

An emergence perspective on entrepreneurship: processes, structure and methodology
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Summary

This paper explores entrepreneurship from the perspective of emergence, drawing on literature in complexity theory, social theory and entrepreneurship. Entrepreneurship is conceptualised as the production of emergence, or emergent properties, via a simple model of initial conditions, processes of emergence that produces emergent properties at multiple levels (new phenomena such as products, services, firms, networks, patterns of behaviour, identities). Conceptualisation through emergence thus embraces actors, context, processes and (structural) outcomes. This paper builds on previous work that theorises the relationship between entrepreneurship and social change. We extend that work by considering the methodological implications of relating processes of entrepreneurship to the emergence of new phenomena.

Keywords: emergence, entrepreneurship theory, processes of emergence; methodology

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1. Introduction

This paper extends previous work that investigates the significance of the concept of emergence in theorising entrepreneurship. Building on an earlier paper (Fuller et al, 2007a) we review the role the concept of emergence plays in entrepreneurship theory and research by bringing in a rigorous theoretical perspective. We highlight emergence as a concept which in different ways bridges multiple levels of analysis in the entrepreneurship domain. Thus far, drawing on the work of Archer (1995) and Sawyer (2005), we have linked a set of theorised processes, identified by Fuller et al (2007b), which appear to constitute an entrepreneurial *process* mechanism to the emergent *ontology* produced. We now conclude by considering the value of linking structure to process in this way from a methodological standpoint. While emergence offers theoretical rigour, it presents a methodological challenge too: there is a need to make sense of multiple observations across different levels of analysis and show linkages between levels as new phenomena (products, services, business models) emerge over time.

Our theorisation of emergence is grounded in complexity theory. Management theorists' interest in complexity theory is based firstly, on complexity's emphasis on order creation in open, non-linear, dynamic systems, a view that resonates with similar themes in organisational theory; secondly, the potential to theorise (through the notion of emergence) across multiple levels of analysis, such as individuals, firms and the broader environment. Using a metaphorical language for change and development (Lissack 1997), complexity theory has been used in the design of organisational strategies (Burnes 2005; Houchin and MacLean 2005; Lichtenstein et al 2006; Lichtenstein 2000a; Stacey et al, 2002; Stacey, 2003). Concomitantly, the value of complexity theory in theorising entrepreneurship has been recognised (Fuller et al, 2007a,b; Fuller et al, 2004; Fuller and Warren, 2006a, b; Fuller and Moran 2000; Fuller and Moran 2001; Lichtenstein 2000a,b,c; McKelvey 2004). McKelvey (2004) contends that this approach is relevant because at a deep theoretical level it is consonant with the creative destruction of Schumpeterian entrepreneurship (Schumpeter 1934), where entrepreneurship is defined as discontinuous change that destroys economic equilibria. Old orders are destroyed, new economic 'orders', are created in contexts that are far from equilibrium. In this vein, 'emergence' is a powerful trope that can capture the way novel structures come into being; in general terms, conjunctions of forces can produce an outcome that is more than, or at least behaves differently from, the sum of its constituent parts.

The emergence of order in any system is seen as a co-evolutionary process arising from the interaction between heterogeneous agents in the system and is characterised by constant change, mutual dependence between agents (Holland 1998; Lichtenstein 2000a) and sensitivity to initial conditions (Gleick 1987). For Holland (1998, p122) emergence is "above

all a product of coupled, context dependent interactions”, a description that resonates with notions of the complex landscape of entrepreneurship.

Embracing emergence from a complexity perspective suggests a concern with initial conditions (the desires and characteristics of the entrepreneur, the embeddedness of the opportunity with respect to entrepreneurial networks and culture, and the nature of institutional structures. Complexity thinking would presume that these were interlinked and that different initial conditions would produce different outcomes (and cannot therefore be studied separately). An emergentist perspective embraces processual interactions, learning and knowledge creation, the development of legitimacy, identity, enactment, effectuation and timing, demanding longitudinal studies from a wide range of dimensions over time. Of course, as stated earlier, this presents a methodological challenge for researchers. We hope to show that the notion of emergence, has explanatory power not only in conceptualising entrepreneurship but also in providing organising frameworks for research.

In short, if entrepreneurship produces emergent order, then processes that produce emergent order must have some deep relationship with processes of entrepreneurship. Current theories of entrepreneurship can be critiqued and developed by reference to emergence, and theories of emergence can be informed by the empiricism of entrepreneurship. Furthermore, a study of processes of emergence has the potential to transcend disciplinary and ontological frameworks, because such a study is concerned with the causal or effective relationships between multiple levels, as discussed below. We now turn, in section 2, to explore how the concept of emergence has been used in entrepreneurship research. Given the theoretical rigour developed from complexity theory, we examine this separately in Section 3. We conclude with reflections on methodology and suggestions for further research.

2. The concept of emergence in entrepreneurship research

Entrepreneurship draws on a variety of disciplines and theories that connect the individual to the wider environment. Embedded herein is a generalised view of emergence, expressed as the notion that ‘things’ emerge from the relationships between individual and the environment. Such ‘things’ could be the individual constructing an identity, effectuating a market, developing an opportunity and using bricolage to pull together the resources to act entrepreneurial (see section 3 for further discussion). Hence, ‘emergence’ has provided a substantial theoretical underpinning for entrepreneurship studies, both explicitly (e.g., Gartner, 1985, 1993, 1995; Katz and Gartner, 1988; Gartner, Bird & Starr, 1992; Fischer et al, 1997; Busenitz et al, 2003; Lichtenstein and Mendenhall, 2002; Lichtenstein et al, 2006) and implicitly, for example in the context of bricolage (Baker and Nelson, 2005), legitimizing behaviour and trust building (Delmar and Shane, 2004; O’Connor, 2004; Tornikoski and

Newbert, 2006; Welter and Smallbone, 2006), the role of identity creation for entrepreneurship (e.g., Down, 2006; Fletcher, 2003; O'Connor, 2004; Warren, 2004), effectuation and causation mechanisms (e.g., Sarasvathy, 2001); and opportunity recognition (e.g., Eckhardt and Shane, 2003; Shane and Eckhardt, 2003; Sarasvathy et al., 2003).

One stream of entrepreneurship literature, based on organizational behavioural approaches, has used the notion of emergence as indicator for progress made with venture creation. For example, Katz and Gartner (1988) name four properties, namely intention, resources, boundary and exchange, which distinguish emerging organizations from existing ones, in order to develop a framework for identifying and selecting new organizations and to better link entrepreneurship research to organization theory. The authors put forward a process perspective of entrepreneurship, emphasizing 'newness' as a result of this process: "By focusing on organizations-in-creation, that is, the transition from preorganization to new organization, we are likely to acquire a better understanding of the nature of the concept of emergence and the answer to the question "How do organizations come into existence?". (Katz and Gartner, 1988, p. 437).

Gartner et al. (1992) develop this further, by suggesting entrepreneurship as the process of 'emergence', which the authors perceive as a good metaphor for relating entrepreneurship to other disciplines. Here, entrepreneurship is viewed as a type of organizing, drawing on Weick's phenomenon of 'enactment'; and organizational emergence starts with enactment. Entrepreneurs act 'as if', that is, they interpret equivocal events as expected and sure outcomes of their actions: "Emerging organizations are elaborate fictions of proposed possible future states of existence." (Gartner et al., 1992, p. 17).

In perceiving organizational emergence as a process of "how organizations make themselves "known" (Gartner, 1993, p. 234), these earlier studies have paved the way for recent research focusing on legitimating behaviour of nascent entrepreneurs and its connection to organizational emergence (e.g., Tornikoski and Newbert, 2006) or firm survival (e.g., Delmar and Shane, 2004). In this regard, Aldrich (2000: 217) suggested that successful new entrepreneurs are more likely to be those who can build networks of trust, which assists them in creating legitimacy within the market. He refers to an earlier, unpublished paper by Gartner and Low (1990), who argue that 'organizations emerge when entrepreneurs are successful in achieving an understanding among the trusting parties – potential customers, creditors, suppliers, and other individuals and organizations – that things will work out'. With regard to organizational emergence, this research illustrates how activities undertaken to obtain trust and legitimacy can reduce venture failure and enhance venture creation.

Another stream in the entrepreneurship literature, which implicitly uses the notion of emergence, draws on cognitive approaches, for example in analysing opportunity recognition processes. Here, several studies have explored how opportunities 'emerge', discussing

whether opportunities are ‘out there’ (Davidsson, 2003) or whether they are ‘enacted’ as individuals make sense of information and their actions, thus retrospectively ‘discovering’ and ‘recognising’ opportunities (Gartner et al., 2003; Fletcher, 2006). Sarasvathy et al. (2003) suggest that studying opportunities might add knowledge on how value in society is created, thus drawing attention to an outcome of entrepreneurial activities, which often is neglected in narrowly focusing the emergence debate on venture creation. Other studies concentrate on how opportunities are discovered, evaluated and exploited (e.g., Eckhardt and Shane, 2003; Shane and Eckhardt, 2003), which the authors see as central to the process of venture creation, although this focuses just a small part of organizational emergence.

The above discussions prove how valuable the concept of emergence has been in the theorising of entrepreneurship. There are however gaps that merit further study. Much of the research discussed above, neglects the context-relatedness of entrepreneurship. Only a few studies analyse organizational emergence and entrepreneurial behaviour related to the embeddedness of entrepreneurship, drawing on sociological theory such as Giddens’ structuration theory (e.g., Jack and Anderson, 2002), the concept of structural embeddedness (e.g., Simsek, Lubatkin and Floyd, 2003) or institutional approaches (e.g., Smallbone and Welter, 2006) and thus adding different environmental viewpoints, albeit implicitly. Recently, entrepreneurship studies started exploring organizational emergence through processes of identity creation, adding a social constructionist perspective. Narratives and discourses are used as a resource to craft self-identities (Down, 2006). Moreover, entrepreneurs themselves create a meaning and deeper understanding of organizational emergence, as they frame the venture creation process through dialogue and interactions (Fletcher, 2003).

Lichtenstein et al (2007) argue that there has been too much emphasis on what emerges and when rather than on the process of organising for emergence. These authors moot (2007, p. 238-40) that organisational emergence should instead be examined “*at a more general level by examining patterns of new venture creation activities, rather than focusing on specific organising activities themselves*”. They suggest that interdependent patterns of wide-ranging entrepreneurial activities, rather than individual acts such as creating business plans, are significant in initiating processes of emergence towards novelty. Further, although Fuller and Moran (2001) suggest that these patterns of behaviour operate through multiple hierarchical structural levels, there has also been a tendency to reify entrepreneurship as the activities of individuals (entrepreneurs) within the process. Even where a broader ‘system-wide’ view is taken, as in Lichtenstein et al (2007), the scope is limited, still largely centring on the individual.

Yet, as Low and McMillan (1988) point out, to understand entrepreneurship, one needs to understand process, context and outcomes, or “[how] strategies are constructed, moulded and adapted in processes of interaction with environments” (Aldrich and Martinez 2001, p 520). Indeed, the question of multiple levels of analysis and multilevel theory building is still a key issue for entrepreneurship research (Davidsson and Wiklund 2001; Phan, 2004). Phan (2004) widened the phenomenon of emergence to include not only the discovery and exploitation of new opportunities, the creation of new firms, but also the creation of new industries. He calls for multilevel theory building on questions of emergence, which has to “pay attention to the interactions among cognition, organization, and industry levels of analyses [...]” (Phan, 2004, p. 619).

3. A specialised view of emergence

The above descriptions demonstrate ways that a generalised notion of emergence is conceived in the entrepreneurship literature, and of the variety of ‘order’ that may be produced through entrepreneurship. Some theoretical perspectives take a less generalised view of emergence, seeing it as a central process in the shifting relationships between individuals, firms and their environments in a social hierarchy. Sawyer (2005) notes that an emergentist approach to societies requires a focus on multiple levels of analysis – individuals, interactions and groups – and a dynamic focus on how social phenomena emerge from communication processes among individual members. The significance of emergent order at multiple levels is set in the context of a wider problem in social science, the micro-macro divide, that is, “our capacity to explain the relationship between the constitutive elements of social systems (people) and the emergent phenomena resulting from their interaction (i.e. organisations etc.)” (Goldspink and Kay 2004, p597). Similarly, systems theory calls for holistic studies of social phenomena (Mulej, 2007), where the goal is not to look at ‘everything’ (Wilby, 2005: 388) but to clearly determine the boundaries of study in line with declared existing and emerging phenomena.

One approach to dealing with this issue is the use of multi-level models, utilised to connect ‘units of analysis’ to their wider environment in recognition, or expectation, of causal relationships between macro and micro; agent and structure, or process and context. Various methodological strategies are used for this as outlined for example by DiPrete and Forristal (1994). Goldspink and Kay suggest that complexity theory has a theoretical value in this endeavour, while both Thornton (1999) and Zafirovski (1999) eloquently articulate the case for a sociological approach to multi-level modelling of entrepreneurship to investigate micro-macro relationships. The argument that entrepreneurial emergence takes place across different ontological levels provides support for the relevance of complexity theory (in which the emergence of order is a central concept) to entrepreneurship research, because it allows

the study of change at multiple levels of organisation. Harvey and Reed (1996) after Boulding (1968) and Smelser (1963), suggest a dynamical relationship between emergent ontological levels.

“Lower levels form the loose foundations and conditions by which higher levels emerge and operate. Concomitantly, the higher levels, once established, feed back upon and delimit the operations of those levels that under-gird their very existence” (Harvey and Reed 1996, p308).

Of course, what exactly constitute ‘lower’ and ‘higher’ levels of multi-level models in the field of entrepreneurship is open to question. Boundaries in social systems are socially constructed and are not value free (Midgley et al, 1998). However, empirically it seems self evident that the ontology of a network is constituted by firms and relationships between organisations, and yet the ontology has different properties and dynamics that of any individual organisation. Similarly, an ontology of an organisation is constituted by individuals and groups and their relationships, but behaves differently from these constituents, and even at the individual level, the self is constituted in ways that are understood in different ways from the behaviour of the ‘whole’.

Some examples of work that more closely analyses order creation to entrepreneurship, from a complexity science perspective, are briefly outlined below, in order to indicate ways in which this difficult concept is being operationalised. In each case, processes are seen as a key element, i.e. sequences of events, as are relationships that cross disciplinary ontologies. The examples below focus on the interactions between individuals, firms and their surrounding environment. We note however, that complexity studies have generated insights into the emergence of innovations and inventions (Fleming and Sorenson, 2001; Garud and Karnoe, 2003).

McKelvey (e.g., 2000; 2004) promotes the use of agent-based models in a ‘model centred approach’ to researching entrepreneurship. He suggests that by constructing ‘rules’ about the way that agents behave in relation to each other in the context of external forces, and simulating the dynamics caused by these inter-relationships, experimental theories can be tested in ‘a model-centred’ approach.

Fuller et al (Fuller and Moran 2001; Fuller and Warren 2006a,b;; Fuller, Warren and Argyle 2004, 2007) offer two main contributions to the debate. Fuller and Moran (2001) suggest that ontological structures in entrepreneurship are hierarchically emergent, i.e. they are produced from the inter-actions of their substructures, i.e., enterprises are created by entrepreneurs, networks are made up from firms, and so on. Fuller et al (2004, 2007b) identify four processes of emergence that produce order through a series of events, Fuller and

Warren (2006a,b,) suggesting that these processes act simultaneously at the individual, firm and network level. This is further developed below.

Lichtenstein et al (Lichtenstein 2000a,b,c; Lichtenstein, Dooley and Lumpkin 2006; Lichtenstein et al., 2006, Lichtenstein and Brush 2001) has, inter-alia, considered the series of events that eventually produced an emergent new venture. He (2000a) shows how in each of four high technology business start-ups the business model had to be changed several times before becoming stable, not because a particular pattern was unstable per se, but because it was designed relative to an unstable and unpredictable environment. The reshaped behaviour pattern of the enterprise is, according to Lichtenstein, an “emergence from a process of self-organizing” that created repeating and amplified behaviours around the “dominant logic”.

4. Review

Examination of the scope of the above literature from a complexity science perspective leads to the following analysis. The range of entrepreneurship literature cited implicitly concerns itself with three major aspects of emergence, namely initial conditions, processes and outcomes. This point is elaborated below. The literature places the entrepreneur at the centre of these aspects, i.e. it implies that, without people acting as entrepreneurs, the emergence of (let us say) new ventures would not occur. The following aspects are characterised in Figure 1.

- Aspects of the entrepreneurship literature concerned with initial conditions, i.e. the structure(s) in which entrepreneurship takes place, includes that on personal characteristics, on the nature of opportunity and on the nature of institutions and the embeddedness of entrepreneurship within these (networks, cultures etc.). Complexity theory would presume that different initial conditions produce different outcomes.
- Aspects of the entrepreneurship literature concerned with processes, largely relate to socio-economic process, i.e. the construction of social knowledge through actions and interactions between people and organisations. Examples include opportunity recognition, vision and communication, the development of legitimacy, enactment, effectuation and the timing and intensity of actions.
- Aspects of the entrepreneurship literature concerned with outcomes, largely relate to the empirical properties recognised as enterprises; resources, cash-flow, are concerned with the question of when does an enterprise exist. However, the multiple outcomes of “entrepreneurship” are wider than normally explicitly identified and are often inherent in the literature. They are in effect new structures that form the conditions for entrepreneurship. Examples could include personal identity, a particular business model, or more structural change such as networks of firms, new industries or changes in regulation.

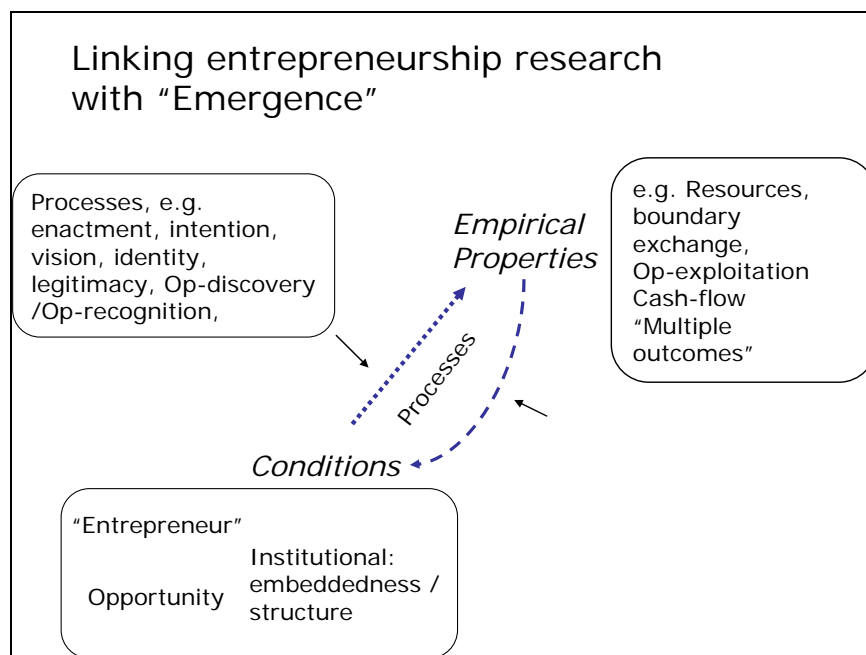


Figure 1. Conditions, processes and emergent properties, a complexity perspective on emergence in the entrepreneurship literature.

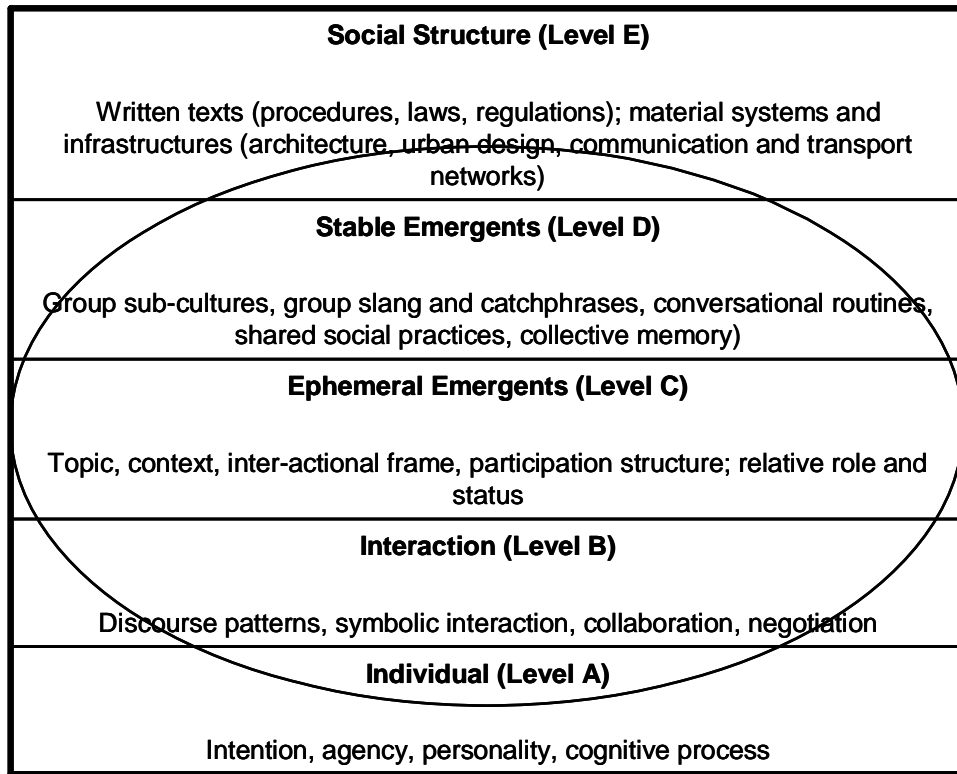
One question that arises from this analysis is whether the above 'model' (as shown in Figure 1) is only descriptive, or whether it contains inherent theoretical explanatory power. This question will be developed during further research.

5. Process, an 'emergentist' perspective at multiple levels and methodology.

In this section we develop the analysis by relating the 'processes of emergence' model of Fuller et al (2004) and Fuller and Warren (2006a,b), and Fuller et al (2007b) to Sawyer's (2005) 'social emergence' perspective. With the evident influence of Archer's work, amongst others, Sawyer suggests that to theorise emergence it is necessary to accept analytical dualism, i.e. "to theorize the nature of individuals, the nature of social environments and the nature of their [two-way p, 141] causal interaction" (2005, p140). In so theorising, Sawyer produces an 'Emergence Paradigm' of social structures that posits a hierarchical model of individual, interaction, ephemeral emergents, stable emergents, and social structures (see figure 2). In any social situation, Sawyer suggests, "there is a continuing dialectic: social emergence and downward causation from those emergents [...] whose presence continuously constrain the flow of interaction" (p220). Sawyer broadly states that stable social structures (e.g. material systems, infrastructures, regulations) do not owe their continued existence to interactions, and thus fall largely outside the Emergence Paradigm. He notes Durkheim's

(1897, 1952) 'crystallized currents' as being examples of somewhere between social structures and stable emergents. Sawyer suggests that economic systems are 'stable structures'. We would suggest that the particular patterns of social practices manifest as an organisation or firm are 'stable' emergents within even more stable social structures. Similarly, we can conceptualise collective relationships between firms as being emergent to become stable, but in a highly interactive way, i.e. that the interactions involving discourse patterns, symbolic interaction, collaboration and negotiation produce unstable (ephemeral) emergents of interaction frames, relative roles etc. (See figure 2). Our analogy is that such unstable emergents have ontological status and causal power.

Figure 2. The Emergence Paradigm.



The Emergence Paradigm (Sawyer 2005, p211), showing the 'circle of emergence' (p220), i.e. that area which is subject to social emergence

The social processes observed by Fuller et al (2007b) in the ongoing creative destruction of an entrepreneurial firm were elaborated as *experimentation, reflexivity, organising and sensitivity* (EROS), summarised in Table 1.

Table 1: EROS Processes of Emergence

Process	Behaviour
Experimenting	Diverse exploratory behaviours that might (or might not) become part of the firm over time; new things tried out in often very informal ways, small scale; often developed through exploration of social interactions; shared experiential learning across project teams and stakeholders; 'what works'
Reflexivity	Continuous reflection on the identity of the firm and the self-identity of its owner(s) through the discourses within the business

	and with stakeholders; vision setting through narratives of self and firm; ‘who we are’
Organising	Organising around a dominant logic (or project); patterns established through negotiated practice; pattern-making and pattern-breaking; ‘what needs to be done now’
Sensitivity	Interpretation of shifts in industry landscape; detection of difference; weak signals; triggers and thresholds for change; ‘what we might do’

Referring to the business case called Flightdirectors in that paper; given the ‘stability’ of a firm that had been in existence for about 20 years in a fast moving environment (the airline industry), its ontology at periods in that history was manifest in an ongoing set of temporary stable emergents; particular business models, particular identities, particular dominant logics, particular triggers for change etc. Within that, some were more stable than others and became part of the business; others initially commanded intensive resource and attention at the time but were not taken through to fruition. Nonetheless, even ephemeral and unstable structures that did not persist, exhibited ontological status and considerable causal power – at least for a time, as the firm sought to make its way forward in a highly uncertain environment. For example, the self-identity of the entrepreneur and the identity of the firm as ‘being something in the airline industry’ were highly stable and causal to the dynamics and direction of the firm. Similarly, the ‘stable’ structural nature of economic systems provided a constraining framework (you have to make profits, pay staff etc.). However the instability of the industry, created mainly by new technology, deregulation and therefore greater competition provided (in Sawyers terms) a downward causation on the (in)stability of the emergents of the firm, for example, on their everyday practices, everyday discourse patterns, potential new projects, types of collaboration and intentions of the entrepreneurs involved.

Fuller et al (2007b) propose that the (EROS) processes they identify, when taken in totality, provide an entrepreneurial mechanism, i.e. a set of processes that are interconnected and together produce novel and emergent structures. For example, the formation of experiments can have strong aspects of identity and vision attached to their inception, (and vice versa). Similarly the motivation to change and the interpretation of environmental signals are informed by the power of existing organising domains and self-identity. There are also inherent tensions between the processes, for example between the ordering of practice and the flexibility of experimentation. Such tensions are not polarised, and can be understood as part of a dialectical production of outcomes.

From a conceptual perspective, we begin to investigate the relationship between these entrepreneurial mechanisms and Sawyer's 'Emergence Paradigm' in Figure 3.

Figure 3. Entrepreneurial mechanisms in the context of Sawyer's Emergence Paradigm

	Experiments	Reflexive identity	Organising domains	Sensitivity to (changes in) conditions
Social Structure (Level E)	The stability of social structures enables relative experiments to take place	Stable structures will provide grounding to self-identity. Also will create tension as between structures	Much will be 'taken for granted', such that stable emergents are seen as innovative and/or threatening	By definition, stable social structures will be resilient to change
Stable Emergents (Level D)	The results of 'successful' experiments, is ones supported by social action	Sense of self in context, both personal and at the level of the firm	Dominant logic clear through regular discourses and habitual actions	Perhaps identified as challenges or threats to stability
Ephemeral Emergents (Level C)	Whether as thought experiments, discussions or as short term practice, the transient nature of these emergents are a key part of ascertaining the legitimacy of particular sets of actions	The shaping of the individuals sense of self and the (new) ventures sense of self within the context of existing markets etc.	The salient organising domain is that of 'experiment', i.e. a overt reflexivity that links stability with instability	The ephemeral emergents are the manifestation of the sensitivity of the individual and organisation
Interaction (Level B)	Interactions in experiments are constrained by existing emergents and structures. The introduction of new discourses and meaning into the firm from external structures (e.g. new industries or new technologies) produces changes in interactions and emergents.	Discourse patterns for example, are both part of a the maintenance of identity and the renewing of expressed identity.	Discourse has been used to identify ephemeral and stable emergents in entrepreneurial practice	Interactions provide a mechanism of sensitivity to external conditions
Individual (Level A)	Entrepreneurial intention is seen as an important motivating reason for entrepreneurial action	Self-identity can form a stable emergent and in this model provide bottom up causality of emergence	Intention and personality have causal influence on emergence in entrepreneurial settings	The individuals cognitive awareness and openness to change / resilience will be causal to emergents

In essence, this diagram sets out a proposed relation between the EROS processes and the ontological emergence of novel structures. While more research is needed, we suggest that this model has considerable analytical power with regards to understanding the production of order at multiple levels and the articulation of types of pro-active processes that are associated with the construction of order in practice. This approach, we argue, may benefit the study of entrepreneurship as a class rather than a set of sub-disciplines (Thornton, 1999), not only in a conceptual sense based on a rigorous treatment of emergence, but also by providing a methodological framework too. As stated earlier, studies so far have explored facets of entrepreneurial embeddedness in the wider context of society, but a holistic picture is missing, in part because of methodological challenges

If we are to study the dynamics of entrepreneurship within industry networks, we need to address the problem of making sense of multiple observations across different levels and showing linkages between levels as new structures (products, services, business models) emerge over time. As Lichtenstein et al (2006) discuss, the study of system-wide dynamics is challenging, as the process can span long periods of time. Also, many modes of activity take place across different contexts (Low and MacMillan 1988). The most common approach to this issue has been to simplify research designs by focussing on one level of analysis, in most cases the entrepreneur, the firm or the industry. Growing awareness of processual theories of entrepreneurship (Steyaert, 2007) have resulted in more sophisticated methodological approaches that relate the activities and behaviours of individuals over time to the firm and other contextual factors, such as ethnographic methods (e.g. Jack and Anderson, 2002; Down, 2006), multi-method case studies (e.g. Lichtenstein et al, 2006) and narratives (e.g. Mallon and Cohen, 2001; Fletcher and Watson, 2007; Rae, 2006). At the firm level, focussing on life-cycle models of new and growing firms has had considerable intuitive appeal (Phelps et al, 2007). While early, linear, sequential conceptions of growth trajectories are seen as flawed, the process views espoused by Garnsey et al (2006) and Lichtenstein et al (2006) are far more sophisticated, linking contextual factors and quantitative measures to internal development processes of the firm and the motivations of individual entrepreneurs. Crises such as setbacks (Garnsey and Heffernan, 2005) turning points (Garnsey et al, 2006), emergence events (Lichtenstein et al, 2006) and tipping points (Phelps et al, 2007) are suggested as probes to enhance the analytical power of these approaches.

Yet thus far, there has not been a methodological approach that has taken advantage of the possibilities offered by rigorous theoretical conceptualisations of emergence. Pettigrew et al (2001, p. 698) have highlighted that the issues of multiple contexts and levels is a major analytical challenge for the study of organisational change: a key issue is, however, how many levels of context should be considered, and how many multiple processes do we

include in our analyses? While we would not claim that our framework solves the problems of the social sciences that Pettigrew et al are addressing, the 4 processes that we have identified (a,b and Warren, 2006) are grounded in empirical observations of entrepreneurial firms. Thus far our research suggests that we have gone some way to capturing an entrepreneurial mechanism in the cases considered, that spans the individual, firm and industry network levels of analysis that dominate entrepreneurship research, thus placing the entrepreneur in the context of firm and environment. Further, we have developed a relationship between those processes and a range of unstable and ephemeral emergent structures (products, service, business models, careers during emergence resulting from entrepreneurial activity. The test for the value of this framework methodologically, of course, would be, Does it support effectively the collection of data of ordering and categorising empirical observations concerning how different phenomena, such as new products, services, firms, networks, patterns of behaviour, careers, identities, emerge over time across multiple levels of analysis? One might also question further as to how the analysis of such data might improve practitioner competence (Whittington, 2006).

6. Conclusion

In this paper we have turned our attention to the creation of (novel) order through processes which are contextually contingent and therefore produce unpredictable outcomes at unpredictable times. We have suggested that while this description accords with an understanding of outcomes and processes linked to entrepreneurship, it also accords with the concept of emergence, as developed in complexity science. We have not delved deeply into complexity science in this respect, but rather have illustrated the point by reference to entrepreneurship research that explicitly taps into this theoretical area.

In doing so we have also shown that emergence is formed by processes that take place through time and in multiple ontological levels (as characterised by multiple disciplinary regimes and by multiple behavioural characteristics). One implication of this is that by isolating entrepreneurship research to the behaviour of the individual, accounts of the social value and effects of entrepreneurship are incomplete. In this, we concur with Davidsson (2003) who argues that entrepreneurship has to be seen from a societal perspective as well as being a research discipline. He introduces the notions of 'entrepreneurship as societal phenomenon', which draws attention to outcomes of entrepreneurial behaviour, and 'entrepreneurship as a scholarly domain', which aims at understanding what entrepreneurship is about. This emphasises the need for entrepreneurship research to acknowledge the heterogeneity of environmental conditions, outcomes and behaviours that exist.

A social emergentist perspective has demonstrated in the above examples the potential analytical power with regards to understanding the production of order at multiple levels, to counter-factual examination of causation (through modelling) and to the articulation of types of pro-active processes that are associated with the construction of order in practice. This approach, we argue, may benefit the study of entrepreneurship as a class rather than a set of sub-disciplines (Thornton, 1999).

We find that theory building from empirical studies in entrepreneurship, informed by entrepreneurship and social theory has resonance with an emergence perspective in social science. Suggested interlinked processes that produce emergence in the field of entrepreneurship might inform theory in relation to the emergence in a wider social and economic domain.

The key point is that the processes theorise interactions between structure and agent in a dualistic way; i.e. that ontology is as significant as process is to the production of change in everyday socio-economic practice found in the domain of entrepreneurship.

Bringing together one current viewpoint of entrepreneurship research, namely that entrepreneurship also is a societal phenomenon, with an emergence perspective, we then can re-conceptualise entrepreneurship as a *dualistic process*, which itself produces emergence precisely because of its embeddedness into society and its interactions with society. Although an emphasis on the embeddedness of entrepreneurship is not a new one, there are few empirical studies which have explored facets of entrepreneurial embeddedness in the wider context of society. Finally, we have reflected on the methodological challenges inherent in pursuing our approach.

And although there is clearly more work to be done, it is here that we hope to make a contribution as to how entrepreneurship produces emergence, posing the questions below as a starting point for further theoretical development and empirical analysis:

1. Does the framework coherently and comprehensively theorise the linkage between entrepreneurial processes and emergent ontologies produced?
2. Does it support effectively the collection of data of ordering and categorising empirical observations concerning how different phenomena, such as new products, services, firms, networks, patterns of behaviour, careers, identities, emerge over time across multiple levels of analysis?
3. How are these observations best linked to improving practitioner competence?

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