



# The external environment's effect on management and strategy

## A complexity theory approach

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### Abstract

**Purpose** – This paper seeks to investigate the influence of the external environment on the choice of strategic management activities, from a chaos and complexity perspective, since a business environment is a complex adaptive system.

**Design/methodology/approach** – The study in this paper was of an exploratory nature, using the qualitative techniques of case study, depth interviews and document analysis to collect data from two companies each in the IT and packaging industries, namely, more successful/less successful companies.

**Findings** – The paper finds that first, it was proposed that more successful companies in turbulent environments would use radical, fast and disruptive strategies. Furthermore, strategy making should be a democratic, bottom-up process and should be organic, self-organising, adaptive and emergent. The results confirmed these propositions. Second, it was proposed that more successful companies in stable environments would use more traditional management and strategies and more formal strategy planning activities. The findings did not confirm this proposition, probably due to the fact that in reality a truly stable environment does not exist in South Africa.

**Originality/value** – This paper is of benefit to managers and strategists by emphasising a new way to consider the future management and strategies of their companies. Since businesses and markets are complex adaptive systems, using complexity theory to increase understanding of how to cope in complex and turbulent environments is necessary, but has not been widely researched.

**Keywords** Strategic management, Complexity theory, Chaos theory, South Africa

**Paper type** Research paper

### Introduction

The business environment is comprised of a set of relationships between agents or stakeholders in the environment – relationships that are changed by individual decisions taken (Lewontine, cited in Wheatley, 1996). These interactions continuously “co-create” the environment. The business environment is changing faster than ever before (Achrol, 1991; Hamel and Prahalad, 1994; Kotter, 1996; Glass, 1996; Loewen, 1997; Conner, 1998), with such change occurring in two major dimensions, complexity and turbulence (Dess *et al.*, cited in Robbins, 1990; Huber, cited in Achrol, 1991).

Complexity is defined as the measure of heterogeneity or diversity in environmental, sub-factors such as customers, suppliers, socio-politics and technology (Teopaco, 1993; Lane and Maxfield, 1996; Chae and Hill, 1997; Chakravarty, 1997). As complexity increases, the ability to understand and use information to plan and predict becomes more difficult (Black and Farias, 1997). As all systems increase in complexity over time (Farrell, 1998), the increasing complexity leads to more change (Conner, 1998). As the system becomes more complex, making sense of it becomes more difficult (Black and Farias, 1997) and adaptation to the



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changing environment becomes more problematic (Lane and Maxfield, 1996; Merry, 1995).

Turbulence is defined as dynamism in the environment, involving rapid, unexpected change in the environmental sub-dimensions (Conner, 1998; Vorhies, 1998). A stable environment changes little, but when it does, the change is predictable. In turbulent environments, there are many unexpected changes. Turbulence is the natural state of the world (Benton and Lloyd, 1992; Mintzberg, 1994). It is caused by changes in, and interaction between, the various environmental factors especially because of advances in technology and the confluence of computer, telecommunications and media industries (McKenna, 1991; Samli, 1993; Iansiti, 1995). The result of this growth in environmental turbulence has been the reduction of orderly competition, an increasing need for information, innovation and quicker cycles of development, and more difficulty in predicting customer, product and service requirements (Achrol, 1991; Pine *et al.*, 1993; Haleblian and Finkelstein, 1993; Chakravarthy, 1997). Thus, decision windows are shorter, risk of obsolescence is greater, long-term control becomes impossible and managers have to learn new ways to operate in turbulent environments (Davis *et al.*, 1991). The net result of these changes is an environment that Lynch (1995, p. 46) refers to as “chaotic, fragmented and unpredictable and complex and turbulent”. Although this seems negative, Mavondo (1999) has shown that destabilisation in the environment leads to heterogeneity in the business environment, thereby avoiding “me too” strategies and encouraging differentiation.

Since complex and turbulent environments can be desirable, but since many businesses are uncertain about how to cope with such situations, it makes sense to identify ways to handle such environments. Many believe that identifying a causative link between environmental variables and management action is not possible because of the complexity of variables and the chaotic nature of environments (Windsor, 1995). However, recent research has stressed the inter-relationship between an organization and its environment (Polonsky *et al.*, 1999). Firms co-exist and co-evolve with their environments and therefore are able to influence the environment to a greater extent than previously thought (Brooks and Weatherston, 1997). Organisations shape their environments by influencing their industries or collaborating with each other, thereby gaining some control over some part of their environments. The environment is thus not completely determined by external forces, but can also be influenced by the firm (Anderson *et al.*, 1994, cited in Ford, 1997).

If business environments are increasingly complex and turbulent, are they not then complex adaptive systems (CAS)? Many authors clearly see environments as CASs (Black and Farias, 1997; Tedesco, 1998; Peters, 1999; Prendergast and Berthon, 2000). Others highlight the presence of complexity constructs in business environments, such as:

- Co-determination or co-evolution taking place between firms and their environments (Achrol, 1991; Polonsky *et al.*, 1999).
- Self-organisation and emergence occurring through a loose coupling of participants in the environment (Tasaka, 1998; Peters, 1999; Tedesco Analytics, 2001).
- Environmental changes starting small and developing slowly and unpredictably, which is indicative of sensitive dependence on initial conditions (Tedesco Analytics, 2001).

- Business environments exhibiting non-linearity (Black and Farias, 1997; Tedesco Analytics, 2001).

Furthermore, Black and Farias (1997) have explained how actions taken to reduce uncertainty can lead to non-linearity and unpredictability. When firms make changes in a market they create “ripples” that affect the whole market, forcing other firms to try to improve their strategic “fit” to the shifting market. In other words, the marketplace is in a continuous state of disequilibrium and the more participants there are in a marketplace, the more ripples there will be, leading to further disequilibrium and more complexity. Since environments do appear to be CASs, a complexity or chaos perspective should be used to understand the dynamics and behaviour and to guide strategy development (Tedesco, 1998; Prendergast and Berthon, 2000; Tedesco Analytics, 2001).

### **Complexity/chaos theory**

A collection of theories makes up the body of knowledge known as complexity and chaos theory (Boisot, 1999). The underlying idea “is that all things tend to self organise into systems” (Kelly, 1999, p. 5). These systems develop patterns that are created when a number of simple rules are applied over many iterations. Small differences at the start of the process can eventually result in large differences in the system’s performance. Many interactions in a system can produce unexpected patterns or behaviours (Goldberg and Markoczy, 1998) because stimulating one part of the system can have unexpected effects in other, unanticipated, parts of the system. Such unexpectedness is because of the nature of non-linear feedback networks (Stacey, 1996) and the interconnected and interdependent nature of CASs (Bar-Yam, 2000). Complex behaviour is orderly, yet full of surprise. In other words, despite apparent uncontrollability, the system is not totally chaotic. The rules that generate this behaviour are part of the system, are not enforced by a single agent, or manager, and cannot be predicted from examining any single part of the system. The system spontaneously self-organises as the various decentralised parts of the system interact. This emergence of adaptive behaviour happens at the edge-of-chaos where there is enough stability to sustain existence, but enough turbulence for creativity to overcome inertia (Waldrop, 1992). Although CASs’ behaviours cannot be predicted, they can be influenced by encouraging mutually beneficial relationships between members of the systems (Baskin, 1998).

Several chaos and complexity concepts have relevance to business. The central concept is self-organization, the process of a pattern of order emerging from a set of simple rules in an interconnected network. The process is not controlled by an outside party or “manager”, but spontaneously self-organises from the bottom up through the inter-relationships of the system’s parts. As a result, individual managers cannot predict and plan longer-term outcomes (Wilkinson and Young, 1998; Frederick, 1998; Kelly, 1999), but by fine-tuning the simple rules that determine the system, it can be moved between stability and chaos (Lewin, 1993). This continuous self-organisation allows and encourages an infinite variety of creative responses to emerge from changing environments. This emergence is the second important concept of complexity theory. It happens when the system’s parameters change, leading to a movement towards disorder – important because too much order causes the system to become ossified. The implication is that to cope with change the system should be kept at the edge-of-chaos. CASs continuously reorganise themselves into new patterns of

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relationships and from these new patterns, new possibilities for action emerge (Merry, 1998). Examples of self-organization and emergence include development of new strategies (Conner, 1998), development of marketing tactics for specific prospects (Forrest and Mizerski, 1996), self-directed teams (Gault and Jaccaci, 1996) and growth of strategic alliances (Wilkinson and Young, 1998).

The third important concept is feedback. Stability occurs when negative feedback damps changes in variables, pushing the system back to its original state and producing regular, predictable behaviour (Stacey, 1995; Thietart and Forgues, 1995; Glass, 1996). On the other hand, systems exhibit chaos, or explosive instability, when positive feedback amplifies many small changes (McGlone and Ramsey, 1998). As the system moves away from equilibrium, positive feedback will cause the system to move further away at an escalating rate (Oliver and Roos, 2000), leading to explosive instability, or chaos, and eventual collapse of the system. Together, positive and negative feedback can act as countervailing forces on the system, pushing the system towards instability and at the same time damping changes to increase stability, and so balancing at the “edge-of-chaos” (Thietart and Forgues, 1995). Positive feedback is the principle underlying increasing returns to scale, which specifies that the firm with a small advantage early on can enjoy exponential growth until the advantage is so great that the advantage becomes “locked in”, and becomes an industry standard, as happened with VHS video recorders and Microsoft Windows. Applications of positive feedback have been shown in customer defections (Rasmussen and Mosekilde, 1988), product development (Millier, 1999), mass customisation (Saisse and Wilding, 1997) and advertising (Stacey, 1992; Glass, 1996).

The fourth important concept is sensitive dependence on initial conditions (Briggs and Peat, 1999; Phillips and Kim, 1996). In a stable system, small changes have small effects, but in a CAS smaller changes or errors can grow exponentially with each iteration, until no prediction accuracy is possible (Diamond, 1993). An infinite amount of precise data would be required to produce accurate long-term predictions (Mix, 1993). However, many authors suggest ways of using the concept to cope in turbulent environments. Using small nudges to guide an event, rather than dramatic actions to control it are suggested (Gibson, 1996; Wheatley, 1996). Traditionally a small change would be ignored in business. However, the right kind of “nudge” at the correct time (the initial condition) can lead, through positive feedback, to major changes (Nilson, 1995). Being a “first mover” is essential because sensitive dependence on initial conditions and positive feedback create a “flywheel affect” that reinforces early success, providing a significant advantage over the long-term (Hamel, 2000; Koch, 2000). To be a successful first mover, a company must recognise the patterns and spot the environmental clues that indicate which small changes to “nudge” (Ball and Asbury, 1989; Morrison and Quella, 1999). Such companies are able to influence environmental changes in ways that are favourable to themselves, but unfavourable for their competitors.

CASs have an underlying order or structure (Thietart and Forgues, 1995). Within the apparent randomness of a chaos system, patterns can be found by geometrically mapping the data. These patterns are known as attractors, the fifth important complexity concept. The edge-of-chaos attractor, known as a “strange attractor”, reflects the area where maximum creativity and innovation happens (Herbig, 1990; Lewin, 1992). This transition between order and chaos is the point at which sensitive dependence on initial conditions causes small inputs to cause big changes. A unique feature of the strange attractor is that it always stays within certain boundaries, and

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therefore behaviour is broadly predictable within these boundaries, but never identical. Nilson (1995) refers to this as non-repetitive repetitiveness. Exactly where the system will go next cannot be predicted, but it will not go outside certain limits. In other words, the strange attractor allows change while maintaining some order. This bounded stability allows the CAS to continually adapt, coming close to the edge of chaos where creativity and innovation occur, but pulling it back from plunging over the edge into the disorder and chaos that signify failure (Frederick, 1998). Strange attractors in business could include corporate vision and values (Frederick, 1998; Bates, 1999), market entry and development activities (Black and Farias, 1998) and customer relationship management (Kurtyka, 2000). Strange attractors have also been shown mathematically or via simulations in customer behaviour (Herbig and Golden, 1991), inventory levels (Rasmussen and Mosekilde, 1988), and advertising (Feichtinger *et al.*, 1994).

### **Management**

Most managers have been brought up in, and trained for, an environment of certainty, whereas they now have to cope with increased complexity, uncertainty and turbulence. The traditional authoritarian, control-oriented management style, when applied in an uncertain environment, can lead to destabilisation of relationships and behaviours, and also to unanticipated behaviours and possible explosive instability (McElwee, 1998). What is needed is a complex style of leadership – a transformational, facilitative or influencing leader (Slater and Narver, 1995; Fitzgerald and van Eijnatten, 1998). Managers need to set the organisation's direction and create the environment in which staff can operate (Stacey, 1991; Gibson, 1996), and the lower levels can steer (control) the organisation in the direction specified by management (Senge, 1990; Gibson, 1996; McGlone and Ramsey, 1998). Managers create the conditions in which individuals, teams and the system are encouraged to respond spontaneously to the changing environment (Fitzgerald and van Eijnatten, 1998), thereby enabling people to "self-organise" and so keep pace with the rapid changes (Baskin, 1998). In other words, control should be local, through self-management, rather than global, by management. In complex and turbulent environments this style of management is best practiced in flat, decentralised, organic structures, as they can maintain global stability but absorb a high degree of uncertainty and still adapt at the detail level (Peters, 1999; Prendergast and Berthon, 2000). In such an environment planning is still important, but it should have a short time horizon, information should be freely distributed and used quickly, it should be about how to do things rather than what to do, and it should include alternative possible outcomes (Skae, 1989; Nilson, 1995; Jones, 2000) – in other words, less prediction, control and stability and more self or group control to enable quick adaptation to the changes (Jaworski, 1988; Briggs and Peat, 1999).

In summary, management in a complex and turbulent environment should be organic, with the manager concentrating on creating an internal environment conducive to co-evolution. Decision-making should be decentralised, learning and experimentation facilitated and change encouraged. Management must provide the information to support this approach and control must be exercised through self or group control. This can be called self-organising management.

### **Strategy in dynamic environments**

There is agreement amongst chaos and complexity authors that traditional strategy making is ineffective in turbulent environments. Traditional strategy making is not



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innovative, creative or original, leading to strategic rigidity (Nilson, 1995; Edgar and Nisbet, 1995; Brown and Eisenhardt, 1998, and Roos, 1999). Strategic success formulae become rapidly obsolete in volatile markets (Conner, 1998), and competitors make strategies irrelevant by rewriting the rules of the game (Fradette and Michaud, 1998). These problems happen because traditional strategy making is often based on:

- Information that is obsolete by the end of the planning process (Nilson, 1995; Loewen, 1997; Frederickson, cited in White, 1998).
- The assumption of a stable environment (Volberda, 1997; Chakravarthy, 1997).
- The assumption that the firm can, to an extent, control its environment (Goold and Quinn, 1990; Cravens, 1991, White, 1998).

This ineffectiveness of traditional strategic planning is partly due to the inability to predict in environments that are near the edge-of-chaos (New Marketing Imperatives Roundtable, 1994; Kurtyka, 2000), because the system is continually and unpredictably changing, and therefore managers have to continually obtain new information to understand the environment. Any plan is therefore obsolete before it has been fully implemented. Staff who have to cope with environmental shocks are restricted by a detailed, prescriptive plan (Glass, 1996).

Strategic planning is evolving to meet these changing conditions (Wall and Wall, 1995). Strategy is being done differently, such as involving more people in the process, delegating to those closest to the customers and using cross-functional teams. Strategy has become a trial-and-error process, evolving through the discovery of what works. As a result planning cycles are shorter, and because quick responses are required, tactics often dictate strategy. In the 1990s, bottom up planning became the norm. Stacey (1992) suggests that strategy making should be a spontaneous self-organising process, with groups of managers informally discussing strategic issues. Sengupta *et al.* (2000) suggest a reactive learning system that monitors environmental deviations instantly, communicates the problem or opportunity, and empowers individuals for prompt decision making, instead of strategic planning.

Eisenhardt and Sull (2001) are more prescriptive, recommending that strategy in turbulent environments must be flexible but disciplined, which requires a set of strategic rules help managers to cope with opportunities and threats coming rapidly at them without having to refer to superiors or do slow strategic planning exercises.

Wheatley (1993) is even more radical. She maintains that self-organising systems have a clear sense of identity – values, traditions, competencies, culture, and core beliefs. Therefore, any action is based on a reference to these principles and so adapting to environmental change does not need to be reactive or uncertain. This is known as self-reference. The system knows what to do in a turbulent environment. As a result autonomy at a local level is encouraged, as individuals will be directed by the self-reference system, rather than by orders or strategic plans from above.

A fundamental problem of strategy making in a fast changing environment is to achieve “adaptive innovation” at the edge-of-chaos, while still achieving consistent and reliable execution of the strategy. Brown and Eisenhardt (1998) maintain that this is achieved by “improvisation”, a balance between the too much structure and too much chaos. Improvisation requires lots of experimentation and competitive moves to destabilise the market and push it to the edge-of-chaos, but with sufficient structure that change can be efficient (priorities, deadlines and responsibilities), but not so rigid that change is discouraged. One strategic framework for coping with turbulence

suggests that a firm must produce chaos through repeat innovation (Chakravarthy, 1997). Merely being a first mover is not enough, as competitors can get a “free ride” and, because of the difficulty in defending a strategy in a turbulent environment, the firm may be overtaken or side-stepped by competitors. It is essential, therefore, to innovate continuously to the extent of making one’s own products obsolete and replacing them, before a competitor does.

Other issues supporting such a strategy making framework are the ability to adapt faster than competitors (Hooley and Beracs, 1997), being flexible to keep up with or stay ahead of changes (Chakravarthy, 1997; Brown and Eisenhardt, 1998), risking the mistakes of fast responses and learning quickly from these mistakes (Chattell, 1995; Barnett, 1996; Glass, 1996), and using strategic alliances to leverage competencies (Chakravarthy, 1997; Joshi *et al.*, 1998).

The above shows that strategy making in a complex, turbulent environment is different when approached from a complexity and chaos viewpoint. A firm’s strategy should involve a vision or identity, bottom-up emergence of the strategy involving all the staff, balancing between structure and rapid change through flexibility and rapid adaptability, and initiating change rather than reacting to environmental change. This can be called emergent strategy making.

### **Method**

The problem to be researched was defined as understanding how more successful South African companies, operating in environments of differing complexity and turbulence, differ in their use of management and strategic activities from companies that are less successful. To solve this problem, four propositions were developed:

- P1.* It was proposed that the more successful company (ITA) in the complex/turbulent environment would use self-organising management and emergent strategy making processes.
- P2.* It was proposed that, in the complex/turbulent environment, the less successful company (ITB) would use traditional management and strategy making processes.
- P3.* It was proposed that the more successful company (PA) in the simple/stable environment would use traditional management and strategy making processes.
- P4.* It was proposed that, in the simple/stable environment, the less successful company (PB) would use self-organising management and emergent strategy making.

The research problem has inherent in it the difficulties of understanding management and strategic approaches, the assessment of success, and the lack of research in the specific field. These difficulties dictated the need for a qualitative exploratory study. The approach chosen was the case study method to enable the problem to be studied intensively (Welman and Kruger, 1999). Two companies each in a simple/stable industry and a complex/turbulent industry were selected to represent the more successful and less successful companies.

Maximal variation sampling was used to select the companies. This method strives “to integrate only a few cases, but those which are as different as possible, to disclose the range of variation and differentiation in the field” (Flick, 1998, p. 70).

The sample was selected through a two-stage process:

- (1) First the most complex/turbulent and most simple/stable industries were selected via a questionnaire posted to experts such as stock brokerage industry analysts and management consultants. The results highlighted the IT industry as the most complex/turbulent, and packaging as the most simple/stable.
- (2) Within each industry, a most successful and a less successful company was chosen, based on a Delphi process, using panels of experts specialising in the IT and packaging industries, such as consultants, journalists and buyers. The panellists nominated ITA as more successful and ITB as less successful in the IT industry, and PA as more successful and PB as less successful, in the packaging industry. To obtain the companies' co-operation anonymity was necessary.

Data was collected via depth interviews with knowledgeable managers in the companies, including directors, managers and staff. Interviews took about an hour each, were based on an interview guide and audiotape recorded and, in addition, notes were taken. Furthermore, various company documents were collected and analysed, for example, annual reports, brochures, web pages, advertisements, meeting minutes, manuals, etc.

A combination of techniques was used to analyse the material. Thematic coding, using NVIVO software, was used to deconstruct and reconstruct the transcripts so as to categorise findings according to each of the two perspectives being studied (stable/turbulent and more/less successful). Content analysis was used to paraphrase, summarise and reduce the field note data and the documents to generalisations in order to compare them with the research problem and propositions. This analysis was done manually by summarising and aggregating the interview notes and the documentary evidence into tables to compare the two companies in each industry against each other and against the proposals, and to compare the companies similar in success to each other and against the proposals.

"Method-appropriate criteria" such as data triangulation, methodological triangulation, prolonged engagement and an audit trail were used to validate the procedures and to ensure trustworthiness in the study (Flick, 1998).

## Findings

The results of the analyses were summarised for each company and are presented as four cases below:

### *Case 1 – ITA – more successful company in complex/turbulent industry*

ITA has a culture of acceptance and encouragement of change. Adapting and being flexible are critical abilities. They react quickly to achieve an advantage over competitors, as is shown by the following extracts:

Decisions around selecting technology, that time is very short.

Reducing time to market.

ITA change frequently, have experience in handing change, and therefore have learnt to cope with change, as the following extract shows:



... in any period of six months this company will change and that change is expected.

However, planning is not precluded:

Everything is planned carefully ... but those changes have to be made very quickly.

They adopt a short planning horizon (three to six months) that forces them to face change regularly. This results in ITA being proactive and having a positive attitude to risk:

It is a culture that accepts trial and error.

They are “agile, constantly innovative, and open to change”. As expected of a successful company in a turbulent market, ITA was prepared to be aggressive in order to lead, and control, their market.

ITA’s management style is open and democratic, with independent and entrepreneurial action encouraged, which the following extract shows:

... to get the guys at the coalface to come up with innovations and new ways to do things.

This is supported by the fact that they “... rely on self control, we do not go around checking up on (people)”. This does not imply a *laissez faire* approach – they have “iron fisted control, intolerance of failure”. This does not detract from the findings, because tight control refers primarily to financial control.

They have few policies and procedures, relying on some basic principles and staff who know what to do. This informality and lack of “rules” is typical of the flexibility needed for a successful company in a turbulent environment to be sensitive to, take quick advantage of, small and rapid environmental.

The strategic direction of ITA is based on goals set by top management, but the details of the plan evolve from the environment. This is reflected in the following extracts:

The way (planning) evolves is not cast in concrete.

(Planning) might be reactive to market demands or reaction to customer demands or even competition or even suppliers.

In other words, strategies are both planned from the top down and evolve from elsewhere in the company. The plan is flexible – “it will be adapted quickly” and “we can and do change our minds.” They are very aggressive, shaking the market up and developing new ways of doing business – “we will be seen by the industry as being innovative and constantly changing.” They aggressively enter new markets as is reflected in the following extracts:

Continuous entry into new markets.

... use competitive advantage to obtain dominant position in embryonic stages of market development.

Their strategy making process involves the strategy emerging from a wide range of influencers, such as “market demands or reaction to customer demands or even competition or even suppliers”. Adaptation is seen as a key method of strategy making – they prepare for change and do not see it as only reacting to change. Thus, ITA use quick adaptation to change as a strategic tool, as was anticipated of a more successful company in a turbulent and complex market. They place a lot of emphasis on

relationship building, partnerships and strategic alliances with their customers and suppliers, using the relationships to adapt to change and to grow in new markets, as well as maintaining existing markets.

The above shows that ITA uses self-organising management and emergent strategy making, thus confirming *P1*.

*Case 2 – ITB – less successful company in complex/turbulent industry*

ITB changes slowly, appearing to resist change. This is illustrated by the fact that they change "... slower than our customers. We are not proactive generally." This is supported by comments such as "grow steadily through partnerships" and "improve ... in a controlled manner." Since they avoid change, they are not experienced in coping with change. ITB adopt a long-term planning horizon ("We are on a three year plan now"), thereby trying to maintain the *status quo* and avoid having to cope with change. ITB is thus reactive, as is shown by them saying "We follow what (others) are doing because inevitably they set the trend." They see this as "a lower risk ... we do not cause change," because "we need to ... be cautious."

In other words, ITB do not welcome or encourage change, but delay having to change until it is inevitable. Even then change is seen as something to be planned carefully to avoid the inherent risks. This means that they do not take advantage of opportunities created by innovation and developments in this turbulent industry. The emphasis seems to be on cautious efficiency rather than adaptive flexibility.

ITB's management style is open and democratic, as is reflected by:

... everyone can take routine decisions. That's your internal process – that is trust.

... because I believe people want that freedom, they are mature, they are rich in knowledge. You cannot go and hound them all the time.

They also rely on self-management and control:

You were responsible for a project and they actually allowed you to do it, nobody checked on you, you worked your own hours.

There are few policies and procedures, which is not consistent with a less successful company struggling to cope with a turbulent environment. It may be that this informality has been adopted because it is the "fashionable" style in the industry. ITB uses formal strategic planning conducted by management, via a long-term (three years) plan. It is more conservative and reactive, possibly due to a restricted strategic vision, as is indicated by this extract:

Strategic vision is probably one of our liabilities ... we are very good at ... doing the same thing, but the brand new thing about where you need to go, that is needed ...

This planning appeared to be unsuccessful, as "(the plan) was all airy fairy but no one knew how we were going to achieve this, there were no milestones".

Although many interviewees stressed that adapting was important, there is a belief in the company that efficiency and concentrating on current business is more important, so they wait for the market to move and then react – "we do not have the processes dynamic enough to support quick running".

ITB place a lot of emphasis on relationship building with customers, but use them only to maintain existing business. Their neglect of market development is shown by

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the fact that “they spoke about developing new markets . . . but in reality they stayed in the same line.”

ITB’s formal, planned approach was expected of a less successful company in a turbulent and complex environment, but their less formal management style was not exactly as expected. Therefore Proposal 2 was partially confirmed.

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*Case 3 – PA – more successful company in simple/stable industry*

PA have a positive and proactive attitude to change, instigating change in their industry to gain a competitive advantage – “. . . (disrupting the market) is one of the key strategies.” Although they appear slow and deliberate, they have learnt to take decisions quickly and to implement rapid change when necessary (“It depends on what the changes are but they can be done very quickly”). Their mission statement reflects this too, namely “fast, efficient and professional” and “deceptively fast.” This is a suitable method for a fundamentally stable environment that has pockets of turbulence and rapid change, and for a company prepared to instigate changes to keep ahead of the competition. Their approach to planning is consistent with this, taking a longer term view on strategic issues such as product development (“. . . looking at a cycle of three to four years”), while in operational matters they adopt a short term view (“We do not look beyond 12 months”). In other words, PA emphasise stabilising actions most of the time, which the following extract shows:

I think in some ways we have kept the market stable . . . in some instances we have actually brought people into the company not to ruin the market.

They destabilise the environment when it suits them, and are able to cope with the instability that this causes. These findings reflect the opposite of what was expected, namely that PA should follow a stabilising strategy. Despite this commitment to destabilisation, they have a strong need to maintain stability in other areas of their operation, specifically in terms of competition. Thus PA encourages stability, except when it suits them to destabilise!

PA’s management style is open and transparent – everyone can contribute and motivation and commitment is generated through involvement. Structures are loose and overlap, and people can get involved in, and comment on, any aspect of the business, as is reflected below:

The company has always had a very open way about things, and you have meetings where they dish out the financials to everybody from cleaner up . . . the company trusts people, and if you have a view on something you can speak.

This freedom does not imply a lack of discipline or control. The culture of the company encourages self-control and makes it clear what the decision should be. They refer to it as “self policing”, which imposes conformity to the corporate goals. Consistent with this democratic style, PA had no written policies and procedures. Although this was not expected of a successful company in a stable environment, it is not surprising considering the innovation and creativity in this company.

PA’s approach to strategy is innovative and aims at doing things differently – a maverick – but not overly aggressive. Strategy development is predominantly a top management activity, but with strategies discussed with staff who are invited to submit ideas. Strategies are “extremely focussed”, but not in writing. Although projects are carefully planned, the strategy is not, as is shown by:

Opportunities are seen along the way and to some extent it can be . . . impulsive . . . go in a certain direction and make those decisions pretty much there and then.

Success results from this “. . . off the cuff, not in a reckless way, but decisive” strategy making method that is based on a clear idea of who they are and where they want to go. PA’s planning is short term, continually monitoring the environment and maintaining flexibility to adapt quickly to anticipated changes. Strategic planning is a continuously evolving process, changing and developing based on changing environmental factors. Although long-term relationships were developed with larger customers, this is not prevalent throughout PA’s customer base.

PA’s approach to strategy and management is generally what was expected of a successful company in a turbulent environment, rather than in a stable environment, and thus *P3* is not confirmed.

*Case 4 – PB – less successful company in simple/stable industry*

PB has a reactive approach to change and change slowly:

I think if the company can get away with what they have got they will stick with it, but if it is technological they will wait and see if it is going to work properly before they change anything.

PB, when they do change, do so with reluctance – “The move away from (our traditional market) was forced upon us.” There is no longer term or shorter term planning. Other than the annual budget, no real consideration is given to future environmental changes. Although this could be acceptable in a rapidly changing environment, in a stable market some form of longer term planning would be advantageous. PB are the victim of change rather than being able to avoid the negative impacts, as is shown in this extract:

Well this industry changes with the other industries that we deal with, so if they change then we follow suit.

PB is a long established, family business. Their management style was disciplinarian and authoritarian, involving a bureaucratic, family oriented style. The previous Managing Director “ran this place like an army concentration camp, people were not allowed to think for themselves.” At the time of the study they were trying to introduce democratic management but some staff were not comfortable with this style, which is reflected in their attitudes to control by managers or by the Policy and Procedure manuals, or by the Managing Director’s comment – “Not that there should be policemen but there should be checking.” PB has a formal policy and procedure system, which has curbed people from making decisions “as there is no system for bypassing the procedure so you hesitate to take a decision.”

PB avoids strategic aggression and prefers to “go carefully in the market, not to tramp on too many toes.” PB’s strategic approach is to concentrate on the current situation, as is reflected by the fact that they are “company, product, and technology oriented.” Strategy and planning is primarily budgeting and production planning. There is no strategic planning, with strategies neither being planned, nor evolving. At best it can be said that their strategy is a reaction to environmental changes, an attempt to “keep up”, or as one manager said, “We see something going that way and we follow it and . . . blunder along.” They are at the mercy of the environment – unable to have any say in their strategic direction. In other words, they do not adapt to environmental changes but are reactive and slow in taking the required decisions.

They emphasise efficiencies in current markets rather than developing new markets. Although they have long-term relationships, these are not strategic, but revolve around salesforce relationships.

The strategy and planning approach adopted by PB is not consistent with what was expected of a less successful company in a stable environment, and therefore *P4* was not confirmed.

**Discussion of results**

To provide a clearer view of these findings, a summary of the three data sources (interviews, documents and field notes) is plotted in Table I. A score of 2 indicates that empirical findings match what the literature proposed, a score of 1 indicates a partial match and 0 indicates a mismatch.

This summary illustrates that the findings for the companies in the complex/turbulent environment were generally consistent with the literature. The more successful company (ITA) used self-organising management and emergent strategy making as proposed by the literature, while the less successful company (ITB) did not. The findings for the simple/stable environment, however, were not consistent with the expectations for this environment and were not as proposed by the literature. The more successful company (PA) performed like a successful company in a complex/turbulent environment, while the less successful company (PB) partially used the approaches expected of the more successful company.

Overall, ITA and PA both performed as expected of a successful company in a complex/turbulent environment, and ITB and PB both performed as expected of a less successful company in a complex/turbulent environment. In other words, *P1* and *P2*, relating to the complex/turbulent environment, can be accepted, but *P3* and *P4*, relating to the simple/stable environment cannot be accepted.

Since the findings generally supported *P1* and *P2*, it is concluded that the use of complexity and chaos theories can be helpful to understand complex/turbulent market dynamics. However, the accuracy of specific predictions of management and strategic approaches can be questioned, as not every management or strategy issue behaved exactly as predicted. Possible reasons for this may be:

- Since the South African environment has become complex and turbulent over the past decade, even less successful companies may be adopting the tactics predicted for more successful companies. In fact, the predicted approaches may

Factors	Turbulent/complex						Stable/simple					
	More successful			Less successful			More successful			Less successful		
	IT	DA	FN	IT	DA	FN	IT	DA	FN	IT	DA	FN
Attitude to change	2	2	2	2	2	1	0	0	0	0	0	0
Management	2	2	2	0	2	1	0	0	0	0	0	0
Strategy	2	2	2	2	2	2	1	1	1	1	0	1
Relationships	1	2	0	1	2	2	1	2	0	1	0	2
Total	7	8	6	5	8	6	2	3	1	2	0	3
Gross scores	21	19	6	5								
Percent	87.5	79.2	25.0	20.8								

**Table I.**  
Summary conclusions

**Notes:** IT = Interview transcripts; DA = Document analysis; FN = Field notes

even apply to unsuccessful companies, but by definition the unsuccessful companies are no longer in business, and so cannot be examined.

- How companies perceive their markets may be more important than the actual state of the markets. Since all ITB interviewees believed their industry to be changing significantly, their management and strategic actions may have been copied, but poorly implemented, from companies they perceive to be successful in their industry.
- Although the environment may determine management and strategy actions, they may have little effect on success. Other issues may be more important determinants of success, for example, the quality of implementation of the strategies.
- Although the computer industry is complex and turbulent, the conservatism inherent in South African business may have led ITB to adhere to traditional tactics, as “they are the right thing to do”, or because “the competitors are doing them”, even though not environmentally determined.

With regard to the simple and stable environment, *P3* and *P4* were not accepted, therefore questions must be asked regarding the relevance and accuracy of the management and strategic actions suggested by the literature for this environment. Although the complexity/chaos theory approach may not be entirely accurate, there are other possible reasons for the unexpected results:

- Since the South African environment has become complex and turbulent over the past decade, the packaging environment may not be sufficiently stable to reflect the expected strategies. Even the most stable industry in South Africa may be turbulent enough for companies to follow the approaches expected in a complex/turbulent market.
- How companies perceive their markets may be more important than the actual state of the markets. Most packaging interviewees believed their industry to be changing significantly, and therefore it makes sense that some of their actions would be like those of a company in a complex/turbulent environment.
- Although the nature of the environment may determine the management and strategic approaches to follow, they may have little effect on success. Maybe successful companies in any environment would follow similar management and strategic approaches.
- The packaging industry may be in a state of transition, moving from stability towards turbulence, which was not sufficiently understood by the panellists who nominated the industries and the companies.

### **Implications for managers and for further research**

This study has highlighted the relevance of chaos and complexity theories as techniques to better understand the market dynamics being experienced by companies in many South African industries. It has further highlighted the complex nature of the problem and the difficulty in making conclusive statements about success or failure in the rapidly changing South African market. Nevertheless, it is believed that these theories can help to develop superior management and strategic approaches for the environment in which a firm operates, and also to better understand the behaviour and dynamics of competitors in a market.



It is hoped that some of the anomalies and difficulties outlined above can be resolved by further research over a wider range of companies and in different industries. Furthermore, it is believed that quantitative research focussing on a specific industry could be very helpful in more clearly differentiating the management and strategic approaches of more successful from less successful companies.

As a general conclusion it is felt that the overall objective of the study has been met by showing that more successful companies, operating in environments of differing complexity and turbulence, do differ, to a considerable degree, in their use of management and strategy making approaches, from those that are less successful.

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#### Further reading

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