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Complexity theory and tourism policy research.

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Abstract

This paper investigates debates about complexity theory and its applications in the social sphere and considers its potential contribution to enhance understanding of tourism policy making. It identifies five concepts and outlines how they might be employed to enable researchers explore the complex social circumstances and human interactions that influence policy.   It considers the philosophical implications of social applications of complexity suggesting a move away from concerns about linear process, universal modelling and tangible outputs of policy (such as a plan) and towards localised and deeper studies to explore the dynamics of the enactment of policy within its context. It suggests that complexity theory might be used as a thinking tool to enable a more holistic approach to policy analysis which can investigate policy in its context, the interactions that exist between different policies and programmes, and the implications of human agency.

Key words: complexity theory, social science, tourism policy,

Introduction

Chaos and complexity theories have been used in the study of tourism phenomena, particularly incidents and aspects of which are perceived to be chaotic. They have also been used to challenge models and methods that conceptualise phenomena in a simplified, linear manner, claiming that this ignores both the complexity and dynamism of those phenomena and the environments within which they operate.

This paper investigates the potential contribution of debates about complexity theory in the wider management, policy and organisational literature to enhance

understanding of tourism policy making. It is developed from a social

conceptualisation of tourism policy, recognising its societal context and the role of

people negotiating and communicating to develop and implement policy. Five

complexity concepts are identified that might be used as a foundation from which to

build research into tourism policy taking account of the complex social

circumstances and human interactions that influence policy. These concepts are

represented here as they arose during research into tourism policy making in the

U.K. which focussed on actors perspectives of (…..2006).

The implications of complexity in a social sphere are considered and approaches are

suggested to enable policy analysts to deepen their understanding of the social

aspects of the policy process by developing studies that recognise both complexity

and social context. The intention of this paper is to identify the *complexity* of

complexity science and explore debates about how its concepts might be used to

develop understanding of tourism policy making taking into account its context,

dynamics and relationships. It intends to add to the existing literature on complexity

and contribute to the debates about the use of complexity theory to develop

understanding of tourism policy.

Theoretical Framework

Chaos theory

Much of the tourism literature on complexity draws from chaos theory and looks at

the chaotic parts of systems. Chaos theory provides explanations of unexpected and

unanticipated outcomes and points to the impossibility of long-term prediction. The

principles of chaos have been explored in various fields and have been found to

apply in meteorology, physics, chemistry and biology (Gleik, 1988; cited in Stacey,

2003). Much of the early work on chaos within complex adaptive systems that informs complexity theory was based upon occurrences within the natural environment and was framed by research by biologists and ecologists. More recently economists, social and political scientists have started to develop and adapt chaos theory as a way of understanding human systems. Specifically, Faulkner (2001) Faulkner & Russell (1997, 2001), McKercher (1999), Ritchie et al (2003) and Russell & Faulkner (1999) have considered chaos theory as a way of understanding the complexity of phenomena associated with tourism. McKercher (1999) develops a chaos model that highlights the variety of interrelationships between nine different elements in "the tourism process". Russell & Faulkner (1999) investigate the role of chaos makers in destination development. Chaos theory has been used to underpin some research into crises and disasters (including Miller & Ritchie, 2003).

Chaos and complexity theory are often discussed in a manner that suggests they are interchangeable and identical, however Byrne (2001), Haynes (2001) Harvey (2001) Mitleton-Kelly (1998) and Stacey (2003) claim they are not the same. Haynes (2001) contends that complexity theory has developed from, and uses the language of, chaos but has adopted different methods of research. Mitleton-Kelly (1998) claims they "may share certain characteristics but differ in so far as a complex adaptive system is able to evolve and to change" (1998:6).

Harvey (2001) contrasts complexity theory, as advocated by Gell Mann (1994), Lewin (1993) and Waldrop (1992), and chaos theory as advocated by Prigogine and Stengers (1984, 1997) and the *Brussels Group*. He claims that complexity theory is focussed on the "*internal sub-system* of complex systems while chaos theory" studies "…the *external system* of complex systems" (2001:3). Stacey (2003) contrasts the approaches adopted by chaos and complexity theorists claiming that the former are

often looking for an overall 'blueprint' for the whole system whilst the latter are more likely to model agent interaction at the local level.

Complexity theory

It is not possible to identify one complexity theory because different approaches have been developed across different disciplinary fields as researchers have sought to understand various aspects of diverse systems within complex environments (Mitleton-Kelly, 1998; Medd, 2001a). Complexity theory has been developed across disciplines, initially natural sciences (e.g. Prigogine and Stengers, 1984), physics (e.g. Gell Mann, 1994), biology (e.g. Goodwin, 1997), computer science (e.g.Traub and Werschultz, 1998) and economics (e.g. Brian Arthur, 1997), and more recently education (e.g. Tosey ,2002), management (e.g. Stacey,2003), spatial planning (e.g. Healey, 2007) and social policy (e.g. Harvey, 2001, Haynes 2001) and has involved sharing and borrowing ideas from those disciplines. Research by Medd, 2001a, Stacey (2003) and Healey (2007) indicates that there is a growing gap between natural and social science in terms of understanding complexity, and debate about modelling complex interaction in social or human systems.

The application and contribution of complexity theory to tourism phenomena

Researchers including Farrell & Twining-Ward (2004), Faulkner & Russell (1997), McKercher (1999), Russell & Faulkner (1999, 2004), Twining-Ward (2002), and Zahra & Ryan (2007) have investigated complexity theory as a way of understanding tourism phenomena. They criticise existing tourism models for their selectivity and focus on stability or orderly linear change rather than complexity and turbulence in systems. Russell & Faulkner (1999) are critical that research has focussed on "phenomena that exhibit order, linearity and equilibrium" (1999:411). Faulkner &

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Russell (1997), McKercher (1999) and Russell & Faulkner (1999, 2004) use ideas from complexity and chaos theory to critique models of that simplify phenomena in order to identify key parts and then assume linear relationships between those parts.

McKercher (1999) contends that tourism is characterised by a complex range of interactions and that its dynamics are chaotic non-linear and unstable. He draws from the work of Lewin (1993) demonstrating that large, interactive, dynamic systems evolve naturally towards the edge of chaos. The implication for tourism phenomena is that they can appear to evolve in a stable, predictable and linear manner over long periods of time, until a trigger initiates a period of chaotic upheaval where non-linear relationships dominate. The dominance of 'Newtonian' and rational approaches in tourism means that knowledge is well developed in some selected parts of the tourism system but that there is little knowledge of the relationships and interactions between these parts (Farrell & Twining-Ward, 2004).

Farrell & Twining-Ward (2004) identify the problem that

> "…researchers schooled in a tradition of linear, specialised, predictable, deterministic, cause-and-effect science, are working in an area of study that is largely nonlinear, integrative, generally unpredictable, qualitative and characterised by causes giving rise to multiple outcomes, quite out of proportion to the initial input" (2004:277).

The literature identified above draws from the ideas developed in the physical/natural sciences rather than the social sciences (the latter can be found in the wider organisational and public policy literature including Fonseca (2002), Stacey (2003), and Shaw (2002)). Complexity is presented in terms of the challenges it presents to linear thinking and determinism. Researchers debate the extent to which complexity

theory surmounts or surpasses existing approaches with Farrell & Twining-Ward (2004) suggesting a paradigm shift and Faulkner (2003) advocating a more cautious "diversification of perspectives" (2003:216) rather than a paradigm shift.

The contribution of complexity theory in developing understanding of tourism phenomena is significant but limited. Its significance arises from its role in identifying the complex and dynamic nature of tourism phenomena and questioning theory that is underpinned by notions of stability, linear relationships and predictability. Discussion about the implications of complexity has provided an opportunity for researchers to re-examine the interconnected nature of tourism phenomena and to develop methods and models that attempt to encompass multiple relationships, turbulanceand change.

The main limitations of the applications of complexity theory to tourism phenomena are that they have been applied to a comparatively narrow range of issues by relatively few researchers. These studies are largely underpinned by ideas developed by physical/natural sciences and are predominantly grouped around chaotic events or crises management (McKercher, 1999; Miller & Ritchie, 2003; Ritchie et al, 2003) the roles, power and tensions between groups in the policy making process(Tyler & Dinan, 2001; Zahra and Ryan, 2007) and destination development (Russell & Faulkner, 1999), and as a way of progressing sustainability research (Farrell & Twining-Ward, 2004; and Twining-Ward 2002). While it is possible to find references to complexity concepts in emerging wider policy research (for example the research on network theory by Bramwell (2006)) it is often difficult to ascertain the sources, boundaries and assumptions that underlie these concepts. It therefore seems an appropriate time to review the debates about complexity theory in the wider policy literature to enable reflection upon the opportunities and insights that might be offered to policy studies.

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The abovementioned studies do not investigate the *complexity* of complexity science and with the exception of Zahra and Ryan (2007); they do not articulate which particular approach to chaos or complexity they have adopted. A review of the literature indicates that Russell & Faulkner (1999) and Twining-Ward (2002) have adopted biological and ecological definitions of chaos and complexity and their ideas appear to draw from the work of Prigogine & Stengers (1984, 1997) and the *Brussels Group.* There is much less discussion about the work of researchers from a range of disciplines from the *Sante Fe Institute,* who have developed mathematical and scientific approaches to model social phenomena (including Gell Man, 1994 and Waldrop, 1992) and no explicit discussion of the wider debates arising in management and public policy literature around complexity.

Chaos theory underpins research into both chaos and complexity and has usually been applied to the turbulent or chaotic parts of tourism systems. An example of this is a model developed by Russell & Faulkner (1999) suggesting polarity between the inclinations of entrepreneurs and planner/policy makers associating the former with intuitive, innovative, experimental inclinations which are perceived to be essentially chaotic in nature. Policy makers' are characterised as controlling, rational and risk averse and as a stable part of the tourism system "establishing a 'Newtonian' regime of equilibrium and linear change" (1999:417). This dichotomous thinking is reductionist as it overstates the differences between different groups of people and underplays their interactions. It ignores the relevance of complexity theory to understanding detailed social interactions involved in policy making.

It appears that tourism research has drawn heavily from scientific approaches and "traditional" chaos and complexity theory. The next section this paper will consider the contribution of social scientists and policy analysts to complexity theory and

discuss the debates about modelling complex social phenomena . It will consider more nuanced approaches arising from questions about whether, and how it is possible to apply complexity concepts to human or social phenomena and how to study complexity taking account of all its complexity.

Wider applications of complexity theory to develop understanding of social phenomena

An important contribution of policy researchers including Medd (2001), Byrne (2001) and Harvey (2001) is the questions they raise about complexity science as an alternative way of seeing the world and transforming understanding of social phenomena. Medd (2001a) claims this "extreme position" is underpinned by an assumption that complexity science offers a coherent and ordered body of knowledge that is superior to other positions. The problem with this discourse is that it identifies complexity not as a "way of looking at the world to be compared with other possibilities, but the way of the world" (Medd, 2001a:2). This focuses attention away from the broader potential contribution of using complexity concepts to explore possibilities for understanding the social world and towards what is claimed to be a better conceptualisation of the world.

Policy and organisational theorists including Fonseca (2002), Medd (2001a&b), Shaw (2002) and Stacey (2003) explore the philosophical implications of complexity and the methods that can be used to research complex phenomena in the social sphere. They are critical of research that attempts to make direct translations of complexity concepts to the human sphere arguing for looser, nuanced and more reflective approaches. They argue against the direct importation of scientific

approaches to modelling complex social phenomena and develop narratives as a way of investigating complexity within organisations.

They also discuss the extent to which policy making is a "soft" intuitive human process. Human interactions play a key role in the process that is typified by continuous communicative interactions between people. Interactions are formal and informal, cross official boundaries, between teams, departments, organisations and often cross boundaries between "work" and "leisure". The interaction and negotiation involved in developing and implementing policy is wide ranging, including people with different values and experiences from a range of organisations.

The complexity and unpredictability of human behaviour raises questions about how and whether complex adaptive systems fully encompass human agency and action. Haynes (2001) questions those complex adaptive systems models that assume humans are generally passive and conditioned by the rules and their environment, claiming that humans are capable of producing new rules and choosing whether or not to apply them. In policy research it is important to acknowledge that humans are complex so they are "socially determined, productions of historically situated social structures" (Harvey 2001:8) but also are "free-agents" who exhibit unpredictable behaviour. Human behaviour creates an additional layer of complexity to the policy process.

Is it possible to model complexity in the social world?

In order to apply complexity metaphors to the social sphere it is necessary to make assumptions about the policy system, the relevant policy makers and their relationships. Medd (2001a&b) demonstrates the subjectivity involved in this process by illustrating three episodes from an ethnographic study. The episodes illustrate

connections and collaborations between different people from different organisations involved in the development and delivery of the project. Each episode is connected because they all relate to one project, but they are disconnected, because they occur in different times and places with different outcomes, and are enacted through different people with diverse motivations. His three episodes illustrate the extent to which the researcher makes decisions based upon *a-prioi* assumptions about the system and illustrates that a complexity model of this system "would have to be as complex as the system itself" (2001b:4).   The connections made by the researcher have implications for what is deemed relevant to the policy and what is studied, and illustrates the need for researchers to acknowledge and evaluate their position and likely bias.

Stacey (2003) argues that as participants in interactions in the social world, humans cannot analyse that world in an objective and value free way. Fonseca (2002), Mitleton-Kelly (1998), Shaw (2002), Stacey (2003) and Tsoukas & Hatch (2001) reject model building as a way of seeking to understand complex phenomena in society. They draw attention to the fundamental distinction between human and other complex systems, based on the assumption that humans are able to make choices and as a result their behaviour is complex. They claim that modelling involves simplification of complex phenomena and is based upon the mistaken assumption that the researcher can analyse the world in an objective free way. Straightforward approaches to modelling connections between different elements in the system are likely to be reductionist and deterministic reflecting the personal experiences or understanding of the researcher.

The discussion presented in this section suggests that traditional modelling might not be an appropriate tool when researching complex social phenomena such as policy making. Medd (2001b) show how complex systems models tell a specific story,

based upon the assumptions adopted by the researcher. These assumptions lead them to focus on particular issues and limits understanding of the process.

Developing exploratory approaches to improve understanding of complex social phenomena

Van Uden (2005) suggests "loose" applications of complexity theory might be appropriate as a way of developing understanding of social phenomena. Researchers including Fonseca (2002), Haynes (2001), Sanderson (2000), Shaw (2002), Stacey (2003) and Tsoukas & Hatch (2001) contend that complexity requires methods which are more exploratory than explanatory. They challenge the simple importation of complexity concepts into the human realm using conventional systems thinking and suggest that an alternative approach might be to tap complexity as a way of investigating the relationships involved in the complex responsive processes in society. They focus on the importance of human interaction and communication in the construction of "every day reality" and develop ideas about reflexivity and understanding through participation.

Medd (2001a&b) and Harvey (2001) draw attention to the pitfalls of a simple or literal translation of complexity to explain human activities. Medd (2001b) argues that complexity models carry assumptions that affect understanding of policy dynamics. In particular he identifies limitations of traditional or mainstream complexity models in terms of their reductionist and deterministic assumptions. Fonseca (2002), Stacey (2003) and Shaw (2002) echo these concerns and have developed alternative approaches.   They have developed research that reflects the importance of communication, conversations and story telling in organisations supported by narratives as a way of demonstrating relationships and developing knowledge about the dynamics of change in the human sphere.

The discussion outlined above suggests complexity theory should be developed as a way to encourage thought and learning as a "frame of reference – a way of understanding what things are like, how they work, and how they might be made to work" (Byrne, 2001:7) It should not be applied literally, as a set of rules, methods and models when it is used to understand social phenomena or human systems.

Five key concepts and their relevance to understanding tourism policy

This section investigates some of the debates and applications of complexity theory in the social sciences, focussing on five concepts, to help define and explain ideas about phenomena and dynamics in that occur in complex policy environments. It draws from research by Blackman, 2001; Byrne 2001, Fonseca, 2002; Harvey, 2001; Medd, 2001 a,b; Stacey, 2003; Shaw, 2002 and Tsoukas & Hatch, 2001 and investigates their relevance to understanding tourism policy within its social and relational context. This is not intended to be exhaustive but intends to bring social and management perspectives about complexity into the literature. The list has been framed in the context of research into policy making at the destination level in the U.K. (…….., 2006)

1. Complex adaptive systems

Complexity theory seeks to understand changes in *complex adaptive systems.* The term complex is used to describe a system in which interaction is detailed, and where agents (people) make choices about their individual actions. A complex system is adaptive because it influences and is influenced by its environment (Brian Arthur et al., 1997; Harvey, 2001). In the policy sphere the complex adaptive system consists of a large number of people, working within organisations, each behaving according to a set of rules or principles that require them to interact and negotiate with other

people. Their actions are constrained by conventions and rules and by access to resources. They are shaped by official hierarchical relationships and informal working relationships which are affected by a range of intangible and human factors. In this context the idea of a complex adaptive system can be used to draw attention to the way that people within systems provide opportunities and are constrained by linkages to each other.

The notion of a complex adaptive system is useful for understanding the specific context within which policies are made. For example in a destination where tourism policy is explicitly defined as a part of economic policy, actions will be framed and articulated within an economic context. This will constrain its nature, but will not be the only constraint as tourism policy intersects with other policy areas such as transport, environment, culture and leisure which also offer opportunities and create constraints. The relationship will also be affected by the position of tourism in the policy hierarchy of any given destination, access to resources and the ability of tourism policy makers to influence a wide group of people in partnership organisations. These multiple and cross cutting linkages or relationships result in behaviour within the policy system that is both 'patterned' and 'unpredictable' (Battram, 1998; Stacey, 2003). While it is possible to identify the key relationships between policy arenas (e.g. tourism, economics, transport, environment) the relationships between these arenas and between the policy makers within them are all constantly changing.

Tourism policy systems are "nested" within an environment comprised of other complex systems. The boundaries between these systems are not discrete and Byrne (2001) identifies "nested inter-penetrating systems" which intersect and interact, with influence flowing in many directions, across hierarchies and structural boundaries as policy is developed and enacted. The interactions between people in

these different systems are constantly evolving, and change is intense due to developments in the wider policy environment such as the transition from government towards 'governance' with new structures and practices to deliver 'joined up' policy across organisational boundaries (Sanderson, 2000; Healey, 2007). Policy is made in a context that is characterised by change and instability so it makes little sense to conceptualise policy systems within a stable context or to develop models which are based upon a notion of "equilibrium".

2. Emergence

Emergence is a characteristic of a complex adaptive system arising through the innovation and learning that occurs as the internal structure of systems evolves and changes (Battram, 1998; Manson, 2001). It is a 'bottom up' process arising when the collective behaviour of interacting individuals results in a system or part of a system adapting and creating an emergent order (Stacey, 2003). In a policy system, emergence draws attentions to the way that allegiances and groupings emerge within partnership organisations, and across political groupings, the way that people outside the formal system lobby and influence powerful decision makers.

……..(2008) identifies the emergent qualities of tourism policy making in Leeds between 1977-2007, highlighting its fluidity as it evolves and regresses, and connects with a variety of more mainstream policy areas. Over this time it develops from informal to formal policy and its progress onto the policy agenda demonstrates a mixture of learning and opportunism as alliances are formed by policy makers.

Emergence draws attention towards the importance of human action in developing and delivering policy. ……. (2008) demonstrates how significant shifts in tourism policy making in a destination can be precipitated by the actions of one person. The significance of individual policy makers vary over time as tourism policy emerges and

declines. Tourism policy makers demonstrate successive shifts between power and powerlessness as they form alliances to develop and enact policy.

Emergence draws attention to the idea that it may not be possible to predict the behaviour of a system from knowledge of what each component of a system does in isolation. It leads to the situation where the capacity of a complex system is greater than the sum of the constituent parts (Battram, 1998; Manson, 2001; Stacey, 2003; Waldrop, 1992 ;) or "somehow different from its parts" (Urry 2003:24). The implications of emergence on policy making within a complex environment, characterised by partnership working and change, are that changes in complex adaptive systems may be too complex for people to control. Emergence challenges people to acknowledge that they can influence rather than control action within a complex environment (Tosey, 2002).   It highlights the need for exploratory approaches focussed not just on an understanding of the system and its interaction with other systems but to consider the interactions of individuals and groups of policy makers to investigate the complex and contradictory dynamics that arise.

3. The edge of chaos

The *edge of chaos,* **(**Battram, 1998; Tosey, 2002), is also termed the *zone of complexity, (*Stacey et al, 2000) or *bounded instability* (Mitleton-Kelly, 1998) and describes the transition phase in a complex system where ordered behaviour co-exists with disordered or turbulent behaviour (Battram, 1998; Mitleton-Kelly, 1998). It occupies the area between order and chaos, and is a place of intense learning, innovation and creativity (Battram, 1998; Tosey, 2002), the point of maximum fitness, or maximum evolveability (Lewin, 1993). At the edge of chaos changes can occur easily and spontaneously as the system breaks with the past (Stacey et al, 2000; Battram, 1998) and new systems of order emerge from and alongside the disorder

(Mitleton-Kelly 1998). Forces, such as emergence, push organisations or systems towards the edge of chaos (Battram, 1998 and Manson, 2001).

Battram (1998) Mitleton-Kelly (1998) and Stacey (2003) identify the paradoxical dynamic at the edge of chaos where apparently conflicting elements appear to be operating at the same time. In terms of understanding policy dynamics the edge of chaos challenges some of the traditional assumptions about policy making such as the idea that for success contradictions and paradoxes must be resolved and the tension that they cause, relaxed.   While this traditional approach equates success with dynamics of stability, regularity and predictability, the edge of chaos opens up the possibility that contradictions and paradoxes can never be resolved. It highlights the dynamics of policy making and action in terms of continuing tension that generates patterns that are irregular, unstable and unpredictable.

Several writers have considered the type of decision making that takes place at the edge of chaos and draw attention to what Zimmerman (2001) calls *'garbage can decision making'* which is intuitive, is characterised by muddling through, agenda building, brainstorming and dialectical enquiry. She contrasts it with the traditional management approaches required in an environment which is relatively stable and consensual. Darwin (2001) identifies the traditional "toolkit" of methods for decision making in a stable environment, including techniques such as SWOT, PEST(EL), five forces analysis and stakeholder analysis. He claims that these methods underplay 'backstage activity', including power and politics. Darwin's (2001) research does not specifically relate to tourism policy making but the methods he associates with linear thinking and stability are commonly recommended in policymaking texts (including Gunn, 2002; and Veal, 2002).

The edge of chaos is particularly useful in developing an understanding of policy making in the context of the changes associated with governance. Governance is characterised by the changing role of government and the emergence of new structures, agencies and processes. In particular there has been a focus on engendering more collaboration and partnership working (Richards and Smith 2002; Stoker 2004; Stoker and Wilson 2004). These changes have led to an intense period of policy making, a range of sometimes contradictory initiatives and context that is turbulent and complex (Healey, 2007). They have also led to policy makers moving away from traditional approaches to policy making and developing new exploratory and experimental approaches which involve more collaboration.

4. Positive and negative feedback

Mitleton-Kelly (1998) claims policy and planning systems that are developed within equilibrium frameworks are based on the assumption of *negative feedback*. Negative feedback is "the process required to produce the dynamics of stability" (Stacey, 2003:33), with the assumption that links between cause and effect are clear-cut. For example the policy process models discussed by Gunn (2002) and Veal (2002) are based upon the assumption of negative feedback. They indicate a process which includes an explicit monitoring stage where the role of the policy maker is to take action to reduce the gap between the intended and actual outcome.

Positive feedback is the term given to the progressive widening of the gap between the required and the actual results (Mitleton-Kelly, 1998; Sanderson, 2000; Stacey, 2003; Urry 2003). Positive feedback loops "can exacerbate initial stresses in the system and render it unable to absorb shocks to re-establish the original equilibrium" (Urry, 2003:11)The discussion around negative and positive feedback in social systems highlights how a policy response to a multifaceted problem in a complex

environment can be successful at one level and unsuccessful at another. For example a destination that is perceived to offer low quality service standards may adopt a policy to develop a service training programme to improve the skills of its workers. This may result in 100 people being trained and at one level be perceived to be a success. However if those 100 people then use their training to gain better employment in other destinations, or in other sectors, the overall outcome of that policy intervention may lead to service standards dropping further. In this case the concept of positive feedback draws attention to the implications of a range of complex interrelationships, movements and interactions within a system and its environment where a policy intervention amplifies the problems it is intending to resolve.

5. The policy landscape

Some complexity theorists describe the environment outside a given system as the *landscape* (Battram, 1998; Blackman, 2001) and claim that its characteristics affect the dynamic and nature of change. Healey (2007) highlights the need to "read" landscapes to ascertain their dimensions and qualities. In respect of tourism policy, reading the landscape would involve developing an understanding of the wider policy and political context of policy making, about the scope, nature and purpose of tourism policy making, and about its intersections and relationships with other policy areas.

Blackman (2001) identifies a rugged landscape as one where autonomous action is stifled and claims that this ruggedness reduces the likelihood of transformative change within complex systems. The wider policy environment in the U.K. provides an example of a rugged landscape and arises from the tensions between 'Third Way' ideology (Giddens, 1998) governance and the modernisation agenda. Richards &

Smith (2002) claim that the fragmentation associated with governance has led national government to introduce centralised control to measure and standardise policy provision at the local level. The local policy environment is therefore extremely rugged and policy makers have limited scope for autonomous action.   However ….…… (2006) indicates that in the U.K. the policy landscape for tourism might be less rugged than other policy areas as tourism policy is discretionary, devolved to the regions and is not monitored by nationally set targets. While tourism policy at the destination level is "embedded" in a rugged wider policy landscape, the implications of this ruggedness are indirect and apply where tourism policy intersects with other policy areas.

The concept of landscape is interesting for tourism policy analysts not just because it draws attention to the extent that policy interventions are always embedded within their wider environment but also because it enables them to identify and investigate some of the contradictory dynamics in the wider environment.

Using complexity theory to develop understanding of tourism policy making

Complexity theory is informed by, and is being debated within many disciplines and is relevant to the study of tourism policy as it acknowledges its inherent intricacies . The complexity of tourism policy is exacerbated by the lack of agreement about its nature and purpose, its multi-disciplinary roots and diverse body of theory. Theorists interpret the policy 'problem' in different ways and have developed different models reflecting a variety of disciplinary perspectives.

The literature on complexity theory present a plausible challenge to many assumptions that underpin the literature on tourism policy making. In particular the challenge to positivism, linear thinking and the notion that policies and plans can

predict, control and shape complex environments. Complexity theory draws attention away from the relative order attributed to tourism policy making which is characterised by the development and enactment of written policies and is illustrated by process models (Gunn 2002 and Veal 2002), systems models (Gunn 2002, Hall 2000).It enables us to consider the disorder arising from interaction, competition and human agency on the policy process.

The five concepts outlined in this paper draw attention to some of the complexities and contradictions arising in the development and enactment of tourism policy. Consideration of *complex adaptive systems* encourages reflection on the nature and interpenetration of tourism policy systems highlights the instability and turbulence of those systems. *Emergence* draws attention to human agency, "bottom-up" learning and innovation and their implications on our ability to predict. The *edge of chaos* characterised by the co-existence of order and disorder, stability and instability giving rise to contradiction and uncertainty. This questions the relevance of policy tools that are developed from an equilibrium framework. *Positive feedback* draws attention to the way narrowly framed policy interventions might amplify problems and identifies the need to consider the wider and longer term implications of policy. *Policy landscape* illustrates both the embeddness of policy and the contradictory dynamics that exist in the wider environment.

The concepts identified from the complexity literature questions our ability to fully understand the policy process and to forecast, regulate and control the future. It highlights the intrinsic relationship between policy research and ignorance and requires a research approach that can encourage the researcher to be both humble in recognising their own limitations and courageous in resisting the orthodoxy to reduce and simplify.

In policy analysis, social approaches offer insights by drawing attention to the subtle intangible and contradictory aspects of the process such as the relationships and alliances that develop between people as they develop and enact policy. They suggest more localised and deeper studies to develop a more nuanced and exploratory approach to policy analysis. They emphasize understanding of how policies are implemented, how they generate effects over time, and how such effects are dependent on contextual circumstances, interactions and human agency (Sanderson 2000).

The debates identified from the social sciences suggest that complexity theory might be used as a thinking tool to enable a more holistic approach to policy analysis. They focus away from understanding the detail of the policy process and towards developing an understanding of broader themes, patterns and principles that arise when developing policy in a complex and contested environment. They also focus away from the tangible components of policy, such as a tourism strategy document and towards policy context and relationships.

Complexity theory challenges assumptions about research and analysis raising questions about *what we should try to understand and how we should try to understand.* Complexity science works on the assumption of non linearity, which implies that knowledge is local and contextual. This raises questions about the extent to which researchers can develop models that have meaning outside the local context.   It implies the rejection of those models that claim to be universal and that are reductionist, simplifying processes and systems in order to understand them. Research into social phenomena requires a research methodology that can encompass the inter-relationships, interactions and communications between people involved in developing and delivering policy.

Conclusion

Complexity concepts are the subject of debate in many disciplinary areas and are subject to multiple interpretations. In the same way that it is not possible to identify one policy theory, it is not possible to identify one complexity theory as different approaches have been developed in different disciplinary fields. Complexity theory is negotiated and open to varied interpretation, which presents a wide range of possibilities in exploring its implications on social phenomena such as tourism policy making.

Complexity theory does not provide a new 'truth' about the way the world works. The underlying concepts of complexity can be both deterministic and reductionist, limiting learning in much the same way as traditional models about organisations and policy making. Tsoukas & Hatch (2001) claim orthodox approaches to complexity exhibit the same reductionist tendencies as the Newtonian, linear models when they identify the common principles underlying different systems.

Social approaches to complexity highlight its role in encouraging researchers to question their assumptions, broaden their thinking and strive towards a more holistic understanding of phenomena. They explore the possibilities of 'loose' (Van Uden, 2005), reflective (Harvey, 2001)or 'dis-connected' (Medd, 2001b) applications of complexity theory in the social sphere, demonstrating the benefits of bringing the concepts and language of complexity into the study of social phenomena to provide a focus for debate and discussion that might underpin a deeper understanding of those issues.

This paper intends to build on existing work in complexity theory, by drawing attention to the debates arising in the social sciences. It identifies five concepts, emergence, complex adaptive systems, edge of chaos, positive feedback and landscape and discusses how they might be used to develop thinking about policy making. It suggests exploratory approaches to enable consideration of the landscapes in which policy decisions are made, the relationships, intersections and adaptations of tourism policy, the emergent nature and implications of human action, the turbulence and dynamism of change at the edge of chaos and the positive feedback arising from the complex relationships between cause and effect, as policy makers seek to resolve problems.

To date the main contribution of complexity theory to understanding social phenomena in tourism has been the challenge to linear thinking and positivism and the criticism of the emphasis of much research on the ordered, and more easily defined aspects of systems. This has progressed thinking at a conceptual level. It is now time to take that challenge further and to draw upon some of the wider debates about the application of complexity to social phenomena and explicitly engage in discussion about its methodological implications. Complexity theory has important implications for policy research in cross cutting areas such as tourism. The contribution of a social perspective is that highlights the need for more holistic understanding of policy process and raises questions about how we should analyse policy interventions in a social world.

Complexity theory contributes to policy analysis due to the questions it raises about the stability and equilibrium implicit in many policy process models. It provides a basis from which to consider policy in the context of 'real world' phenomena, taking account of turbulence and disequilibrium, self organisation and co-evolution. Highlighting the importance of communication, it provides new insights in

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conceptualising the dynamic between policy and practice. It raises questions about the methods for researching complex social phenomena highlighting the nature of human communication and need for exploration rather than prediction.

The debates outlined in this paper support the development of further research into the characteristics of the tourism policy process, taking into account the turbulence and complexity of its environment. Research need to be undertaken to focus on what tourism policy is, and what happens when tourism policy makers develop and enact policies in different policy environments, and what the implications of tourism policy are over longer time frames. There is a need for the development of longitudinal, case based research to improve the understanding of tourism policy making in its specific context from the perspective of the people involved and to broaden understanding of policy as a social process involving collaboration and negotiation.

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