Using a Non-Linear Relational Paradigm to Evaluate the Entrepreneur in a New Venture

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ABSTRACT
The paper builds on a wide range of literature in entrepreneurship, physical science, human science, and the so-called new science. The basic tenets of the NLRP characterise new venture creation as Non-Linear and the entrepreneur's approach as Relational.

The resulting Non-Linear Relational Paradigm (NLRP) is used to analyse extensive empirical data about the process of new venture creation, gathered from diverse informants who are intimately involved in the entrepreneurship process. NVivo® allowed the large number of cases to be handled with scientific rigour. Insights from Empirical Phenomenology added complexity and depth to the frameworks of Yin and Eisenhardt.

This paper distilled 20 separate meanings that form the NLRP. The informants' evidence confirms Non-Linearity as a key to any realistic description of entrepreneurship. The NLRP is presented as a unique and coherent framework within which to understand and conceptualise entrepreneurship's intriguing human complexities.

INTRODUCTION
Entrepreneurship requires a wide range of skills, some of which are well-honed management techniques. There are however other more creative abilities that are vital in successfully managing a start-up through its inception until the product or service is accepted as part of the customer-landscape. These inventive abilities clearly set new venture creation apart from best-practice management techniques that are taught and practiced in all the best business circles. It is these more creative skills, the ones that rely on human ingenuity, that are the focus of this paper.

Traditional management skills can be thought of as the basic building blocks of any business - without these in place, the venture is simply a non-starter. These are what some call "the race qualifiers" [Campbell 2001] - others are more specific [Cartin 1997] and define three basics for new ventures as: Money, Market and Missionary. Empirical research [Campbell 2003] also
confirms that the visionary (missionary) entrepreneur, a clear market for the product, and a clear money strategy, are fundamental to any new venture's success.

Entrepreneurship is often characterised as "thinking outside the box" and this provides a useful distinguishing metaphor. The traditional management techniques that allow us to manage effective businesses are all pretty well defined - they are "inside the box". What this paper aims to do, is help guide nascent entrepreneurs as they venture "outside the box" into the unknown, where notions like best-practice begin to lose their value altogether.

In order to navigate this relatively unknown space outside the box, an appropriate framework is required for these key innovative dimensions of new venture creation. This framework for creative and innovative thought and actions is constructed as a new paradigm, called the Non-Linear Relational Paradigm (NLRP).

Some Definitions

Before describing some of the research which underpins and creates this new paradigm, several definitions are required. In addition a philosophical stance will be outlined to flesh out the orientation of this paper toward entrepreneurship, plus some of the necessary basic assumptions about new venture creation.

First, entrepreneurship itself can tend to be somewhat of a moving target, and this paper thus chooses a relatively wide definition, based on the experience of industry pragmatics. It is a consensus view that distils five main elements in entrepreneurship, and leads to a relatively sparse definition, especially useful in that it can be generalised over the range of situations which this paper will consider. Entrepreneurship is thus defined here as the craft that spots an opportunity, and creates and then manages a new venture so that it grows, despite risk. Similarly, no distinction will be made between new venture creation and entrepreneurship. The overall research project on which this paper is based, focused on technology-based ideas that become viable products (services), and the definition of entrepreneurship is thus also modified by this focus.

The word craft is used in this working definition to indicate that new venture creation is a profoundly human endeavour. Without the entrepreneur there is simply no entrepreneurship. The entrepreneur introduces the key ingredient of creativity, and with this we must also accept the concomitant humanity of whims, foibles and suchlike fickleness.

This paper uses the term Non-Linear to describe aspects that do not fit the regular patterns of reasoning often characterised as Linear thought. This terminology has been found to be generally well understood and fits with other authors who refer also to the non-linear dynamics of new venture creation. Mathematicians (and users of their craft) might require some adjustment to their finely-defined use of these words, but entrepreneurship research is in any case clearly outside the realm of such finely-tuned definitions, making the difference readily understood. Synonyms for Non-Linear as used here are for instance: incongruous, paradoxical, fickle, anomalous, chaotic and erratic.
Philosophical Stance

The way in which one views entrepreneurship, and especially the resulting conclusions, are closely allied to the worldview with which one begins. In order to provide a sense of the paper's philosophical approach, this section sets out a brief review of the foundational positions that are key influences when viewing the phenomenon of entrepreneurship.

The holistic nature of entrepreneurship revolves around the term "holistic" which refers to a philosophical position [Hansen 1995] which claims that:

• Wholes cannot be taken apart
• Every whole can be understood only in the context of the larger whole containing it
• A whole is more than the sum of its parts

While this systems view is very similar to the position outlined by Bohm & Peat [2000] and Wheatley [1992], Hansen [1995] also refers to the related systemic concepts of equifinality and multifinality. Equifinality occurs when a system is stimulated in a number of different ways, but produces the same result. Multifinality is however encountered when the repetition of the same stimulus produces a range of different results. Equifinality can thus be described as linear, with the system-output or process-result being identical for a number of different stimuli. Multifinality is however more closely allied to this research's concept of nonlinearity.

In a machine model of organisations [Morgan 1997] the assumption is that the whole can be understood by dissecting it into its constituent parts. This is exactly true, for instance, of an automotive engine. However, when dealing with human phenomena, the situation is more akin to the baking of a cake. Once baked, it is impossible to separate it into its constituent parts. Also, examining the eggs, flour or sugar on their own, before being baked, will give little clue as to their mutual interaction during the baking process, and thus only tentative indications of the outcome of the process.

Entrepreneurship is very much a holistic process. Success is determined not so much by the elements in the process of new venture creation, but how they interact (or are made to interact) during the process.

The next issue to consider is whether entrepreneurship can in fact exist without an entrepreneur. This research takes the view that to study entrepreneurship without full and constant cognisance of the entrepreneur, seems rather futile, and doomed to inaccuracy at least, if not complete irrelevance [Shaver & Scott 1991, Mitton 1989 & 1997, Bygrave 1989a &1989b, Bygrave & Hofer 1991, Gartner 2001].

The necessity of a champion (the entrepreneur) to drive any new venture forward [e.g. Cartin 1996, Timmons 1999, Mitton 1989] is widely agreed. Shaver & Scott [1991] clarify the stance from the field of psychology, which views the emphasis on the person as an essential part of the study of any phenomenon that involves human endeavour. This view is strongly built and stands upon previous work such as Brockhaus & Horwitz [1986], Mitton [1989], Gartner [1989] and Carsud, Olm & Eddy [1986]. Shaver & Scott's work [1991] has in turn been built upon by others since [Gartner, Shaver, Gatewood, Katz 1994; Shane & Venkataraman 2000]. It is thus with some confidence that this central thesis is reiterated, namely that new venture creation is a
profoundly human endeavour, and to lose sight of the person in the entrepreneurship process would seriously jeopardise the relevance of any such research.

Another component of the philosophical stance concerns what is termed The Scientific Paradigm and its effects on Entrepreneurship Research. Bygrave [1989a] makes a strong argument for entrepreneurship not blindly assuming that the success of the scientific fraternity is transferable to the realm of entrepreneurship research and it is unrealistic to expect such linear machinations to produce coherent new theories that reflect the observed reality of entrepreneurship.

Any fresh creative insight has to come from getting new answers - the analysis of information will not yield new ideas [de Bono 1992:11]. This is a fundamental premise behind the Non-Linear Relational Paradigm. Since the entrepreneurial process is decidedly non-linear, only a portion of the truth can be captured by any linear model. Entrepreneurship requires a paradigm which accepts non-linear attributes like discrepancy, anomaly and irrationality. The linear paradigms of science cannot offer such flexibility. The human sciences offer more appropriate research instrumentation, despite being less convenient and more complex. Surprisingly, relatively few entrepreneurship researchers utilise the avenues of human science.

The nature of order, and especially what constitutes order in a new venture, is another fundamental that underpins the philosophical stance. Tolerance of ambiguity (lack of order) is often quoted as a typical trait of entrepreneurs and innovators [Moss-Kanter 1983, Wheatley 1992, de Bono 1992, Leifer et al 2000, Hamel 2000], a fact also borne out by the informants in this research database.

To explore the nature of creativity, and what impedes it, Bohm & Peat [2000] investigate the whole nature and significance of order. Linear order is characterised by the notion of a line - everything follows in sequence. More complicated order involves chance and chaos, with randomness not seen as disorder but as an infinitely complex form of order and yet, even at this tenuous level of order, this research would still argue that the entrepreneur's hunch is in fact an unconscious perception of order. Acting on such a hunch would then be interpreted as a creative perceiving of hidden order, so hidden in fact that even the entrepreneur is unable to verbalise the reasoning behind the hunch.

Finally, there is the philosophical prerequisite that entrepreneurship is viewed as Non-Linear. Pioneering research [Brockhaus & Horwitz 1986] plumbed the personal characteristics of entrepreneurs, recognising the importance of the human element in entrepreneurship. However, characteristics of the typical entrepreneur have subsequently proved difficult to quantify consistently. Although a measure of consensus has emerged, research and debate on these factors continues [Shaver & Scott 1991, Gartner 2001, Shane & Venkataraman 2000]. The linear expectations that successfully typify an engineer or accountant are clearly much less able to personify the entrepreneur.

Linear models of innovation are however usefully deployed in incubators, technology parks, innovation centres, and by venture capitalists, as they are the best tools available at present. The limitations of linear descriptions of entrepreneurship have long been apparent and many authors have addressed this in various ways. For instance, the technology-derived concept of an iteration loop has proved a very useful non-linear addition in new product development (NPD) circles
[Wilson, Kennedy & Trammel 1966]. Importantly, non-linearity also more accurately describes the actual, empirically-observed process of entrepreneurship [Mortimer, Campbell & Verveckken 2000]. Clearly, to research a phenomenon like entrepreneurship, the philosophical position must accommodate the critical non-linear characteristics of entrepreneurship such as discontinuities, changes of state, and multiple antecedent variables [Bygrave & Hofer 1991:21].

BRIEF LITERATURE REVIEW

There are four main groups of literature on which this paper draws: Entrepreneurship; Physical Science; Human Science and New Science.

Bygrave's discourses on The Entrepreneurship Paradigm [1989a,b] begin the literature review, as they clearly make a distinction that is pivotal in this research. There is a significant divide that separates entrepreneurship research from the physical sciences. Bygrave & Hofer [1991] elaborates on this argument, indicating that the extent of this chasm is apparently not always well understood, nor its implications always appropriately applied in entrepreneurship research.

Once this important distinction is made, Shaver & Scott [1991] add the vital human perspective of the psychology angle on entrepreneurship. This ensures that the focus is squarely on the person at the centre of this process of entrepreneurship - the entrepreneur.

James Quinn [1980, 1985] describes the innovation process in a way that clearly brings out the ubiquitous aspect of chaos within this very human endeavour. He offers logical incrementalism as an effective way of creating sufficient (and appropriate) order to successfully negotiate a way through the complex maze of new venture creation.

Radical Innovation [Leifer et al 2000] is quite different from the less frenetic incremental innovation, and also shows many similarities with innovation and entrepreneurship. The description of hi-tech innovation within the (often hostile) context of large companies, highlights this important contrast. It also helps distinguish some management techniques and contexts best suited to radical innovation and entrepreneurship.

The advent of so-called "new science" provides descriptions of intriguing new notions of fractals, non-linear dynamics, negative time space and self-organising systems. Margaret Wheatley [1992] comes from a management background and provides a fresh view on the use of these new-science processes as metaphors in organisation settings. The emphasis also falls on the immense efforts required to shift organisational paradigms, in order to capitalise on these more human-orientated contexts and techniques.

Bohm and Peat's contribution [2000] has its foundations firmly in the well-established physical sciences. Bohm's extensive involvement in the theories of quantum physics has however required the utilisation of techniques that branch away from science's Newtonian foundations. This provides a sound physical science foundation for non-linearities that require, for instance, new conceptualisations of order and rationality including the theory and demonstration that "Human intention can affect physical reality" [Tiller et al 2001]. Here too, the difficulties involved in the required paradigm shift are given attention.
The human sciences have a strong bearing on the phenomenon of entrepreneurship, and Morgan [1997] adds to this dimension, in the context of organisational dynamics, with its complexities of human interaction. Morgan uses the metaphors of new science to provide effective ways of explaining new techniques that organise people without hindering human creativity and initiative.

Economics uses the assumption of "market rationality" in many of its theories. John Nash [Myerson 1999] extends the theories of market equilibrium to include aspects that improve their empirical viability. Despite these improvements, market rationality remains an inappropriate assumption in many economic scenarios. Useful parallels are drawn which help highlight assumptions made in the realm of entrepreneurship research.

Engineering design has a history stretching over many centuries. Petroski [1994, 1996] analyses some instructive cases which help illustrate the dangers of becoming entrenched in a particular paradigm. Entrepreneurship has borrowed some useful tools and models from the management sciences, but the caveat of paradigm lock-in clearly shows that such tools and models have limited utility. Flowing from this is the formation of a non-linear paradigm for entrepreneurship.

The notion of Lateral Thinking is one of Edward De Bono's most recognisable creations [1992]. Its close affinity to innovation and entrepreneurship make his theory of the human brain as a "self-organising patterning system" one of the most applicable in the context of new venture creation. This model is comparable to a recent scientific phenomenon, now in everyday use in engineering technologies, called Stochastic Resonance [Gammaitoni et al 1998]. The similarities are striking and the attention on the modelling of human thought also helps return the focus onto the person in the process - the entrepreneur.

This introduces some of the most important literature references for this paper. Next, the arguments and issues introduced above are developed and linked, to provide a basis or hypothesis for the research method and data analysis that will follow. The relevant insights from the literature review can now be gathered into three broad themes:

1. **The Process & Person**: The literature shows quite clearly that the person and the process of entrepreneurship are so closely linked that they become almost indistinguishable. It is quite impossible to conceive of entrepreneurship without an entrepreneur. Entrepreneurs are a particularly non-conformist group of people, indeed they are characterised by the fact that they think and act quite differently. Stage-gate models and other linear representations of entrepreneurship therefore require supplementation with the non-linear before they can describe the human essence within the new venture process.

2. **Paradigms & Holism**: In the context of organisations, there are distinct paradigms that have formed to enable a better understanding of the processes that help manage and lead groups of people. Paradigms become established over time, and key assumptions allow scientists, for instance, to build on existing knowledge bases. It is quite evident though, that new paradigms are now forming around creative management theories, which are more appropriate than the styles characterised as command-and-control. These alternative paradigms seek instead to control the context (not the person), looking for increased autonomy, and promoting self-organisation - brave new concepts that are yet to become fully worked out or accepted in mainstream organisations.
Moreover, these new paradigms are especially suited to environments of constant change, with new venture creation as a prime candidate, with its typical non-linearities. The literature thus points to non-linear paradigms as being most appropriate for entrepreneurship, and this type of paradigm will be explored and constructed using the input data from entrepreneurship practitioners.

3. **Entrepreneurial Rationality & Order**: It is apparent from the literature that there are forms of order that go way beyond the normal, or linear, conceptualisations that are in everyday use. There are also many more dimensions to human perceptions than the commonly conceived three, or by adding time, four dimensions. These subtle forms of order and extended dimensions of perception, are part of the additional picture that enables entrepreneurs to see aspects of new ventures that only become apparent to most of us after the fact. The entrepreneur's type of rationality accepts, even invites, disorder. Innovation is managed and controlled in very different ways - looking to contexts, balancing inter-relationships - with a sense of order also being intuitively and creatively perceived.

Overall, the literature thus shows considerable and wide-ranging support for the unique concept of non-linear that is applied by this research to the art of new venture creation. Non-linearity is thus a key that is formed into a paradigm-framework to underpin the methodology with which the richness of the interview data will be interrogated.

The other main feature to arise from the literature is the significance of the relational considerations, whether in organisations, paradigms, or systems. The NLRP hypothesises this as a way of explaining the order which entrepreneurs manage to bring to the new venture environment, which can so easily appear as chaotic disorder. The verification of these two key aspects, Non-Linear and Relational, thus follows in the sections to follow.

**RESEARCH METHOD**

**Case Selection Protocol**

The basic list of candidate cases was conceivably one of the most comprehensive lists of hi-tech businesses in the Cape Metropolitan Region of South Africa. It included contact lists of the Cape IT Initiative (CITI), the Cape Entrepreneurs Forum (CEF), companies polled in a survey of hi-tech companies [Hodge & Driver 1999], and augmented by the author's long-standing contacts in the technology industry in the greater Cape Town region.

The selection criteria were firstly that the business under scrutiny should involve "a clear entrepreneur". Secondly, the company should export at least 30% of their turnover, as exports are an important determinant of success [Hodge & Driver 1999] since the local economy is inadequate to support significant growth in the specialised hi-tech market.

The interviewee was then chosen as the entrepreneur, and/or someone who was close enough to the entrepreneur during the startup phase to be an "informer" on the entrepreneurial process. The entrepreneur's view would tend to be subjective, while the informer would balance this with more objectivity. Entrepreneurship practitioners included people who, although not necessarily entrepreneurs themselves, were in regular contact with entrepreneurs and the process of
entrepreneurship, consisting mainly of venture capitalists, several technology licensing managers at universities and some intrapreneurs and innovation managers. Yin's [1994] use of the word "informants" helps emphasise that, given the focused methodology, interviewees provided far more value than could have been gained from simply responding to a list of questions.

The above was also subject to a willingness to be interviewed, taped, transcribed and used in a research project database. Also, since it is premised that entrepreneurs more easily comprehend the non-linearities of new venture creation, it is valuable to obtain evidence that this is not true for non-entrepreneurs, and two interviews were specially chosen to elicit this "counter-view".

**Data Gathering**

The data gathering process proceeded over quite some time and a short synopsis is given below in Table 1. The first ten interviews were also used in a paper presented at the Babson 2000 Entrepreneurship Research Conference [Campbell & Khavul 2000] and further background detail can be found there. Most of the interviews were conducted in the greater metropolitan area of Cape Town (population 3M+) in South Africa.

<table>
<thead>
<tr>
<th>Data Source</th>
<th>Purpose</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study Visit</td>
<td>Wide range of interviews to map out scope.</td>
<td>Written synopses of interviews in database.</td>
</tr>
<tr>
<td>to UK, USA</td>
<td></td>
<td></td>
</tr>
<tr>
<td>1st round interviews</td>
<td>Test aptness of Depth Interviews. Test Empirical Phenomenology for effectiveness in analysis stage.</td>
<td>Both test-aspects confirmed. Focus required in certain facets of research. All interviews in database.</td>
</tr>
<tr>
<td>Focus Group</td>
<td>Clarify non-linearities in new ventures.</td>
<td>Basic interview structure to focus on Idea-to-Product.</td>
</tr>
<tr>
<td>2nd round interviews</td>
<td>Further cases for triangulation, depth. Some views from non-entrepreneurs.</td>
<td>All interviews in database.</td>
</tr>
<tr>
<td>Australian interviews</td>
<td>Probe for differences compared to South African context.</td>
<td>No significant differences. All interviews in database. Better articulation leads to further overall &quot;search clues&quot;.</td>
</tr>
<tr>
<td>Workshops &amp; Seminars</td>
<td>Use transcripts that include the views of diverse experts.</td>
<td>Adds further depth &amp; texture</td>
</tr>
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The research is thus informed by the above various iterations of data collection, refinement, and analysis. This type of asymptotic approach is recommended in the context of qualitative research by a wide range of authors [e.g. Punch 1998, Strauss & Corbin 1998, Miles & Huberman 1994, Yin 1993 & 1994, Eisenhardt 1989, Glaser & Strauss 1967].

**Data Analysis**

The documents formed a significant database of some 200,000 words from 38 individual informants. 25 individual depth interviews were conducted, polling the views of some 16
entrepreneurs, 4 intrapreneurs and innovation managers, and 9 entrepreneurship practitioners, plus 2 non-entrepreneurial managers, for a total of 31 interviewees since some interviews had multiple participants. Added to this were the documented experiences of workshop and seminar leaders and specialised focus groups that helped inform the research.

The data analysis began with the two most basic tenets of the Non-Linear Relational Paradigm (NLRP) as postulated during the preceding literature review, namely:

- Non-Linearity in new venture creation
- The Relational approach of the entrepreneur

Once these key meanings (nodes) had been identified in the database, the process sought related meanings or sub-meanings of these foundational concepts. A rigorous and conservative schema of triangulation was used to ensure that the meanings most significantly represented in the database through citation frequency were given prominence and that unsupported meanings were rejected.

The array of NVivo® search facilities allows the power of Empirical Phenomenology [Giorgio 1985] to be seamlessly integrated into the analysis. The actual citations per node vary widely between 5 and 139, with an average at about 48. The average was considered excessive, and resorting to statistical calculations shows a large standard deviation of 36, almost equal to the average itself. If this were a normal distribution, 68% of values could be expected to fall in a range one standard deviation either side of the average, thus between 12 and 84. The chosen decision-level of 20 was thus considerably more conservative than the lower statistical limit of 12, and also fell comfortably between the two closest values of 18 and 24 citations. These meanings were encapsulated in 962 individually coded passages, based on the diversity of and richness from the entrepreneurship practitioners who informed this research.

These decision-limits were then superimposed on the overall level of support from the research data base to indicate the four categories according to significance (see figure 1):

- 14 Richly Supported
- 5 Widely Held
- 0 Committed Few
- 1 Lesser Supported

The scores given by the NVivo® coding process were then related to scientific frameworks like Yin [1993, 1994], Eisenhardt [1989], and Strauss & Corbin [1998]. This key was then used to inter-relate these meanings to one another coherently in a node-tree as shown in Figure 2. As can be
seen from the node-tree, the most significant meanings are at the top (parent nodes) with siblings being treed off below them.

RESULTS & DISCUSSION
The NLRP Node-Tree
The data analysis procedure results in a coherent overview of the nodes (meanings) coded for the unique conceptualisation of non-linearity by this research. The treeing process seeks a balance between representing emphases from the literature and the coded evidence summarised in tables and graphs. It is also informed by an "immersion" in the coding procedures that preceded it, resulting in an intuitive sense of the data, or being "grounded" in the data (Grounded Theory). A comprehensive and systematic node categorisation process also created a valuable basis for this important treeing operation.

Naturally, the node for Non-Linear would be expected to be at the top of the organisational tree as in Figure 2. This exhibits not only the research focus and literature emphasis, but importantly it rests solidly on the evidence extracted from the research database, being the most significantly coded meaning-unit to emerge. This support from the database is key since the literature support is scattered among a range of sources. The unique non-linear meaning is thus gathered by this research from the assorted constituent parts into one coherent conceptualisation.

The number of passages that support each node is included in Figure 2 as a quick guide to relevance, bearing in mind that this is only a part of the fuller picture that emerged through copious tables and graphs not included here.

Holism and Sustainability & Ethics are given special positions - in an organigram they would be termed auxiliary or assistant functions, and this description is helpful here too. They are in fact
seen as informing the main node called **Non-Linear Approach** while also playing a vital "oversight role" when seeking to find a **Relational Balance**, and are therefore placed above this meaning unit to symbolise this administrative function.

**Cool with Chaos** illustrates an interesting aspect of the tree structure, as its support from the research database only classified it for lower status. However, the addition of its two siblings made for a combined total of 36 passages. In this way the two siblings add insight, support and complexity to the meaning by treeing in two specific sub-meanings identified from the research database.

In a similar way, the richness and depth of meaning of a major node such as **Relational Balance & Fit** is thus considerably enhanced by its 5 siblings and a further 5 sub-siblings. The number of supporting citations for this major node totalled, by association, almost 300, thus illustrating the power of the treeing process, especially in building a new model for the novel concept of non-linear dynamics in entrepreneurship.

**The Non-Linear Nature of the New Venture Environment**

The **Non-Linear Environment** meaning-unit describes the "playing field" of new venture creation. In this research, the primary touchstone for non-linear meaning has been a list of synonyms, drawn largely from the literature. Consequently, the 79 individual passages in the research database that confirm this meaning, assert that the new venture environment is characterised as: Incongruous, Ambiguous, Inconsistent, Paradoxical, Illogical, Contradictory, Fickle, Irrational, Erratic, Chaotic, Quantum leaps, Inadequacy, Discontinuity, Anomaly, Discrepancy.

This is not the type of environment where rules-based predictions, stage-gate processes, or formulaic management could be expected to excel. It is more plausible to expect attributes like flexibility, innovation and adaptability to succeed in this uncertain environment.

**The Non-Linear Approach of the Entrepreneur in the New Venture Environment**

The **Non-Linear Approach** describes the actions that entrepreneurs use, enabling them to thrive in the non-linear environment of new venture creation. As set out in the research design, the informers’ observations of these actions were meticulously noted, so that consistencies among these actions could be investigated. Patterns among these actions (approaches) were thus coded into nodes to form coherent meaning-units.

The **Non-Linear Approach** is the key node that encapsulates responses that can sometimes be characterised as tit-for-tat. For example, when the environment is fickle, the entrepreneur can respond with a solution that is equally fickle, or a contradictory solution is found to a contradictory problem. Other times the non-linearity in the entrepreneur's approach might be a surprise element, for instance simplicity. The first person to paint a simple white line in the middle of the road solved a very significant problem, and it has proved to be an enduring innovation too.

There are thus two basic types of non-linear approach outlined by the research:

- innovative thinking to get around complex problems in a moving environment
• the (apparently) simplistic response of "answering non-linearity with non-linearity"

Both approaches result in actions that are clearly non-linear although the motivations appear different. Underlying motivations are not the subject of this research, but the non-linearity of the actions is certainly very significant. The node-tree shows that finding a Relational Balance is the key Non-Linear Approach used.

The Relational Balance is described in some detail in Campbell & Gillin [2002] and seeks to make the elements in new venture creation fit together. This is a contrast to approaches typified as best-practice, which considers the stand-alone merits of each particular aspect, and implies a notion of one-size-fits-all, clearly inappropriate for the distinctiveness among new ventures. Some authors also describe what this research calls "finding a relational balance" as "considering the context" [Yin 1993 & 1994, Bohm & Peat 2000, Leifer et al 2000] while others speak more plainly of holism [Tiller 1997, Hansen 1995].

Stand-alone excellence is little guarantee of success in new venture creation. Excellence is certainly valued, but it rates secondary consideration. In entrepreneurship, individual excellence is subject to an approach which first considers the overall, holistic context, and seeks primarily the Relational Balance & Fit of all the significant elements in the venture.

The above discussion, aided by the node-tree, also helps explain the contribution of the Holism node to the overall meaning of Relational Balance & Fit. The other side-function in the node-tree is Sustainability & Ethics and this fulfils a function similar to Holism, as it informs the process which seeks a Relational Balance in new ventures.

If the relational balance does not take account of the long-term viability of the venture, in the words of one informant "it is going to mean failure". Long-term viability is closely allied to ethics, since an adverse ethical impact could be hidden for a time, but in the long run it is liable to ruin the prospects of the fledgling business. Entrepreneurs and entrepreneurship practitioners who informed this research indicated their agreement in no less than 26 individual citations. They also considered it simply a waste of time to attempt underhand methods to a "quick buck" - they saw little chance of lasting success or sustainable wealth arising from unethical behaviour.

At the next level of nodes are the five siblings of Relational Balance, and they help explain the nature of this balance. The five sibling meaning-units are listed below, and to emphasise their previous identification in the literature, some authors are noted beside each node.

- **Flexibility** Mitton, Morgan, Drucker
- **Cool with Chaos** Quinn, Drucker, Wheatley, Bohm & Peat
- **Pattern Recognition** Bohm & Peat, Wheatley, Tiller, Slaughter
- **Strategic Minimalism** Mintzberg, Quinn, Morgan
- **Multiple Experts** Mitton, Leifer

The five meanings above can help when seeking a relational balance in a new venture, and practitioners would thus be guided to success by being flexible. Despite the omnipresence of apparent chaos, the new venture players are encouraged to "be cool" and look for unique, new patterns of order to emerge which can radically transform the business. Strategy should be minimalist, concentrating on just the key elements, and advice should be sought from a range of
experts from diverse backgrounds. All these meanings help maintain this relational balance which is clearly no easy or linear task - it requires a different way of looking at things. In short, it requires Paradigm which permits Non-Linearity and looks for the Relational - the NLRP.

The strong support for Multiple Experts confirms a concatenation of two points raised by Mitton [1989:16]. The type of networking that this research confirms from 66 individual citations, coded as Multiple Experts, is focussed, yet copious. Mitton's observation is that this networking is independent of the target person's perceived power, and this defining insight goes to the heart of the entrepreneur, who likes to consider things differently.

The important addition made by this research is that these Multiple Experts are vital to help maintain the dynamic and ever-changing Relational Balance, so that the new venture survives and flourishes, given the vagaries of the non-linear environment. The multiple views help triangulate the best solution, especially when "you're sailing in the fog", as one entrepreneur describes new venture uncertainties.

Returning to the five sibling nodes, two of these split off into the final level of sub-meanings. First, in order to "be cool" within entrepreneurial "chaos", it requires for instance that one tolerates situations that are ambiguous and where considerable risk is present. The word "unpanicked" was used in the sub-node description for Ambiguity & Risk Tolerance to emphasise this part of the Non-Linear Approach to new ventures. The meaning Don't Tell Yet was not that well supported from the research data but describes an attitude which waits until the fledgling project is sufficiently established before "bringing it out in the open". Quinn [1985] and Drucker [1985] are both particularly strong on this sub-node that helps explain an aspect of being Cool with Chaos.

Strategic Minimalism was one of the best supported meaning units in the node-tree. If the contributions of its three sibling-nodes are included, there were 150 separate passages that supported this meaning. Clearly it is a very significant component of entrepreneurial actions. Mark Shuttleworth, South Africa's IT billionaire, is particularly insistent on the fact that entrepreneurship is closely allied to strategy [Shuttleworth 2001]. Strategic Minimalism continually looks to the future, asking the typical "what if" questions, and also examining the environment to see what has changed, so that quick and savvy action can be taken to capitalise on opportunities. All the time, aspects that were uncertain or risky, become confirmed along the way, and can thus be notched up in support of previously uncertain business assumptions. This type of approach is found in the work of Quinn [1980, 1985], Mintzberg [1994], Slaughter [1999, 2001] and Mintzberg & Quinn [1996].

An example from the research database helps to show how Strategic Minimalism can be applied during in the inception phase of a new venture.

In 1998 Peter Frampton, an entrepreneur, started a not-for-profit IT development organisation with R15 000 in the bank (less than US$2000). Within three years, turnover had reached R3.5M and had created the only IT cluster recognised by South Africa's Department of Trade & Industry surveys of 1999 & 2002. During the formative years he refused to be drawn into a definitive mission statement, preferring instead to network and co-operate with as many players in the IT industry as he could. He openly admits that the initial formalised plan was largely for
appearances, being really "lip service - you've got to at least appeal to rationality. You've got to know where you're going, broadly, but don't expect to know how you're going to get there... be very prepared for divergence".

Only after some time did the basic principles become clearer, and were later framed on the wall at reception declaring: "We Focus On:" and then just three one-line statements totalling less than 15 words. Peter emphasises that "it took a year to get to the simplicity of those three points". In the interim, this highly successful venture had made substantial progress, but without even a clear mission statement.

The resonance of this example of entrepreneurial attitudes with the portions of chaos theory mentioned in Wheatley [1992] and Morgan [1997] is really quite startling. The notion of Strategic Minimalism introduced by this research thus combines observations from the so-called New Science [Wheatley 1992, Capra 1987 & 2002, Morgan 1997] with the extant theory and practice of Strategic Management [e.g. Mintzberg & Quinn 1994].

The above descriptions of the node-tree thus paint a comprehensive picture of the complex non-linearities in new venture creation. These meanings also clearly exhibit a richness that is beyond the traditional stage-gate views of entrepreneurship. Importantly, the meanings are also interconnected and thus adhere to one of the philosophical pillars of new venture creation, namely holism.

In the context of entrepreneurship research, statistical analysis would be at a distinct disadvantage since one of the pivotal statistical requirements is that the variables are independent of one another. This research, with its qualitative design, has no such restrictions, and the interconnected node-tree clearly shows the holistic dependence of all of the meaning-units that together constitute this radical new paradigm.

This novel overall perspective is thus encompassed by a paradigm which admits entrepreneurship's complex non-linearities, and regards inter-relationships as primary.

CONCLUSIONS & IMPLICATIONS

When applying the NLRP it is important to note that not all new venture aspects are Non-Linear. The NLRP is specifically aimed at the entrepreneurial Non-Linearities which include the human vitality and ingenuity which characterises such situations. Entrepreneurial thinking, typified as "outside the box", is where the NLRP finds its application. It is therefore necessary to first discern whether the NLRP is applicable, or whether normal best-practice techniques will suffice. The contrasts listed in Table 2 thus help to distinguish and characterise the type of process that is being observed.
The best overall effect in a new venture will be obtained when the Non-Linear is understood against the backdrop of the linear aspects of a nascent enterprise. The Non-Linear is illuminated by using the NLRP framework, while the Linear is tackled using yardsticks that rely on existing management principles.

The NLRP Node-Tree: a Framework for "Thinking Outside the Box"

To show how the NLRP and the non-linear node-tree (Fig.2) can be used to inform specific new ventures, consider the following statement about entrepreneurs. This statement by Mitton [1989:15] and can be regarded as representative of observations that might be made about entrepreneurs in a range of emerging enterprises: They Welcome Uncertainty: ...willingly seek out uncertainty and yet they define their objectives, strategy, and mix of resources to limit risk.

This clearly contains an overall truth about nascent ventures, but the problem is that it's very difficult to identify what the particular elements are that ring true. What are the key constituents of this observation? This is important as it will help us to typify the activities in any number of new ventures. These are valuable clues that identify successful actions.

Now, using the NLRP's node-tree, we firstly identify the distinct meaning of Ambiguity & Risk Tolerance. Then, moving up the tree helps explain how they are able to calmly "define their objectives, etc." despite this uncertainty. It is because they are Cool with Chaos and use the skill of Pattern Recognition which perceives a unique type of (entrepreneurial) order, thus making it possible to define objectives, strategy, and so on.

The node-tree can thus provide a coherent description of the entrepreneur's endeavours, making sense of things that "ring true" but are otherwise hard to comprehend in an organised or consistent manner. These non-linear aspects of entrepreneurship now appear far more reasoned and, in their own way, more "logical". The NLRP is thus a paradigm that helps illumine the human intricacies of entrepreneurship. There is now a framework within which to understand "thinking outside the box".

Table 2: Some Contrasts between Linear and Non-Linear

<table>
<thead>
<tr>
<th>Linear:</th>
<th>Non-Linear:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Policies, Procedures, Command-and-Control,</td>
<td>Creative, Innovative, Unexpected</td>
</tr>
<tr>
<td>Fixed Expectations</td>
<td>Holistic, considers Contexts</td>
</tr>
<tr>
<td>Best Practice, Standardisation</td>
<td>Qualitative, Paradoxical</td>
</tr>
<tr>
<td>Quantitative, Logical, Cause-and-Effect</td>
<td>Complete Transformation of Products and Industries</td>
</tr>
<tr>
<td>Incremental Improvements, Optimisation</td>
<td>Suits Irrationality, Uncertainty and Quantum Leaps of Entrepreneurship</td>
</tr>
<tr>
<td>Suits Stable Industries and Technologies</td>
<td></td>
</tr>
<tr>
<td>Suits Project Management aspects of</td>
<td></td>
</tr>
<tr>
<td>Entrepreneurship</td>
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