 percent of global GDP. The outstanding performance of the digital economy is mainly attributable to the development of a consumer-driven Internet. By 2025, the industrial Internet is predicted to experience massive growth, with industries across the board seeing high levels of digitalization and intelligence. By then, the digital economy is expected to grow further, to 24.3 percent of global GDP. This rise, even taking into account the fact that the value of digital offerings is underrepresented in GDP figures [1], if it happens will come about largely through innovation. The digital economy, and particularly its service elements, in this sense is the fastest changing sector the world has ever seen.

### 1.1 Service

In some countries, the economy is already dominated by services rather than products. Recognition that customers want the functions that products deliver but do not necessarily want to own the product is the primary driver behind this trend. Customers receive all the upside of being able to perform the jobs they wish to get done (mobility, communication, eating, laundry, learning, managing their finances, etc), without all of the downside of initial capital outlay, maintenance, or eventual replacement of the products required to deliver the required functions. This product-to-service shift represents a vital step towards a more sustainable society.

Prior to their shift to a 'power-by-the-hour' functional sales model, for example, the jet-engine industry had a strong imperative to make engines that required frequent overhaul and replacement. When customers receive 'free' engines that they only pay for when they are being used, however, the engine manufacturers quickly recognised a strong incentive to design engines that lasted a lot longer and required less maintenance. Such transitions, in many cases, only become possible thanks to the benefits attributable to digital technologies…

**1.2 e-**

…in parallel with the product-to-service evolution trend there is a pattern of evolution that sees 'mechanical' technologies evolving towards electronic and digital solutions. The mechanical keypads found on the first mobile phones have evolved to become digital touch-screens; the 35 mm film used to record photographic images has become digital; the physical money traditionally carried in people's pockets, is increasingly becoming 'e-cash'. People used to visit shops and now increasingly shop online. There are literally thousands of examples of such physical-to-virtual transitions [2]. The common factor – that it is easier to move electrons rather than atoms – again delivers inherent environmental benefits as well as being better able to serve customer needs. As such digitalisation looks set to be a trend that will also continue for the foreseeable future.

**1.3 Innovation**

The rise in the importance of innovation offers up another highly visible evolution trend. This trend is driven by the convergence of a host of other societal trend patterns. Globalisation, the transparency emerging through social media, rising populations, climate change, finite natural resources combine to create, firstly, an imperative to find better ways of doing things, and, secondly, an increasing likelihood that if incumbent organisations fail to meet shifting customer needs, someone else will step in.

'Innovate or die' has been a commonly used aphorism for close to two decades now. More often than not, however, it becomes 'innovate *and* die'. 98% of all innovation attempts end in failure [3]. The world of innovation, in other words, is one that is largely dysfunctional. There are many reasons for this, but two stand above the others. One, is the growing recognition that innovation is not the same as the 'continuous improvement'/'operational excellence' management philosophy that has been dominant since the quality revolution of the 1970s. Rather it is the opposite. Methodologies like Lean and Six Sigma, while extremely potent ways of driving improvement, turn out to drive problem solvers in precisely the wrong directions when it comes to innovation. In Operational Excellence world, for example, 'variation' is bad and therefore needs to be eliminated, but in Innovation World, variation is in many ways the prime enabler of identifying step-change opportunities and solutions.

Second is the definition of the word innovation. Over 90% of authors using the word use or imply a definition that equates innovation to either 'new ideas' or, more commonly, 'new ideas that are launched onto the market'. Neither of these definitions, however, makes any kind of sense from the perspective of enabling better understanding of how to innovate. By either measure, e-service providers like Uber count as innovation, but, at this point in time, the Company has lost and continues to lose vast amounts of money. To the point, many investors are beginning to believe that they will never become cash positive. Any prospective innovator taking organisations like Uber as models for their own projects is only likely to

fall into the same financial black-hole. The only innovation definition that makes sense is one that includes a success metric. For most enterprises this metric will be financial in nature – achieving a net positive ROI for example, or customer value, or profit – while for others it will be measured in other ways – patient life expectancy or quality of life. Whatever the chosen success metrics are, a new idea only becomes an innovation once they are met. The primary importance of using this definition is that it is the only one that enables a possibility of acquiring and sharing repeatable best practice…

### 1.4 Systematic

…much of the 98% failure rate found in Innovation World comes from the fact that innovating is difficult. It demands that innovators embrace the innate complexities of the world. It demands they are willing to venture into the unknown. And that they are willing to persevere through the many false-starts, insurmountable obstacles and dead-ends, through the maze of mis-information, mis-interpretation, confusion, stress, and sleepless nights. In many ways, the 2% were first and foremost lucky. They prevailed predominantly by trial and error. Perhaps ironically, the digital world has been lucky enough to stumble upon 'methodologies' like Agile and Scrum, and has evolved the concept of the hackathon in order to increase the speed trial-and-error iterations are able to be performed. The irony being that, even though consistent with working in complex environments, the rapid-trial-and-error strategies of many in the digital world have had little or no impact on the overall innovation statistics. 98% of all innovation attempts fail; 98% of e-service innovation attempts fail.

The big idea underpinning 'systematic' centres around the removal of the trial-and-error randomness from the e-service innovation process. In effect it becomes, like its TRIZ forerunner [4], a programme of research to decode and reveal the 'DNA' of the 2% of successful attempts. When dealing with complex systems, as we inevitably are when it comes to innovation, such a task is fraught with difficulties. Not least of the reasons being that it is never possible to 'step in the same river twice'. Just because an innovation team replicates all of the steps of a previously successful innovation project does not guarantee their success. In fact, given the general speed of change in the world, the surrounding context and environment of any previously successful project is inevitably different in today's project. Many prospective innovators, unfortunately, have been taught that 'doing the same tomorrow as you did yesterday and expecting a different outcome' is one of the first signs of madness. Such an aphorism might have made sense in simpler times, but it carries little if any relevance in a complex world. To the extent that the 423 Fortune 500 companies from the original 1950s list that no longer exist could all be said to have fallen precisely into the trap of continuing to do what they'd always done and expecting to get the same money-making results.

'Systematic' and 'complex', in other words, do not traditionally make for good companions. 'For every complex problem there is an answer that is clear, simple and wrong', says another dangerous aphorism. It is an aphorism that might today be extended to say that every complex problem has *thousands* of clear, simple wrong answers. But in making that extension, now that the appropriate research has been conducted, it also becomes possible to say that every complex problem has at least the possibility of a clear, simple right answer. Provided that the first principles of innovation have been incorporated into the simplicity. This, then, has been the basis of the Systematic Innovation research programme [5] over the course of the last two decades: to understand complex systems from a first principles perspective. Which, in the first instance, means examining millions of case studies and looking for

patterns. There being vastly more examples of failed innovation attempts than successful ones, this in turn means looking at failed projects and looking for repeated failure mechanisms.

The results of this analysis – which to date has incorporated over 11 million case studies – is that when innovation attempts go wrong, they go wrong for a very small number of reasons. When it comes to e-service attempt failures, that number, as shown in **Figure 1**, is effectively three:

Which can be elaborated upon as follows:

1. Jumping off the cliff with the wrong parachute – most e-service innovation attempts in effect fail on their first day because they have misunderstood the customer need. They have, in other words, started with the wrong problem. They have listened to a 'Voice of the Customer' that was never there. Or was wrong. Or partial. There are two ironies here. The first is that listening to the customer's Voice has long been an established norm. While it makes sense in Operational Excellence context, sadly, it makes no sense at all in Innovation World. Customers know that they want faster, cheaper, etc., but they usually have no idea at all about what might be possible. This is especially the case when it comes to the emotion-related aspects of a prospective innovation opportunity. Many customers would like to be 'cool' for example, but that is something they are highly unlikely to even covertly specify in the catalogue of requirements that eventually finds its way to the e-service development team. Much of the 'real' customer need is unspoken and unwritten. As if this were not bad enough, the second irony is that while the rapid iteration processes that come with Agile, Scrum, etc. are in theory all about going regularly going back to the customer with prototypes to obtain their feedback, project teams still do not uncover the real innovation opportunities. 'The Wrong Parachute' means in effect that the majority of innovation teams do not know how to find the 'right' problem, and, even if they accidentally did find it, still would not know they'd found it.

2. Failing to solve the Ordeal. One of the key first-principle differences between the 98% of failed innovation attempts and the 2% successful ones is that the 2% almost invariably identified and resolved one or more contradictions. The 98% continued the Operational Excellence derived belief that the only way to deal with trade-offs, compromises, conundrums, paradoxes, chicken-and-egg problems, and whatever other terms get used a synonym for contradiction, is 'optimisation'. Innovators solve contradictions. Contradictions are the 'David-versus-Goliath' challenges that are inevitably attached to any step-change situation. Again, in theory iterative Agile processes, given enough designers


**Figure 1.**
*Three primary sources of e-service innovation attempt failure.*

and design iterations, should in theory eventually stumble upon contradiction-solving solutions. In practice, however, because almost no designers have been taught that contradictions can be solved, what happens is that Agile and Scrum devolve into trade-off merry-go-rounds which simply transfer the trade-offs from one design parameter to another, until eventually the team ends up, whack-a-mole like back where they began.

3. Failing to find the Road Back. The third problem concerns execution of the innovation project and what might be seen as a failure of perseverance. This is the part of a project where using the wrong definition of 'innovation' comes into play. It is one thing to find 'the solution' to a customer need, it is quite another to turn it into money. A big part of the innovator's challenge here is that large parts of the digital investor world has become too enamoured of so-called 'unicorns'. The digital world has become quite adept at creating companies that are able to attract billion dollar valuations. But attracting a billion dollar valuation and generating more than a billion dollars of new revenue are most definitely not the same thing. The investor ethos seems to hold the irrational belief that what happened with digital Goliaths like Amazon, Facebook, Baidu, Tencent, Alibaba and Google, will also happen to them. And that the game is merely about keeping the enterprise going long enough that the profits will begin to appear. Time, alas, is not the only factor at play, start-up enterprises, need 'innovation DNA' to find the right customer problems and solutions, but they then need to be able to integrate that way of thinking with Operational Excellence World thinking in order to work out how to make money from those solutions. Innovation and Operational Excellence, per earlier comments, may be polar opposites of one another, but any successful enterprise needs to be able to master both sets of skills and bring the requisite ones together at the right places and times. Very few digital start-ups get to master this integration challenge before the last in the chain of investors decide to call time.

## 2. What the 2% did – First principles

Mention of 'jumping off cliffs', 'Ordeal's and 'Roads Back' offer a nod to first-principle thinker, Joseph Campbell. Campbell devoted much of his life to studying the world's literature in order to, in a manner analogous to the TRIZ and Systematic Innovation research, decode the reasons why most literature (not coincidentally, around 98%) ends up as pulp, and a small percentage become enduring classics. His primary answer was published as The Hero With A Thousand Faces [6]. Although he did not understand the dynamics of what the business world now recognises as s-curves, Campbell's 'Hero's Journey describes how successful literature always passes through the same stages that will be experienced by innovators as they make the shift from one solution paradigm to the next. **Figure 2** illustrates these generic stages as they relate to the innovator's journey between s-curves [7].

The vertical axis on any S-curve picture may be plotted to show any and all of the attributes of a system that might wish to be improved. From an e-service perspective, the axis might be plotting customer related parameters such as benefits delivered, satisfaction, adoption rates, or, from the innovator's perspective, such business parameters as number of customers, turnover, risk-reduction, profit, or ROI. At more granular service levels, the axis might be plotting performance parameters like speed, accuracy, consistency, privacy, etc. Oftentimes, all of these attributes can be integrated together so that the curve plots 'value'. The horizontal axis is usually plotted as time, or, in more enlightened environments, improvement effort expended.

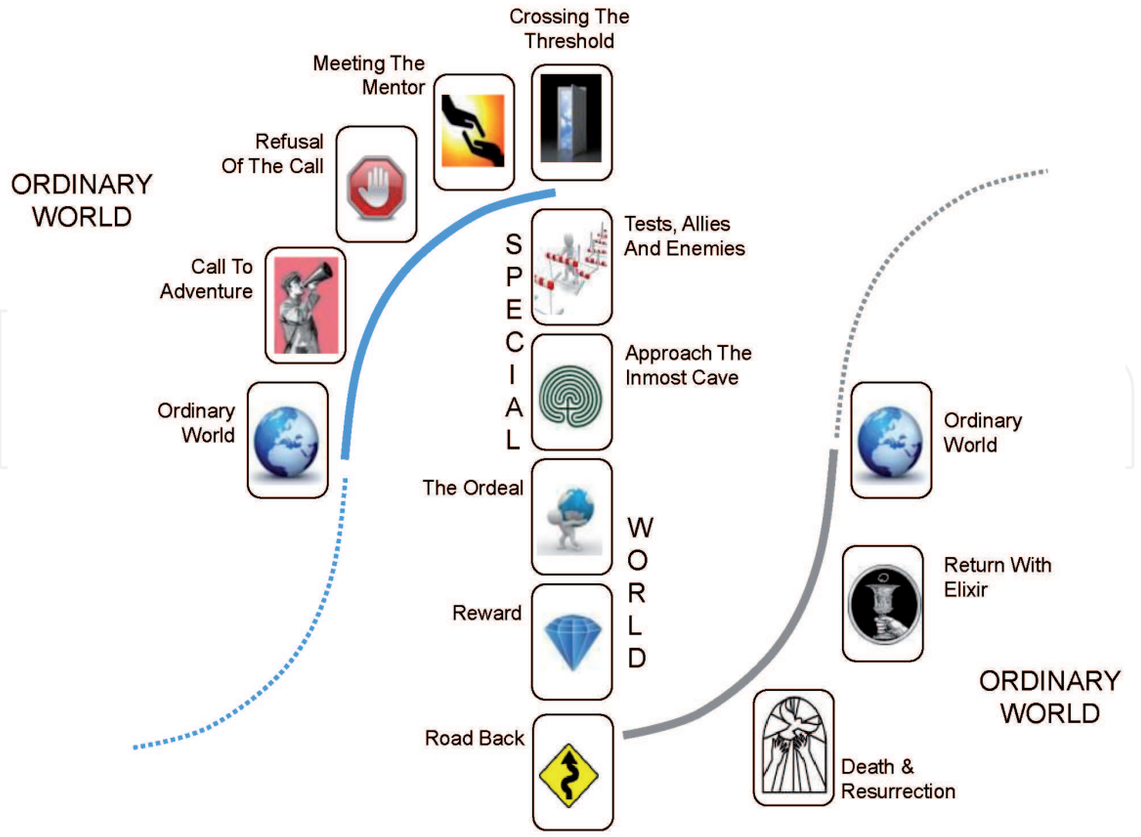


**Figure 2.**
*The Hero's journey As S-curve transition.*

Looking at the s-curve itself, the shallow gradient start of the S-curve is usually associated with the inevitable struggle that occurs when a new service paradigm appears. Eventually, assuming a critical mass of 'early-adopter' customers are willing to pay enough for the 'poor' initial manifestations of the solution, this early revenue will pay for the continuing development of the offering. At some point, there will be some form of internally-controlled production-related Eureka moment – a new delivery technology, for example, or a new pricing model – that will allow the curve to follow a much steeper upward trajectory. This 'stride' portion of the curve is the joyous stage of an enterprise when life is easy – easy sales, easy improvements and easy knowledge creation and sharing. But then, sooner rather than later, comes the law of diminishing returns top part of the curve; the 'stuck' portion. This is where contradictions begin to emerge: whatever it is that the service provider is trying to improve, 'something' increasingly comes to prevent the achievement of those improvements. After 'Crossing The Threshold' (i.e. jumping off the cliff), the brave innovator is exected to endure a series of tests, allies and enemies before, eventually reaching a pont where they have no choice but to confront The Ordeal – i.e. the contradiction. Assuming they prevail and achieve 'The Reward', the beginning of a new S-curve begins to emerge. Then, assuming the 'right' new solution is appropriate, comes the Road Back – the transition from novel service idea to a service offering that is (commercially) successful.

## 2.1 The ordeal

Having revealed the universal nature of the inter-s-curve journey, the original TRIZ researchers shifted their attention to the contradiction part of the story, and began mapping all of the attributes of solutions that customers wanted to improve, and all of the other attributes that emerged to impede those improvements.

The resulting list of parameters was very finite. In a technical context, the latest Contradiction mapping tool identifies just fifty relevant attributes [8]. When the Systematic Innovation research extended the same contradiction attribute search into the world of business, the eventual list comprised forty-five parameters [9]. In the IT world, the list is currently twenty-one parameters [10]. The e-Service world, then, effectively becomes a combination of the latter two parameter lists. Because the primary research underpinning all three tools begins from empirical grounds, there is always the likelihood that more parameters will be revealed in the future. The job in this context is to keep looking, and, more specifically, keep looking for exceptions rather than confirmation that the lists might already be complete.

What this research has then gone on to reveal, having identified the existence of pairs of conflicting parameter, are the strategies that the 2% innovators have used to successfully resolve the Ordeal conflicts. Here the most surprising finding is that the list of possible strategies – whether for technical, business or e-service (or, for that matter, architecture, biology, literature, music, and all other domains of human endeavour) - is even more finite. Since the mid-1970s, in fact, the list has remained static at forty [8–10]. This, again, is not to say that this will be the eventual final total, but rather that, at this this point in time, these are the only forty strategies that prospective innovators need to have in their Ordeal-solving armoury. **Figure 3** illustrates an example of the Business version of the contradiction solving tool, showing how conflicting parameters are mapped onto the relevant rows and columns of the Matrix so that users can then be provided with a ranked list of the forty Principles used in the past to resolve similar contradictions.

In some ways, these Matrix tools and the list of forty 'Inventive Principles' form the foundation of 'systematic'. In others, stepping back to look at other first-principle characteristics of the 2%, it also becomes clear that while the principle of contradiction-solving is a necessary component of success, it is by no means sufficient. In order to reach sufficiency, it is necessary to connect three other elements to the Hero's Journey. The next concerns directionality…


**Figure 3.**
*Example mapping of e-service ordeal onto the business contradiction matrix [8].*

## 2.2 If you do not know where you're going…

…any road will take you there. Why do the solutions offered to customers occasionally make jumps? Is digital 'better' than physical? Is service 'better' than product? According to the next big finding of the TRIZ research, they are indeed ultimately better because the top of the new s-curve sits further up the y-axis of **Figure 2** than the top of the previous curve. The y-axis, as discussed earlier, could be any of a host of different parameters. It could also be defined to include *all* of the parameters that customers might be interested in. TRIZ calls this integrated parameter, 'Ideality'. More generally, it is known as 'value'. Whichever label is used, the meaning effectively becomes the same: ideality or value is the sum of all the positive things customers want, divided by the sum of all the negative things they do not. Examination of the 2% of successful innovation attempts through this ideality lens reveals a very clear direction of success: over time, customers expect the positives to increase and the negatives to decrease. Hopefully, this should not be a great surprise to anyone. The directionality concept becomes interesting, however, when the idea of an *ultimate* destination is brought into play. Theoretically at least, the end point might be seen as the point where customers receive all the positives they want and all the negatives have disappeared. The ideal solution, in other words delivers 'free, perfect and now' to all customers. Although simple to say, many organisations have profound difficulty with the statement's underlying implications. Not least of which is, if customers expect 'free', how does the provider make the money required to stay in business? For enterprises operating in the physical world, the answer is that 'free' will likely not happen for a long time. For those operating in the digital space, however, because it is so much easier to change and evolve solutions, it happens much faster. To the extent that e-service organisations like Google and Facebook effectively already operate as 'free, perfect and now' businesses. No doubt there will be deep philosophical arguments about some of the other implications of the 'all-the-benefits-none-of-the-negatives' evolutionary destination as the ideality concept becomes more widely known. One of the implications becoming most visible relate to the moral and ethical aspects of mankind's 'direction': from an e-service perspective, the easiest of the free, perfect and now destination elements to achieve is 'now'. Innovations that provide customers with instant gratification of their perceived needs has resulted in a growing awareness that the increased convenience can too easily arrive at the expense of meaning [11]. Fast food makes for convenient fuel. Fast food ordered on an app makes the job even easier. But, as can be seen in the slow-food movement, and the rise in home-cooking through Covid-19 pandemic triggered lockdowns, the preparation and consumption of food is a highly social and highly meaningful act. Ultimately, if the ideality destination principle is interpreted in its pure form, this kind of convenience-versus-meaning contradiction merely means that we will not achieve a true Ideal Final Result (IFR) solution until it has been solved. This is a topic that will be explored in more detail in Section 3. In the meantime, the discussion here about emotion-related issues and moral and ethical debate takes us to the next cluster of first principles emerging from the study of the 2%…

## 2.3 If you do not know where you are

…in the same way we need a compass to point innovators in the direction of future success, **Figure 1** suggests that the most common reason for failure in the e-service domain is that the project team does not know where it is starting from. Projects get launched, and the team jumps off a cliff ('Crosses The Threshold' in Hero's Journey terms) with a mistaken understanding of where their customers are.

The heart of the problem here, from a first principle perspective, is that humans have two brains. A fast brain and a slow one [12]. The fast (limbic) brain makes near instant, emotion-based decisions about what a person wants, and the slow (pre-frontal cortex) one rationalises those decisions. The fast brain provides the 'real' reasons a person wants something; the slow brain provides the 'good' reasons. Both of these need to be present if the customer is going to make a decision to hire our novel e-service solution. By far the easiest of the two for providers to deal with are the rationalisable, 'good' reasons. These are all the things that get written into the service offering descriptions and pricing information on the website. All the information, in fact, that the myriad competitors will also have on their website. Which in turn why there are so many e-service price comparison sites. Unfortunately, few if any of these offerings has anything to say about the information the customer's fast brain is looking for. There's a frequently used saying in China: 'when all else is equal, we buy from our friends. When all else is unequal, we still buy from our friends'. Friendship, in other words, very easily trumps the tangible offerings made by most e-service providers. The problem this gives innovators, unfortunately, is that amorphous concepts like 'friendship' are very difficult to measure. The same goes for a host of other emotion-related parameters such as trust, empathy, anxiety or confidence. But just because a parameter is difficult to measure, does not excuse a choice to go and measure something simpler instead. The next important question then becomes, what were the first-principle 'real' reason parameters the 2% focused their attention. The answer is shown in **Figure 4**. On the left hand side are the four parameters that form the 'decision-making' foundations of the limbic brain [13]. On the right-hand side are the six parameters that form the equivalent core of the human moral decision making process [14].

Having recognised the fundamental nature of these ten parameters comes the recognition that a good way to help ensure an e-service innovation attempt ends up in the 2% category is to find ways to measure each of them. This, in fact, has been the rationale and focus of PanSensic since it's inception fifteen years ago [15].

So much for measuring the fast-brain/real-reason information required to inform innovation projects. This might be the more difficult of the two types of measurement required, but it is also safe to say that only a small proportion of innovation attempts get the easier part right either. It may indeed be easier to formulate a specification describing the tangible parameters that will motivate customers to hire a provider's service solution, but unless the search incorporates contradiction-finding, then the heart of a potential innovation opportunity will have been missed. What usually happens here is customers are surveyed to establish what attributes they want, and then, finally, how much they are prepared to pay for them. One of the benefits of shifting to digital services is that it becomes very easy

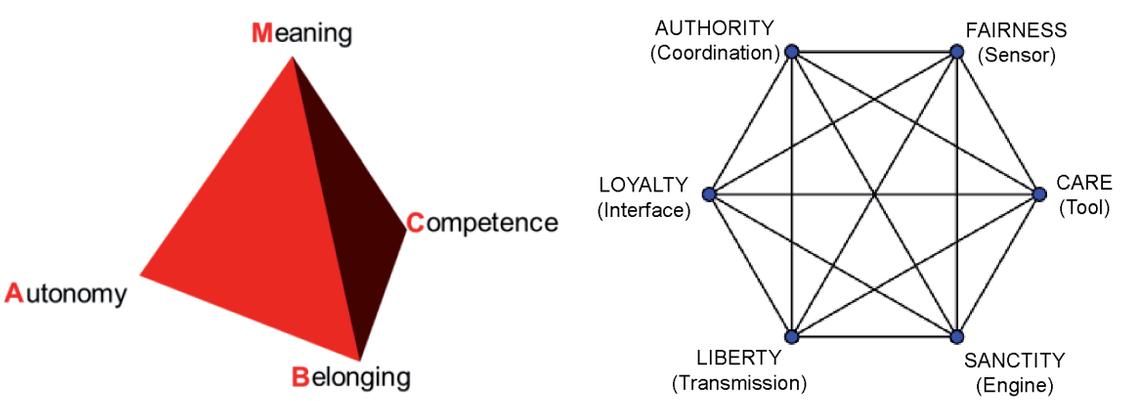


**Figure 4.**
*First-principle human emotion and morality drivers.*

to conduct experiments that will help innovators to establish price elasticity. This is something readily observable on many online retail websites in the form of occasional 'personalised' special offers, or, more generally, prices that are made highly dynamic. Dynamic pricing in this sense may be called an innovation, but its an innovation more for the provider than the customer. And, moreover, such models completely fail to identify the main customer innovation opportunities. In complex systems, it is not so much the attributes of a system that drive purchase so much as the relationship *between* those attributes. The moment a provider attempts to deal with such relationships as optimisation opportunities, the innovation opportunity is effectively discarded. Customer might *expect* to have to make trade-offs between, say, price and quality, or efficiency and effectiveness, or long-term versus short-term, but each time providers encourage such behaviour, innovation opportunity is removed. Again the real task here is to look at these kinds of trade-off from a contradiction solving perspective. Customers do not fundamentally wish to choose between quality and price, they want high quality *and* low price. Hence deploying measurement methods that, first, identify these kinds of underlying contradiction, and, second, are able to prioritise them, in effect becomes the only way – from the tangible side of the story – to identify the genuine innovation opportunities. After a decade or so of working on this problem, the most reliable method of revealing contradictions involves two measurements: a) which attributes make customers express positive emotions, and, b) what are they frustrated about? Necessity may be the mother of invention, but frustration, it turns out, is the mother of innovation.

### 2.4 The road back

Finally, from a first-principles perspective, is the 'failing to find the Road Back' part of the innovation challenge. Solving a customer contradiction might offer innovators their 'Reward' solution, but having a solution is invention not innovation. In Campbell's terms, the innovation team is still in the 'Special World' limbo space between the old and intended new s-curves. Innovation means successfully transitioning out of that Special World back into the real ('Ordinary') world. And, as shown in **Figure 2**, that transition involves a 'Death & Resurrection' stage in the innovator's Journey. What this should effectively say to the innovator is that – fundamentally – something needs to 'die'. This generally means one of three things: 1) the innovator needs to remove themselves from the equation (especially relevant in academic-lead university spin-outs), 2) the service provider needs to 'unlearn' a previous way of doing things, or, most difficult to engineer, and therefore, usually the most challenging, 3) the customer needs to 'unlearn' one or more of their previous habits or behaviours. In being the more challenging of the three, the third option, perhaps not surprisingly, tends to be the one most likely to give the biggest breakthrough. Call that a meta-contradiction.

## 3. Systematic e-service innovation

Revealing the 'DNA' of the 2% successful e-service innovation attempts offers a step closer to a systematic innovation capability, but a knowledge of How, is not the same as understanding the What of the innovation process itself. Making that transition demands an understanding of the different stages and types of challenge that an innovation project is likely to encounter. The critical factor, here, concerns the levels of complexity present at different stages of a project.

**Figure 5** presents a simplified outline of what the archetypal innovator's Journey looks like when plotted onto a Complexity Landscape Model (CLM) [16]. The CLM

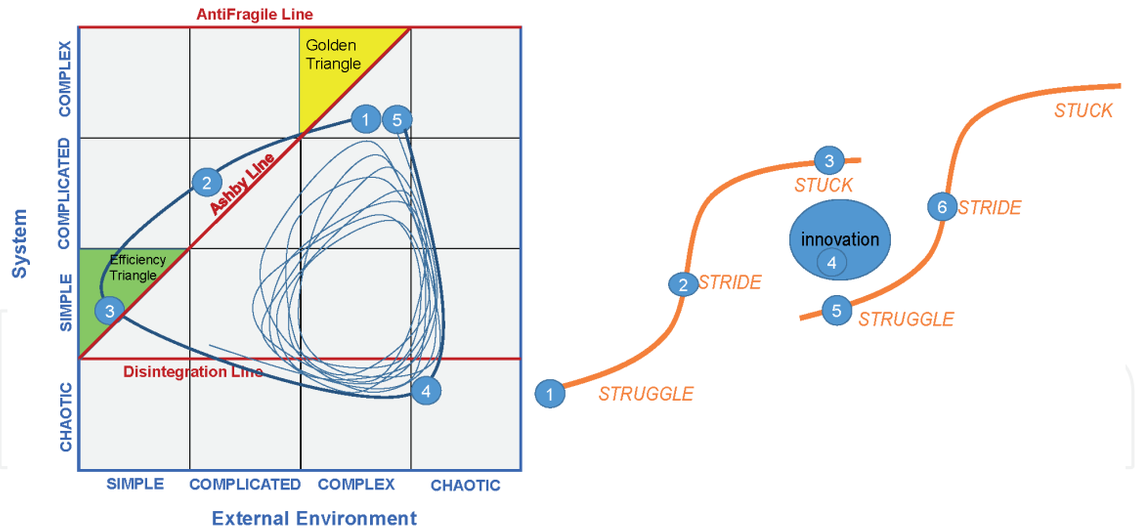


**Figure 5.**
*Complexity landscape model and discontinuous change.*

requires innovators to define two complexity states – one relating to their system, and the other to the surrounding environment. On each dimension, there are four distinctly different levels of complexity: Simple, Complicated, Complex and Chaotic. Each of the four demands different ways of making progress. Hence, by plotting a typical Hero's Journey s-curve transition onto the Landscape – as seen in the 1-to-5 stages included in the Figure – will demand multiple different ways and means of progressing from one stage to the next. Importantly, when a project is in Campbell's 'Special World' (Stage 4), almost inevitably there will be a period of Chaos. There are several reasons why this phenomenon is 'inevitable', but from an e-service perspective, the most pertinent is that organisational change only really occurs in the presence of Chaos. Prior to chaos, the human mind tends to continue applying existing rules and protocols. Only when chaos arrives does it become clear that those rules and protocols no longer apply. Innovation in this sense is about breaking rules. Something that the last forty years of Operational Excellence has taught successive generations of business leader to avoid. Operational excellence, in other words, has been about getting to Stage 3 by making sure employees follow ever more rigorous, ever simpler rules in order to maximise efficiency. Here's another example of 'best practice' leading to unexpected organisational fragility, and, thus another meta-contradiction.

In reality, the 1–5 loop is an 'idealised' road map. In that, given the fact that the majority of the time, a project is likely to be progressed in and environment that is Complex or Chaotic, there can be no such thing as the 'right' answer, and more likely than not, so such thing as the 'right' problem either. Which is to say that the only effective means of making progress involves use of cyclical processes. Processes that, in effect, mean that a project will likely take several circuits around the 1–5 loop.

If this is beginning to sound rather vague and un-systematic, hopefully the next section will demonstrate that, by utilising a process built around the first-principles introduced in the previous section, it is possible to accommodate enormous amounts of uncertainty and variation and nevertheless still be confident that a project will fundamentally continue to advance in the right direction.

### 3.1 Cobra+

Every e-service problem is inherently complex and so from a CLM perspective, smart innovators are well advised to build processes and protocols that acknowledge

this complexity. Project resilience in this context often means operating as much as possible above the CLM 'Ashby Line', which means, per Ashby's Law, that 'only variety can absorb variety' [17], it is better to have excess capability in the project system than that required to deal with the level of complexity present in the surrounding environment. The best place of all to be on the CLM is the 'Golden Triangle' [18]. The COBRA+ process was designed with this scenario in mind. It too ensures problem solvers tackle the issues they are trying to address back at the first principles level. **Figure 6** describes the basic steps of the process.

The process is also template-based in order to swiftly enable problem solvers to work through a logical complexity-embracing sequence of steps without a long learning curve [19]. The overall process forms a cycle, and as such, allows a problem solver to undertake as many iterations as might be necessary to achieve an 'appropriate' solution.

The detailed tests for what might be classed as 'appropriate' are contained within the process, but essentially focus on achieving 'solutions' that a team is happy enough about to consider exposing to prospective customers to receive their feedback. Having obtained such feedback, more likely than not, a team is likely to find themselves passing around the COBRA+ sequence again. And again. One of the biggest difficulties, indeed, when dealing with this kind of customer-change complexity is knowing when to stop. The closest thing to a heuristic that exists to date is that the most likely (2%) winners will be the ones most capable of working through the cycle more swiftly and effectively than their competitors.

Which then leads to a final discussion around the meaning of the word 'effectively'. Systematic here needs to mean something better than trial and error iteration. The overall evolution trajectory towards an eventual 'Ideal Final Result' outcome is one way of helping to assure this happens. The next comes from recognising that each loop around the COBRA+ process forces project teams to identify and find solutions to at least one Contradiction. The final, and perhaps most

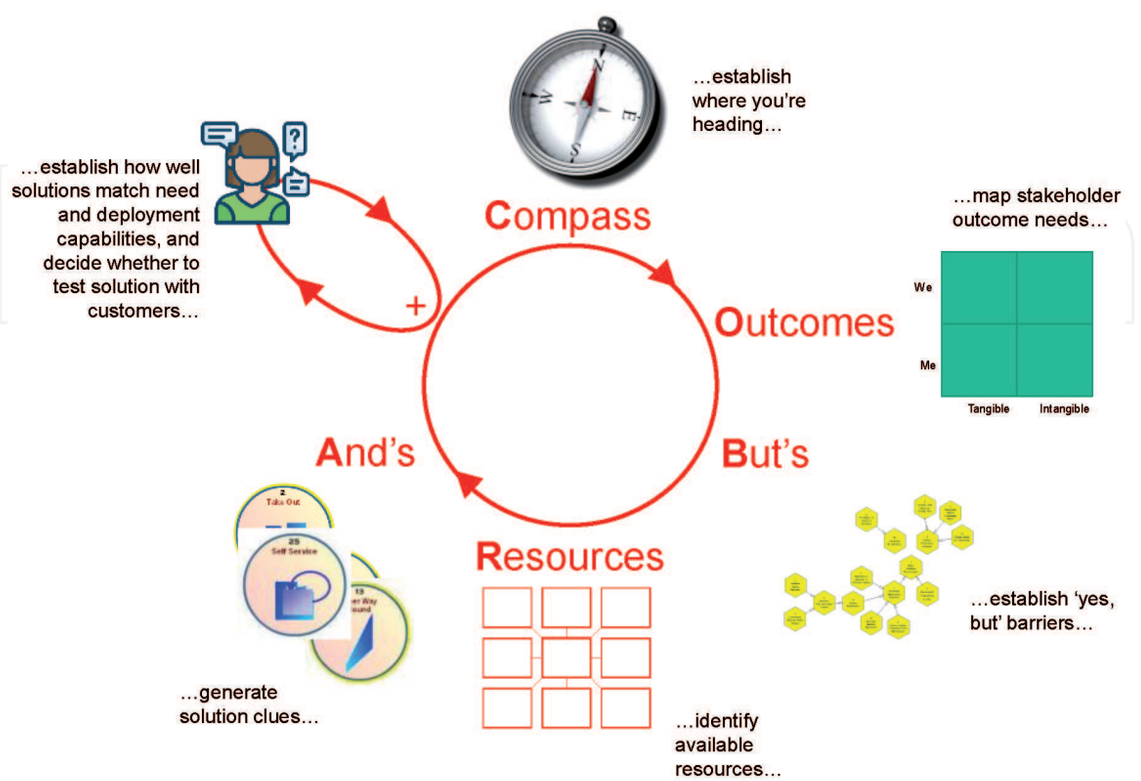


**Figure 6.**
*COBRA+ process.*

important one emerges via another piece of long-term research. This time looking at the meta-level evolution of industries with the aim of revealing repeatable patterns of success. Which, thanks to the contradiction-solving DNA effectively means looking for patterns of contradictions and their resolution. This is in effect another strand of the TRIZ research philosophy. Where – probably more by luck than judgement – it was found that by removing the 98% noise of coming from failed innovation attempts, what would normally looked like a host of random evolution trajectories, actually became a series of very clear step-change patterns. Patterns that, once innovators are aware of them, effectively provide a road-map to reliable and repeatable success, irrespective of prevailing societal and/or market turbulence.

### 3.2 Patterns of system evolution

As industries make their inexorable transition towards Ideal Final Result 'perfection', the journey involves a succession of discontinuous s-curve jumps. As one customer solution matures and hits its 'stuck' plateau, eventually along will come an innovator with a contradiction-solving solution to start a new s-curve. Almost invariably, the start of this new s-curve will present customers with a solution that is 'inferior' in many ways to the incumbent solution, but offers some form of advantage to certain niche situations. Preferably these niche situations will be high value customers prepared to pay a premium for the privilege of their niche advantage (think about the first mobile phones for an iconic example of this dynamic in action). If innovators are able to find such customers, the early revenue they produce, will pay for further developments of the solution that will make it progressively more attractive to a wider variety of customers. And by this means, the new solution will gradually begin to climb its s-curve, until such times as it too becomes stuck. If the innovator has chosen their new solution well, the ideality of their new solution will be higher than the peak ideality of the previous incumbent solution – **Figure 7**.

Such is the way of the world of discontinuous innovation: things will tend to get worse before they get better. This is another challenge for Operational Excellence dominated industries – where KPIs that acknowledge things may get worse for a period of time are virtually non-existent. The problem is not so big in the e-service sector, because the rate of s-curve jumps tends to be much higher than in most (non-digital) industries), and investors are more accustomed to the s-curve rollercoaster ride.

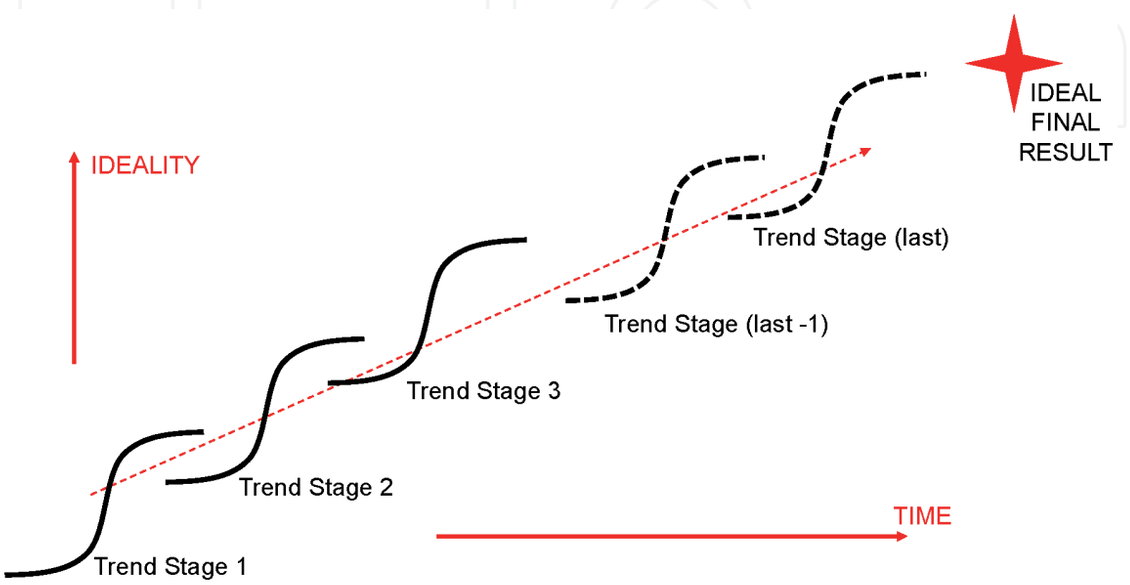


**Figure 7.**
*Evolution trends as roadmaps to the ideal final result.*

The relative speed of the e-Service sector jumps, once the noise associated with failed jump attempts is removed so only the successful ones remain, turn out to be one of the best ways to reveal just how clear the road-map to success actually are. **Figure 8** illustrates one of the most vivid and important of these patterns. One that was first revealed in the work of Gilmore & Pine [20], and is now generally know as the 'Customer Expectation' Trend.

Each stage of the Trend in effect represents an s-curve, and the direction of travel occurs from left to right. The e-Service sector in effect emerges thanks to the jump from the second ('Product') stage of the Trend to the third ('Service'). One of the implications of which is that innovators looking for innovation opportunities would do well to look at industries and sectors that are still at the Product stage, and, preferably, are at the mature end of their current s-curve.

This Customer Expectation Trend was one of the first business evolution patterns to be uncovered. To date, the research has now uncovered over thirty other discontinuous evolution Trend patterns [21]. Lack of space here prevents examination of all of them. What follows, however, are what might be thought of as the next four in a 'Top Five' evolution roadmaps for e-Service businesses:

**Figure 9** illustrates the 'Segmentation' Trend. It applies both to the internal structures of a business, but mainly, in the e-service context, to the segmentation of customers. The left-to-right trend trajectory effectively tells a story of customization and personalization of services. By the time a service has evolved to the next-to-last 'Segments of One' stage, the business has recognised that every customer is different to every other one, and is able to tune the service to suit each individual customer need. The final stage of the Trend takes things one step further and sees service providers acknowledging that not only is every customer unique, but that they are also unique as their moods shift dynamically. In many ways, this Trend is the polar opposite of the core Operational Excellence drive for standardisation, a standardised solution being the one that traditionally delivers the best profit margin. This standardised *and* customised contradiction is in many ways one that the shift from the physical to the digital has enabled more than anything else...

...and that in turn has been made possible thanks to the next Trend, 'Reducing Human Involvement', illustrated in **Figure 10**.

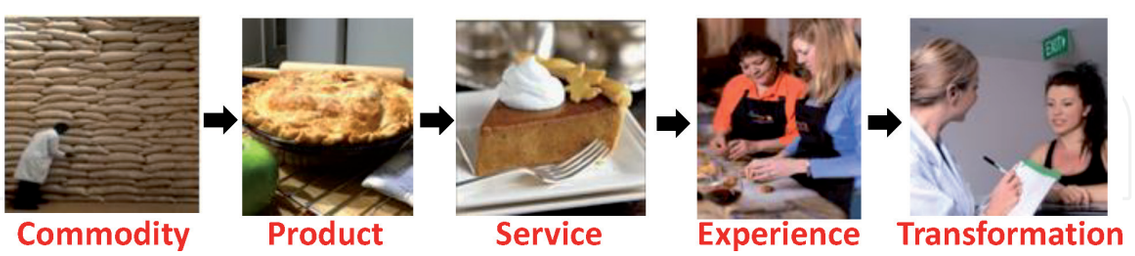


**Figure 8.**
*'Customer expectation' evolution trend.*

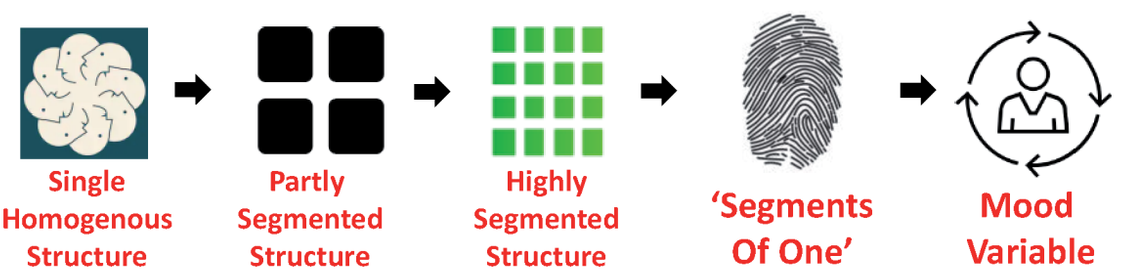


**Figure 9.**
*'Segmentation' evolution trend.*

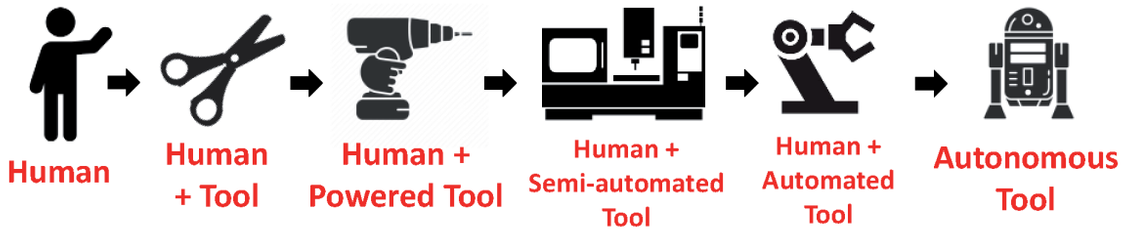


**Figure 10.**
*'Reducing Human Involvement' evolution trend.*

The reason customisation of solutions costs providers money is because delivering a customised service means having large numbers of highly capable and therefore expensive, staff. By replacing these staff with intelligent and increasingly emotionally aware digital equivalents, service providers will ultimately achieve the best of both worlds. How quickly this replacement will occur depends to a large extent on how quickly and how effectively the emotion-related first principles described in **Figure 4** can be absorbed into the software. On this front, the immediate good news is that we know what the job to be done is.

As ever, of course, any kind of progress inevitable generates some form of collateral damage. In this case it looks like the collateral damage will come in the form of swathes of service jobs being displaced. A partial answer to this contradiction may be seen in the next Trend. A Trend showing innovators that in addition to the 'things get worse before they get better' characteristic of s-curve jumps things, as a solution evolves along its s-curve there is a clear pattern of increasing-followed-by-decreasing complexity.

During the initial 'increasing-complexity' portion of this curve, the e-service world is likely to see a host of integrated solutions (in which multiple services are combined into 'one-stop-shop', end-to-end offerings) and hybrid solutions in which human service providers are assisted by data-providing digital assistants. It is already established in the insurance industry, for example, that AI algorithms are already capable of making better loss-adjustment decisions and, in a smaller number of cases, fraud-detection decisions than the average employee, but, in order to ensure the emotional needs of claimants are also met, the average employee is still, for the most part, much more capable than even the best 'emotion-equipped' AI.

In the final analysis, however, the decreasing-complexity portion of the **Figure 11** Trend sees the contradictions of these kinds of human-computer hybrid service solutions being solved such that the customer receives all of the benefits they desire from a service without any of the attendant complexity. This is not to say that the complexity has disappeared per se, but rather that it has been subsumed into the algorithms and is therefore hidden from the customer's view.

Fifth in the Top Five e-Service Trends is the Customer Purchase Focus Trend reproduced in **Figure 12**. This Trend works a little differently from the previous four. At least in so far as implications for service providers. The step-changes described in this Trend examine the non-linear shifts in focus of customer attention as their relationship with services evolves. Initially, on the left-hand-side of the Trend, customer purchase decisions are largely based on their need for performance. As these needs become satisfied, performance thresholds will emerge, beyond which, customers will be no happier and no more likely to purchase the service should providers continue to increase them further (many Microsoft solutions crossed these thresholds some time ago – the majority of Word users, for example, do not use 90 + % of the available functionality of the software, and compatibility issues aside, would be quite happy with the capabilities provided in Word 2). When customers perceive they have achieved enough performance, their

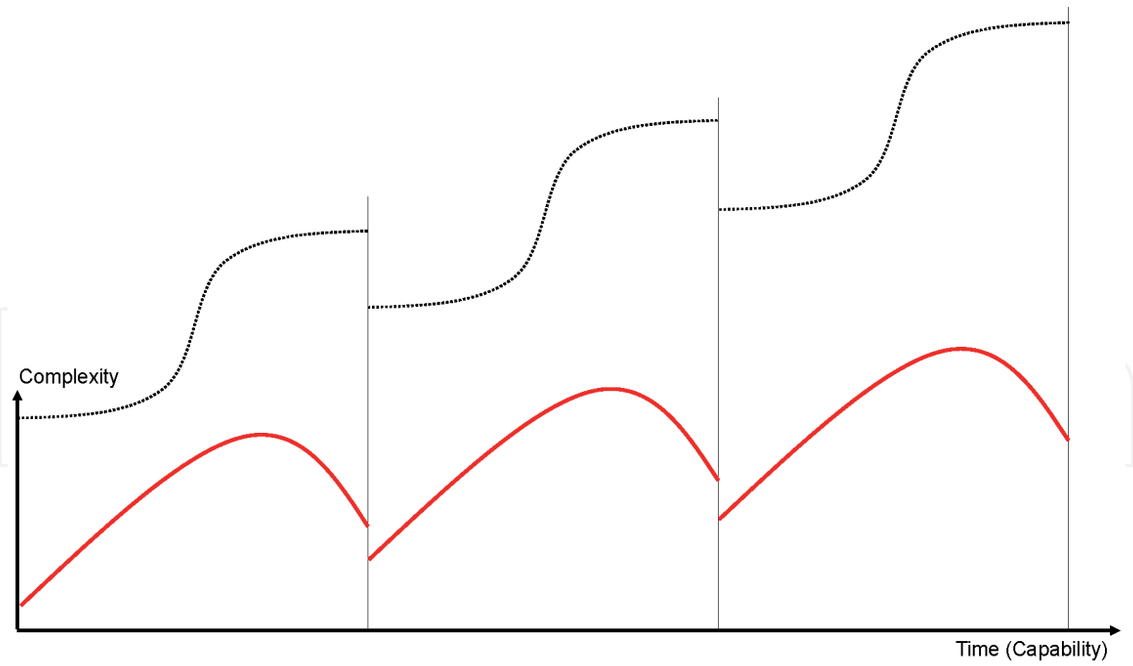


**Figure 11.**
*'Increasing-decreasing complexity' evolution trend.*

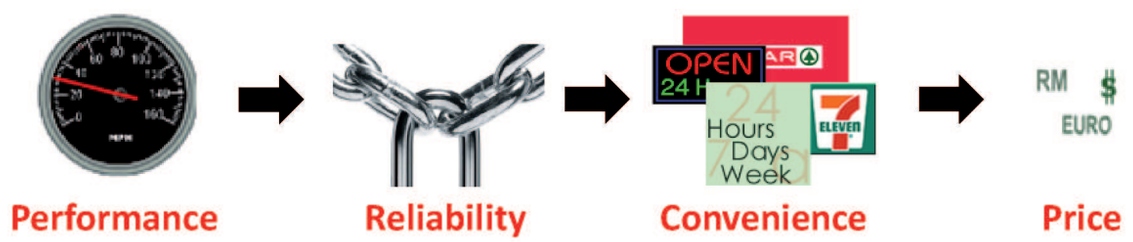


**Figure 12.**
*'Customer purchase focus' evolution trend.*

primary purchase attention shifts to reliability. And then, when they have enough of this, their attention shifts again, this time to convenience. Finally – bad news for providers – when customers have enough performance, reliability and convenience, their purchase decisions are made solely on price. Which effectively means that the service offering has become commoditised.

The job of providers when service offerings approach or reach this final stage is to innovate in such a way that they are able to shift customer attention to new measures of performance. One likely candidate in this regard, to return briefly to **Figure 4** one more time, is that 'meaning' will become a generically applicable new performance delivery opportunity. One that the Covid-19 pandemic, again as discussed earlier, seems likely to play a significant role in bringing to the front of many e-service customers' minds.

## 4. Into the future

The commonly held advice about making predictions of the future is to avoid having to do it if at all possible. No-one can predict the future beyond the next 400 days [22]. In the turbulent times triggered by the fall of the pandemic domino, this number is becoming lower, and with every additional falling societal domino, is tending to become lower still.

What the TRIZ and Systematic Innovation research has shown, however, is that just because we cannot predict everything about the future does not mean we are not able to predict anything. If nothing else, the Trends of Evolution described in the previous section are a good way of informing innovators that, while it might be difficult/impossible to know *when* discontinuous jumps will happen, *what* those jumps will be is much more predictable. A 'product'-based business will, sooner or later, shift to become a 'service'-based business. Similarly – and crucially for those already working in the service industries – sooner or later any service business will evolve into an 'Experience'-based business. The implications of that most likely ought to form the basis of an e-Experience successor to this book.

First Principles knowledge, meanwhile, is remarkably stable [23]. The laws of physics are essentially just that: laws. As mankind's understanding of these laws evolves, the 'first principles' will evolve too, but their half-life generally speaking is measurable in decades or centuries. More subtle, but the TRIZ-originated innovation-DNA research has also revealed the relative stability of knowledge pertaining to the emergence and resolution of contradictions. Innovation – the successful transition from one S-curve to another – is in effect driven by this contradiction story. Innovation, to all intents and purposes, is contradiction solving. Knowledge pertaining to how contradictions are solved will thus inevitably become one of the critical factors in the e-Service innovation story. If organisations are not managing the contradictions in their e-Service business, they are placing their future on a path with a 98% likelihood of failure.

## Author details

Darrell Mann
Systematic Innovation Network, Bideford, UK

*Address all correspondence to: darrell.mann@systematic-innovation.com

## References

[1] Brynjolfsson, E., Collis, A., 'How Should We Measure the Digital Economy?', Harvard Business Review, November–December 2019.

[2] Mann, D.L. 'Hands-On Systematic Innovation', 2nd Edition, IFR Press, 2009.

[3] Systematic Innovation E-Zine, 'Defining Innovation (40 Years Too Late)', Issue 221, August 2020.

[4] Altshuller, G.S., 'Creativity As An Exact Science: The Theory Of The Solution Of Inventive Problems', Gordon & Breach Publishers, Amsterdam, Netherlands, 1984.

[5] Mann, D.L. If All You Have Is A Hammer: TRIZ And Complexity, paper presented at ETRIA TRIZ Future Conference, Marrakech, October 2019.

[6] Campbell, J., 'The Hero With A Thousand Faces', New World Library, 3rd Ed. 2012.

[7] Mann, D.L., 'The Hero's (Start-Up) Journey', IFR Press, 2020.

[8] Mann, D.L., 'Matrix2010', IFR Press, 2010.

[9] Mann, D.L., 'Business Matrix 3.0: Solving Management, People & Process Contradictions', IFR Press, 2018.

[10] Mann, D.L., 'Systematic (Software) Innovation', IFR Press, 2008.

[11] Systematic Innovation E-Zine, 'Free, Perfect & Later?', Issue 226, January 2021.

[12] Kahneman, D., 'Thinking, Fast and Slow', Farrar, Strauss & Giroux, 2011.

[13] SI E-Zine, 'ABC-M Landscapes', Issue 167, February 2016.

[14] SI E-Zine, 'Law Of (Morality) System Completeness', Issue 225, December 2020.

[15] Mann, D.L., Howarth, P., 'Pansensics: Measuring What's Important Rather Than What's Easy', PanSensic Ltd White Paper Series, www.pansensic.com, March 2013.

[16] Mann, D.L., 'A Complexity Landscape', www.darrellmann.com, 31 March 2019.

[17] Ashby, W.R., 'An Introduction to Cybernetics', Chapman & Hall, London, 1957, available electronically at http://pespmc1.vub.ac.be/books/IntroCyb.pdf.

[18] SI E-Zine, 'The Innovation 'Golden Triangle', Issue 206, May 2019.

[19] SI E-Zine, 'COBRA+', Issue 190, January 2018.

[20] Pine, B.J., Gilmore, J., 'The Experience Economy: Work Is Theater & Every Business a Stage', Harvard Business School Press, May 1, 1999.

[21] Mann, D.L. 'Hands-On Systematic Innovation For Business & Management', IFR Press, 2007.

[22] Heffernan, M., 'Uncharted: How To Map The Future', Simon & Schuster, 2020.

[23] Mann, D.L. 'The Little Book Of First Principles', IFR Press, 2021 (in press).