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Management perspectives on dealing with contextual uncertainty and unexpected emergent events

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Abstract

The economic meltdown and 9/11 in many respects were watershed events; they triggered unexpected effects that collectively have played a fundamental role in reshaping an emergent global landscape. It is one characterised by unprecedented technological innovation, socio-political upheaval, contextual uncertainty and as often termed to be "Black Swan" events that are extremely disruptive and have a significant impact on communities and institutions. The convergent emergent systemic effects and the uncertainty and unpredictability it engendered have exposed fundamental difficulties associated with traditional management practices based on ordered systems.

The research study methodology underpinning this paper is that of a multidisciplinary literature review directed at exploring management perspectives that are deemed to be more effective for dealing with a context of innovative and discontinuous change.

A key finding emerging from the research is the need to make use of the appropriate methodology for managing coexisting ordered and complex systems. Further found is the need for a culture of resiliency to deal with the transition from chaos to complex and ordered states.

Key phrases

Complex Adaptive Systems (CAS); leadership; managing the unexpected; resiliency; scientific management.

1. INTRODUCTION

"At the heart of the traditional approach to strategy lies the assumption that by applying a set of powerful analytical tools, executives can predict the future of any business accurately enough to allow them to choose a clear strategic direction. But what happens when the environment is so uncertain that no amount of analysis will allow us to predict the future?" -- Syrett and Devine 2012:2

Courtney, Kirkland and Viguerie (2000:XX) in a similar sense to Syrett and Devine (2012:2) contend that "The traditional approach to strategy requires precise predictions and this often leads executives to underestimate uncertainty". They go on to assert that "this can be downright dangerous". A possible answer to the question posed by Syrett and Devine (2012:20), in the introductory quotation, could stem from the World Economic Forum's suggestion that "it is only through intense interdisciplinary collaboration that one can discover and learn to understand the underlying principles that govern the complexity of our

world. It is only through such understanding that one can hope to master the grand challenges facing our world" (WEF 2013a:5).

It is a contention that resonates with Surowieki's (2005:11) claim that "under the right circumstances, groups are remarkably intelligent, and are often smarter than the smartest people in them". Underlying this approach to dealing with contextual complexity is the notion that bringing together people with diverse knowledge and expertise can better assist in gaining an understanding of the dynamic, highly interconnected and interdependent systems that are reshaping the global landscape (WEF 2013a:4). While embodying many truths it is a notion that does not resonate all that well with traditional strategic and operational management thinking and practice, as may be determined from the introductory statement, where the accent is on determining the future with some degree of certainty.

2. BACKGROUND

Bennet and Bennet (2004:5) describe the prevailing management landscape as one where "Time accelerates. Distance shrinks. Networks expand. Information overwhelms. Interdependencies grow geometrically. Uncertainty dominates. Complexity boggles the mind. Such is the environment and the context within which current organisations must compete, survive and thrive". The researchers go on to suggest that it is a context that necessitates willingness by management to admit that its current practices are inadequate and consequently resolve to enable the institutional human capacity to take effective action in varied and uncertain situations (Bennet & Bennet 2004:5,11).

It in effect entails a new era of management thinking and practice; a reality that engenders a sense of anxiety within executives and managers experiencing a sense of disconnect between managing a past construct of known and knowable, and of now having to deal with increasing uncertainty and the emergence of unforeseen and unexpected events having a significant impact on institutions and communities. Vecchiato (2012:784) claims that the "how" of managing in such a context remains largely unexplored. In a similar vein McGoey (2012:4) accentuates the need to acknowledge ambiguity as a prerequisite for leaning and discovery.

The ensuing discussion endeavours to explore perspectives emanating from the literature, reflecting instances where executives and management confronted with the dilemma of needing to manage strategic and operational uncertainty applied specific approaches, the outcome thereof serving as a source experiential learning and insight. An analysis of the

insights gained from the application of the approaches concerned, as reflected in the literature, are used to inform theory and practice as to the most appropriate and effective means for dealing with the management of uncertainty in contemporary settings.

3. THE EMERGENCE OF AN ERA OF STRATEGIC AND OPERATIONAL UNCERTAINTY

"The fall of the Berlin Wall on 11/9/89 unleashed forces that ultimately liberated all the captive peoples of the Soviet Empire. But it actually did much more. It tipped the balance of power across the world towards those advocating democracy, consensual, free-market-oriented governance, and away from those advocating authoritarian rule with central planned economies." - Thomas Friedman 2006:51

In a metaphorical sense it could be construed that if the fall of the Berlin Wall could have unleashed such forces, with the emergence of what could best be termed to be a hyper connected world of multimedia, the global landscape has the potential to change in ways that are fundamentally difficult to fully comprehend. The global financial crises not only revealed the interconnected nature of the world's economies, it highlighted the fragility of an entire financial and business ecosystem (WEF 2013b:10). Clippinger (1999a:xxi) is of the view that the sheer complexity of the global business environment has rendered many traditional management practices obsolete and advocates a move towards a complex adaptive systems approach for dealing with the new realities of an emergent era of institutional management.

Arthur (1999:31) terms the loss of certainty to be the overriding story of the twentieth century. It is a story that finds resonance in so many unexpected and unforeseen events, the emergence of which has left their unmistakable footprints in the shaping of this era of uncertainty. So for instance despite signs of economic recovery the South African challenge of poverty and high rates of unemployment are still quite evident, which exacerbates a range of social problems and tensions (OECD 2013:11).

The unprecedented South African platinum mine strike and its ripple effect will also undoubtedly constitute one of these characterising footsteps of contextual uncertainty (Parker 2004:Internet). Even government institutions that previously had attained a monopoly status are no longer protected, as communities can now rapidly react on mass on a basis never before envisaged, the Gauteng E-toll saga being a typical case in point (Duvenage undated:Internet). Often the management of institutions are caught off-guard by such events and even more pertinently have not acquired the required knowledge and skills to deal with the effects emanating from the sheer scale and emotional intensity engendered by such events.

3.1 Reshaping of the world order

Klause Schwab, the Executive Chairman of the WEF (2014b:3), expresses the contention that breakthrough technologies, demographic shifts and societies in transformation are reshaping the world order with far-reaching social, political and economic consequences. He goes on to stress that more than ever, leaders need better information and understanding in order to successfully navigate through an unprecedented level of change and uncertainty (WEF 2014b:3). Of the top ten trends identified by the WEF (2014b:9) as playing a fundamental role in shaping the emergent future, three in particular appear to embody a global connotation, namely the widening of income disparities, persistent structural unemployment and rising social tensions. Not only does an apparent linkage exist between these trends, but other emerging trends such as poverty, education, healthcare and lack of values in leadership would seem to all converge to add to the complexity of sense and decision making.

Addressing the persistent structural unemployment, poverty, and rising social tension trends that have come to characterise the South African landscape is quite complex, as the underlying network of interacting systems giving rise thereto needs to be taken into consideration. So for instance what may well be termed to be a skills paradox (Pauw, Oosthuizen & Van der Westhuizen 2008:45) is aggravated by disparities emerging from a dysfunctional South African educational system (George 2013:Internet). On the one hand South Africa has a very significant number of young people who are unemployed (George 2013:Internet; Hayes 2014:Internet), while on the other hand it has a shortage of critical skills required by business and industry (Pauw *et al.* 2008:45).

The nature of the skills that are required tend to be within the fields of engineering, medicine, economics, business and industry, all of which tend to reflect the need for a well-established mathematical and sciences foundation. The WEF (2014c:224), in presenting the "2014 Global Information Technology Report", places the quality of country's education system and its maths and science education in the last position out of the 148 countries surveyed. This undoubtedly, serves to highlight a trend that has significance in influencing the emergence of a future cadre of unemployable young people, further engendering a host of negative social trends instrumental in shaping the future South African landscape. The point to be noted is that it is a trend that when assimilated within other systems has a multiplying effect, further engendering emergent outcomes that are difficult to predetermine.

3.2 The emergence of a context of uncertainty

The very fabric of societies are unravelling, according to the WEF (2014b:15a), engendering a context of insecurity and unpredictability within a more complex ecology of interconnected systemic trends. It may be inferred that at the core of addressing the need to manage the unpredictability engendered by complex system interaction is the need for what is termed to be "networked thinking" (WEF2014b:45a), namely an analysis of the "webs of cause and effect that connect the world's greatest challenges". It is suggested that decision-makers need to adopt a systems-wide view to gain a deeper understanding of the connections giving rise to a new emergent future. The accent appears to be one of bringing together experts from diverse disciplines, with alternative perspectives, in order to find possible new innovative solutions.

Findings emanating from Surowiecki's (2005:3) research seem to confirm that group intelligence outperforms individual experts in dealing with complex uncertainty. It is also suggested by Surowiecki (2005:11) that "truly successful decision making, of course, demands more than a picture of the world as it is. It demands in addition a picture of the world as it will (or at least as it may) be. Any decision-making mechanism therefore has to be good under conditions of uncertainty."

Making sense of networks of emerging trends, their interaction and the possible futures that they could engender undoubtedly remains a key challenge confronting the management of modern day institutions. As reflected in Surowiecki's (2005:11) preceding statement the endeavour is therefore one of finding a means to more effectively deal with sense making under conditions of uncertainty. The notion of using an extended knowledge-base and applying larger teams of expertise in order to better gain an understanding of emergent future reality, forms a core consideration in the application of wisdom of crowds. Nirenberg (1993:9-10) is another researcher who accentuates the need for workplace communities in addressing complexity of sense and decision making.

The use of supercomputer systems to analyse large volumes of data created every single day is yet another endeavour in this quest for dealing with uncertainty and the unexpected. In this regard Nirenberg (1993:9-10) asserts that "as the information age explodes with data, and complexity becomes harder to ignore, it forces us to recognize that we can't know enough as individuals to resolve problems alone." It is a view endorsed by the World Economic Forum's (2013a:5) claim that collaboration is deemed essential for unravelling the underlying principles governing the complexity and challenges confronting society.

Notably, the challenge of dealing with uncertainty is hardly new, as far back as eight BC Pythia, commonly known as the Oracle of Delphi, was consulted as a source of prophesy for dealing with an unknown future (Wikipedia Undated:Internet). "Deep knowledge" is described by Cleary (1988:3), in ancient Taoist terms, as being "aware of disturbance before disturbance, to be aware of danger before danger, to be aware of destruction before destruction, to be aware of calamity before calamity". It was suggested that by deep knowledge one can "change disturbance into order, change danger into safety, change destruction into survival, change calamity into fortune" (Cleary1988:3).

This quest to gain clarity as to the future has gained momentum over the ages with an accent on acquiring the "right data, the right theories, the right methods, and, naturally, the right amount of money" (Pillkahn 2008:27). Yet despite the extensive effort, it appears to have been quite an elusive quest, as determine and make sense of an emergent future appears to remain extremely tenuous to say the least. This then possess the question that forms the crux of this paper, namely of how to deal with a context of innovative and discontinuous change. The ensuing discussion reflects on some of the more contemporary perspectives presented in the literature for dealing with a difficult to predict future from an institutional management perspective.

3.3 Uncertainty: a hyper connected era of the Internet of things and Big Data

"We are in an era of technology and multi device-led transformation where information is accessible anytime and anywhere. Mobility, Social Media, Cloud, Big Data, Augmented Reality and Predictive Analytics are some of the technologies taking center stage and converging to affect all aspects of how markets and customers behave"
– KPMG 2014:1

Chambers (2014:vii) in a similar vein to KPMG (2014:1) concludes that the emergence of cloud and mobile computing, the Internet of Things (IoT), the growth of big data and analytics are fundamentals redefining information and communication technology (ICT) transformation. Two important trends making this technology era quite different, according to Schroeck, Shockley, Smart, Romero-Morales and Tufano (2012:5), are the digitization of virtually "everything" with a resultant creation of huge volumes of real time data and advanced analytic technologies and techniques, enabling organisations to extract insights from data with previously unachievable levels of sophistication, speed and accuracy.

The hyperconnected network is deemed by Chambers (2014:vii), as being the critical accelerator and enabler of the ICT transformation. Big data in effect is a reflection of what could be construed to be the emergence of a "digitalised" socio-economic, technological and

community infrastructure. The emergence of the ICT technology transformation, it could be argued, is of explicit significance in the attempt to more effectively deal with decision making in conditions of uncertainty and in finding solutions for the intractable, complex problems confronting institutions. Data-based value creation, according to Bilbao-Osorio, Crotti, Dutta and Lavin (2014:3), requires the identification of patterns from which predictions can be inferred and decisions made.

The value creation process will bring with it new issues of separating valuable information from hype, as well as the interpretation and sense-making of the patterns identified (Bilbao-Osorio *et al*. 2014:4). In this regard Bilbao-Osorio *et al*. (2014:4) cite Lanier as suggesting that caution needs to be exercised in readily believing any result created by the "wisdom of the crowd". It also, however, apparently brings forth new regulatory difficulties such as privacy, information security and a host of similar issues that will need to be addressed (Bilbao-Osorio *et al*. 2014:4).

Making sense of the intersection of diverse data sources remains a challenge, particularly as most of it is unstructured (Hurwitz, Nugent, Hallper & Kaufman 2013:10,13). Typical cases in point being social media, mobile, data and satellite, and radiological images (Hurwitz *et al.* 2013:29). In addition some of the data is inherently uncertain, for example: sentiment and truthfulness of human engendered data sources, thereby introducing a sense of uncertainty as to the information derived from data analytics (Bilbao-Osorio *et al*. 2014:5).

To manage such uncertainty, analysts need to create context around the data (Bilbao-Osorio *et al*. 2014:5); which in itself means that analysed within diverse contexts, the meaning derived from the information may well be significantly different in interpretation. The point made therefore is that care needs to be taken in dealing with big data analytics; it should not be seen as constituting a "crystal ball" for eliminating future uncertainty in sense and decision making. El-Darwiche, Koch, Meer, Shehadi and Tohme (2014:43) in fact stress that institutions need to remould their decision making culture and build the human capabilities of their staff to interpreted the data and information derived therefrom in an astute manner. It may be concluded therefore that the significant benefits that may be derived from big data analysis serves as a stimulus for institutions to acquire or develop more advanced technical and analytic, as well as the human capabilities required therefore.

3.4 Big data: decision-making construct

Research conducted by Bilbao-Osorio *et al*. (2014:5) appears to suggest that the emerging model of big data adoption is essentially focused upon delivering measurable "business value", the accent being on trying to better understand how big data can help address important business opportunities in their own industries or markets. It is articulated by El-Darwiche *et al.* (2014:43) as constituting a journey in which ever-more-elaborate data influences decision-making and it is further contended that most institutions are still in the early stages of embarking on this journey.

Research conducted by McAfee and Brynjolfsoon (2012:64) revealed that institutions making use of data-driven decision making were on average 5% more productive and 6% more profitable than their competitors. Despite such findings the broad adoption of advanced big data analysis appears to still be in its early stages, as a Gartner survey cited by El-Darwiche *et al*. (2014:45), found that less than 8% of the institutions surveyed have actually deployed big data technology.

From this it may well be construed that evidence would seem to suggest that data driven sense and decision making, directed at dealing with contextual uncertainty, is still at an early evolutionary stage of deployment. Notable, McAfee and Brynjolfsoon (2012:65) suggest that one of the more critical aspects of big data facilitated decision-making relates to "who" makes the decisions and its impact on the decisions made, implying a potential need for a change in the culture of decision making process within the institutions concerned or as traditionally defined "the way that things are done".

From the preceding discussion it may be ascertained that the use of big data predictive analytics in the identification of trends and emerging business conditions, so as to manage uncertainty, is still at an early stage of development. Predictive analytics, as made clear by Intel (2013:2), "applies inductive reasoning to big data using sophisticated quantitative methods such as machine learning, neural networks, robotics, computational mathematics, and artificial intelligence to explore all the data and to discover interrelationships and patterns". It, however, requires people with new skills to manage the data and make sense of the results and currently these are skills in short supply (Intel 2013:5).

3.5 The use of scenarios to managing institutions in a world of uncertainty

"Scenarios are a tool for helping us to take a long view in a world of great uncertainty"
– Schwartz 1991:3

Schwartz (1991:6) quite emphatically contends that scenarios are not predictions of future reality, as it simply is not possible to predict the future with certainty. Ogilvy (2005:331) is yet another researcher who shares Schwartz's (1991:6) view that scenario planning is not a predictive process. Suggested by Schwartz (1991:6) is the notion that they constitute alterative images of the future that may be explored, so as to gain an understanding of what could materialise. Wulf, Meißner and Stubner (2010:3) similarly conclude that the main goal of scenario planning is to develop different possible views of the future so as to think through institutional consequences in the event of their materialising.

Adopting a similar view Intel (2013:2) concludes that big data prescriptive analytics "is focused on understanding what would happen based on different alternatives and scenarios, and then choosing best options, and optimizing what's ahead". An important feature of scenarios in dealing with uncertainty is that they engender a need to evaluate and explore alternative futures that may arise. Scenarios it is contended by Roxburgh (2009:2) enable the strategist to steer a course between the false certainty of a single forecast and confused paralysis that often strike in troubled times, their key strength being the ability of thinking through a diverse range of possible outcomes that could become reality.

The concept of "diversity" in thinking through possible alternatives in dealing with uncertainty also features as an important attribute in Surowiecki's (2005:10) wisdom of crowds, but also stressed by the researcher is the need for independence, decentralisation and aggregation. Independence Surowiecki (2005:10) suggests implies that participant opinions are not determined by those around them, a determinant that would inherently be difficult to achieve in scenario formulation. Undoubtedly, the emergence of "groupthink", in scenario development and exploration, has the potential to negatively impact on the consideration of diverse future conditions that could materialise.

This notwithstanding Surowiecki (2005:xvii) stresses that a group's decisions will be intellectually superior to that of an isolated individual. Independence in this sense doesn't equate with isolation, but implies that individual judgement should not "wreck the groups collective judgement" (Surowiecki 2005:41). Jacobs (Undated:1) supports this contention in arguing that to truly understand one's universe, one must see it through multiple "eyes" and have the tools to communicate these views.

Following this trend of discussion Roxburgh (2009:2) argues that listening to contrary voices is a particularly good corrective to groupthink. The researcher further suggests that in providing a safe haven for diversity of thinking and a context for challenging traditional wisdom scenario development can foster a context that breaks out of the groupthink mould (Roxburgh 2009:4).

Mavrodiev, Tessone and Schweitzer (2012:1) quite pertinently indicate that "wisdom of crowds" refers to the phenomenon that the aggregate prediction or forecast of a group of individuals can be more accurate than most individuals in the group. In a similar sense Kearney (2012:3), asserts that scenario planning, involving multiple levels and functions within institutions, as well as soliciting insights from external experts, results in scenarios that generate a dynamic series of plausible outcomes that challenge preconceptions, uncover blind spots and align institutions around a common accepted sense of direction and action. Saliba (2009:124) quite pertinently maintains that a key result of the development and application of scenario planning is the challenging and shaping of the mental models management use in sense and decision making.

3.6 Strategic planning: a scenario-based perspective

Scenario-based strategic planning, it is contended by Kearney (2012:2), is directed at "connecting the world of 'what ifs' with down-to-earth decision-making processes". As noted by the researchers this highlights one of the key challenges that business leaders face; an overriding desire for greater certainty accuracy at a time when such assurance is extremely difficult to achieve in practice (Kearney 2012:3).

Citing Tetenbaum, Smith (2005:23) seems to concur that in a world full of unintended consequences and counterintuitive outcomes it just is not possible to in advance construct a map to the future. In practical management terms, however, managers tend to make decisions based on their mentally constructed versions of reality (Siliba 2009:124). The intent behind scenario planning therefore, it is suggested by Siliba (2009:124), is to reduce the decision making hiatus so that the people concerned are better informed about the uncertainty and complexity of the context they are operating within. Wack (1985:73) adopts a similar view, in suggesting that the better approach "is to accept uncertainty, try to understand it, and make it part of our reasoning". Suggested therefore is the notion that in a scenario planning exercise uncertainties are identified and understood in how they could possible materialise and impact on an institutions operational activities. Of pertinence here are the scenarios acting as scripts providing insights as to potential alternative windows for making sense of an emerging future

context. They thus enable management to become engaged in exploratory dialogue and develop a capacity to navigate a landscape characterised by uncertainty (Saliba 2009:126).

The picture that emerges from the literature review is one of scenario construction enabling management to gain a potential better understanding of the trends that are shaping the future and the alternative futures that may come into being. It's not about predicting the future with any degree of certainty (Wade 2012:15), on the contrary its real value emanates from the dialogue and process of sharing views and insights, thus enabling what could be termed to be the wisdom of crowds in soliciting divergent alternative perspectives.

The problem that, however, remains is that totally unforeseen and unexpected "black swan" events could give rise to an alternative future not envisioned or even explored within the scenario planning exercise. At best scenario planning has value in instances where an envisioned and explored future scenario or aspects thereof emerge in practice. Smith (2005:22) concurs that in contexts where cause and effects of events break down, as would often be the case in black swan events, scenario-based planning is doomed to failure. While acknowledging this Smith (2005:22) stresses that not all change is emergent and fundamentally predictable. Implied is a reality of the coexistence of complex unpredictability and ordered contexts of determinable future states that may assume reality.

3.7 "Black Swan" events: managing the complexity and chaos

Taleb (2007:xvii) describes black swan events as an "outlier" that lies outside the realm of regular expectation, having an extreme impact and giving rise to explanations for its occurrence after the fact, making it explainable and predictable. In general they assume a "game-changer" status (Green 2011:1) as the emergent future assumes a totally new trajectory of unforeseen impact and consequences. Such sudden changes, or so-termed bifurcations, adopt self-organized structure formation in space and time (Frühling 2006:23) that engender an emergent future, which at the time in question for all practical purposes are unforeseen.

A typical such black swan event could be deemed to be the contemporary economic meltdown and its consequences that have fundamentally reshaped the global financial dispensation. Retrospectively the course of the events that have given rise to and shaped the prevailing financial situation can be determined. In their analysis of the situation Bryan and Farrell (2008:4) conclude that there still remains a haze of clarity as to how the future

financial regulatory, trade, fiscal and monetary policies will unfold and impact on the long-term future of the global financial sector.

Depending on how interrelated and interacting financial related trends come together, most of which remain unknown, the future dispensation could turn out to be quite different from that expected (Wade 2012:21). It is for instance submitted by Van der Heijden, Ramírez, Selsky and Wilkinson (2010:261) that the global financial crises is still unfolding, revealing new connections as it ripples throughout the global financial industry.

It in effect emerged out of a host of economic, regulatory, financial, political, ideological, psychological, cultural and social system linkages that are difficult to map even retrospectively and impossible to predict in terms of how they will unfold to reveal a future financial dispensation (Van der Heijden *et al.* 2010:262,264).

3.8 Chaotic contexts

Roux, Murray and Van Wyk (2009:11) describe a chaotic context as one where "no cause and effect relationships can be perceived". There is nothing to analyse and no time to wait for patterns to emerge. The fundamental question that stems from the unpredictability of black swan events is one of how to manage the uncertainty, as well as the associated chaos and complexity it creates. Green (2011:1) for instance makes the valid point that "the key to addressing a Black Swan is not just mounting an effective response; it is mounting that response while *simultaneously* dealing with the psychological impact of being shocked by an inconceivable event of staggering proportions".

In such a chaotic context Snowden and Boone (2007:74) maintain that the relationships between cause and effect are impossible to determine, because they shift constantly and no manageable patterns exist, consequently searching for correct solutions will be pointless. With this in mind Snowden and Boone (2007:74) therefore suggest that within such a context "a leader must first *act* to establish order, then sense where stability is present and from where it is absent, and then respond by working to transform the situation from chaos to complexity, where the identification of emerging patterns can both help prevent future crises and discern new opportunities".

Snowden and Boone (2007:74) appear to differ significantly with Green (2011:3) who argues that "it's not just about responding to the crisis and getting the situation under immediate control; it's also about figuring out how to fix the problem itself". Having stated this Green (2011:3), however, acknowledges that often no solution to the problem exists. Citing the

September 11 terror attack on the New York Twin towers as a case study, where the events were not immediately comprehensible, Snowden and Boone (2007:74) indicate that the city's mayor at the time, Rudy Giuliani, demonstrated exceptional effectiveness under chaotic conditions by issuing directives and taking action to re-establish order.

As black swan events are just not predictable the accent falls on managing the consequential situations that arises through decisive action and then determining the patterns that emerge. This would seem to be in line with the Roux *et al.* (2009:10) description of a complex context as one where "surprise is the order of the day since expert opinion that is based on historically stable patterns of meaning is insufficient to prepare us to recognise and act upon unexpected patterns".

Suggested by the researchers, is the need to identify early signs of pattern formation and then to disrupt undesirable patterns while stabilising desirable patterns (Roux *et al.* 2009:12). Snowden and Boone (2007:74) similarly contend that "leaders who try to impose order in a complex context will fail, but those who set the stage, step back a bit, allow patterns to emerge, and determine which ones are desirable will succeed". This would seem to imply that institutions need to cultivate what could be termed to be a culture of resilience, namely the capacity to absorb disturbance while still retaining its basic function and structure (Walker & Salt 2006:1). According to Walker and Salt (2006:1) the response of any system to shocks and disturbances, such as in the case of black swan events, depends on its context, current state and its systemic connections.

3.9 Institutional resilience: a key factor in managing complex uncertainty

McManus, Seville, Brunsdon and Vargo (2007:ii) define resilience as a function of an organisation's situational awareness, management of keystone vulnerabilities and adaptive capacity, in a complex, dynamic and interconnected environment. The definition stems from a research study undertaken by the researchers at ten New Zealand organisations, from a range of industrial sectors, to discover common themes that foster and create barriers to increased resilience (McManus *et al*. 2007:ii).

An important finding noted by the researchers relates to the fact that many of the organisations are so busy dealing with day-to-day operational difficulties and in the process give extensive consideration to potential issues that they have not experienced before. Yet others have difficulty moving past previous events and focus on planning for the occurrence of a similar future event occurring (McManus *et al.* 2007:iv). This could be attributed to the

fact that a complex system may in retrospect, appear to be ordered and predictable but in effect, as noted by Snowden and Boone (2007:71), hindsight does not lead to foresight as external conditions and systems are constantly changing.

An important element encapsulated in the building of resiliency awareness is the need for detecting and analysing the soft signals or emergent patterns of contextual change. Weick, Sutcliffe and Obsfeld (2005:415) depicts the process as one of a continued redrafting of an emerging story so that it becomes more comprehensive, incorporating more of the observed data, and is more resilient in the face of criticism.

When action is the central focus, interpretation and not choice, becomes a general fundamental response (Weick, Sutcliffe & Obsfeld 2005:409). In the context of resilience, as articulated by McManus *et al.* (2007:ii), this interpretation takes place with reference to the institutional keystone vulnerabilities, as previously alluded to. Weick *et al.* (2005:412) suggest that if the first question of sense making is "what's going on here?"; the second is "what do I do next?".

The second question is therefore action related, which resonates with McManus *et al.*'s (2007:ii) adaptation element of resilience. Weick *et al.* (2005:413) suggest that such action emerges from "*presumptions about the future, articulation concurrent with action, and projects that become increasingly clear as they unfold*". The retrospective interpretations of an unfolding event in this sense inform the adaptation process and the picture that emerges is one of a need for an on-going awareness of emergent patterns and their interpretation.

Based on the interpretation of the impact of the emergent reality on the institution, with reference to an awareness of its vulnerabilities, adaptation takes place to ensure the survival of the institution. The resiliency interface provides management with the latitude for allowing patterns to emerge without so extensively disrupting operational activities that the institution for all practical purposes starts to falter. Walker and Salt (2006:xiv) assert that at its core, resiliency is about risk and complexity. The question, according to Walker and Salt (2006:2), is how to make the systems that operational activities depend on more resilient? Caralli, Allen, Curtis, White and Young. (2010:1) in this regard question whether institutions in fact have any idea as to just how resilient they in effect are.

In summary, seen from the preceding discussion, sense making of black swan events starts with chaos and an almost infinite stream of events redefining emergent reality, from which management may identify cues for closer attention (Weick *et al.* 2005:411). Kiechel (2010:2) in

a metaphorical sense refers to these streams of events as the "horsemen of the corporate apocalypse", the metaphor originating from a biblical account in the Bible's book of Revelation, where four horsemen unleash unprecedented havoc and catastrophe on the world.

Advocated by Snowden and Boone (2007:74) is that leaders need to first *act* to establish order, then sense where stability is present and from where it is absent, and then respond by working to transform the situation from chaos to complexity. Institutional resilience is seen as being essential in this regard, in creating the capacity to absorb the initial disturbance, while still retaining its basic function and structure to enable the institution to remain operational. It also enables management to identify the emergent patterns that collectively redefine the unfolding complex context that will have a significant impact on the institution and its operations. The accent then, as indicated by Roux *et al*. (2009:12), is one of disrupting unfavourable and encouraging the formation of constructive patterns that emerge. The resiliency interface therefore provides management with the latitude for allowing these patterns to emerge.

4. MANAGEMENT OF COEXISTENT ORDER AND COMPLEXITY

"In a complex situation, things can sometimes happen that appear contradictory and totally beyond comprehension. Because we are historically trained in rational thought and causal analysis, we tend to try to understand phenomena in the same way. In complex systems this simply cannot be done"

Bennnet & Bennet 2004:20

The introductory statement captures a significant difficulty encountered in managing complex uncertainty, namely the application of traditional scientific management thinking, theory and practice. As explicitly stated by Bennet and Bennet (2004:20) this simply cannot be done. Fredrick Taylor is generally deemed to have coined the term "scientific management" (Pillkahn 2008:266) and as giving expression to its principles in his book entitled "The Principles of Scientific Management" published in 1911. A central tenet underpinning the theory is a sense of predictability and "clearly defined laws, rules, and principles, as a foundation" (Taylor 1911:3). An underlying premise of scientific management theory is the assumption that cause and effect can be discovered (Kurtz & Snowden 2003:464), thus giving rise to a sense of predictability.

As noted by Kurtz and Snowden (2003:463) the concept of ordered science has triggered a massive growth in human knowledge and is extended over many disciplines. Most management theory, since the days of Fredrick Taylor, tends to assume a rational, deterministic, mechanistic, ordered approach that reflects a perception of predictability that

stands in stark contrast to the unordered domains of complexity and chaos. In dealing with the distinction between order and unordered domains Snowden and Boone (2007:71) make a rather significant statement, namely:

"Over a century ago, Frederick Winslow Taylor, the father of scientific management, revolutionized leadership. Today, advances in complexity science, combined with knowledge from the cognitive sciences, are transforming the field once again. Complexity is poised to help current and future leaders make sense of advanced technology, globalization, intricate markets, cultural change, and much more. In short, the science of complexity can help all of us address the challenges and opportunities we face in a new epoch of human history".

5. CONCLUSION

This new era of human history, characterised by black swan events and extreme uncertainty, is essential one where the future has become rather fuzzy and difficult to determine with any degree of certainty. Clippinger (1999b:1) refers to it as the era of "science of complex adaptive systems" (CAS) that represents a radical departure from traditional scientific management thinking and practice.

The behaviour of complex systems is neither deterministic nor linear, as in the case of traditional scientific management systems and consequently flouts prediction (Clippinger 1999b:5). Implied therefore is the need for caution towards prediction, but quite clearly this embodies a significant dilemma for management who need to plan the institutions journey into what becomes a very uncertain future (Axelrod & Cohen 1999:12).

The most common traditional approach as previously alluded to is the stability-time hypothesis, namely past and present conditions being used to develop a set of future scenarios that may materialise. Pilkahn (2008:35) claim it is unsettling to think that these forecasts are the basis for many political and economic decisions. Axelrod and Cohen (1999:14), however, belief that the situation is note quite so hopeless, as both ordered and unordered can co-exist in time. The issue is therefore one of being able to use appropriate management practice for each of these domains. A good example of this is Mintzberg's (1994:24) model of deliberate and emergent strategy, the former being well positioned for dealing with ordered states and the later for complex contexts.

In managing the evolutionary potential of the present, as institutions move into the future, the accent consequently is on engendering a culture of resilience. Hamel and Välikangas (2003:52) contend that "*resilience is not about responding to a onetime crisis. It's not about*

rebounding from a setback. It's about continuously anticipating and adjusting to deep, secular trends that can permanently impair the earning power of a core business". Management of emergence thus assumes relevance in moving forward.

This notwithstanding there will be unkown, unkowns, that will emerge and these as previously alluded to will require decisive action to allow patterns to emerge as the institution moves from a state of chaos to complexity. In effect it would appear from the literature review conducted that the management approach adopted will be dependent on the prevalent ordered and unordered contextual conditions that coexist at any particular point in time. To quote Donald Rumsfeld, cited by Syrett and Devine (2012:1):

> *"There are known knowns; there are things we know we know. We also know there are known unknowns; that is to say we know there are some things we do not know. But there are also unknown unknowns – the ones we don't know we don't know".*

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