Entrepreneurship and Emergence – Is It Possible to Get Something for Nothing?

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CAPRI Publication 11-01

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**Keywords:** emergence, entrepreneurship, value-added, central-planning, profit, returns to scale, human-interaction.

**Abstract:** Successful entrepreneurship is an emergent outcome in a fundamentally economic sense that is distinguishable from emergence understood more generally. Successful entrepreneurship entails a process of forming innovative capital combinations that result in the enhancement of value. Value may be seen to have been created, to have emerged from the process. Successful entrepreneurship occurs within a context of human interaction and depends on the emergent orders that constitute civil society. Case by case it is inherently unpredictable. In fact, successful entrepreneurship is the outcome of a contest between competing views of the future world. Nevertheless, as a phenomenon it is related to certain general conditions. Entrepreneurship is indispensible for economic growth, yet it is a phenomenon not amenable to economic planning at any detail level. It is elusive in its nature and cannot be taught in any formulaic way.
Introduction: classical and emergent ways of thinking.

The advent of the digital age poses a challenge to inherited modes of thought. This is true in all branches of inquiry from biology to physics to philosophy. The “classical” model of the world is a closed one in which outputs (results) can be explained by a sufficient understanding of the necessary and sufficient inputs (causes). To be sure, the model may accommodate tractable non-linearities (like multiple mutual interaction of inputs), but, to be plausible and “scientific,” it must be complete; that is to say, an understanding of the workings of the inputs must suffice to completely explain the observed outputs – there is no “magic” left to be explained. Furthermore, in principle, it is possible to impute shares of the output to the various inputs (the shares adding to unity) – though, in practice, the imputation problem is frequently impracticable.

The dominance of this view has been eroded. The observation that even very simple computer programs can yield highly complex, unpredictable outcomes over time (for example, Wolfram 2002), has provoked the suspicion that perhaps the tight input-output model is ill-adapted to an understanding of many real-world processes. Similar reactions have been provoked by the development of evolutionary science. The outcomes of evolutionary processes, even simple ones, turn out to be complex and unpredictable. Hence, we have the appearance of chaos theory, complexity theory, cybernetics, and many other heterodox fields of inquiry. Most recently, many of these disparate approaches have coalesced in a view of the world that emphasizes the phenomenon of “emergence.” Emergence refers to the phenomenon of non-complete causal attribution of outcomes. Results emerge that seem to transcend the capabilities of the combined inputs.

Economists and management scholars have long considered this phenomenon. Synergies, economies of scale, increasing returns, spontaneous order etc. all refer to essentially emergent processes of production. The issue is most clearly dealt with in the theory of capital. A “production function” is a tight input-output model in which outputs can be nicely imputed to the inputs – their
marginal products (additional contributions that they make to output). And Euler’s Law expresses the common sense expectation that, as long as we are able to account for all of the inputs and their potentials, the marginal products should add to the total output – we have what economists call constant returns to scale (CRS). Non-constant returns to scale is an indication that we have “left something out” of the model. In principle all production processes are CRS, though in practice it is impossible to account for all of the inputs and their interactions.¹ This latter realization means that increasing and decreasing returns to scale are to be expected and can be analyzed, but, it does not suggest that the basic model of complete attribution is to be abandoned. Indeed, progress can be gauged by the extent to which we are able to approach it in our research.

This traditional micro-economic approach has been criticized for its inability to account for the role of the entrepreneur – raising the question of whether the entrepreneur is just another input (factor of production) or whether there is something else going on. Is there room for the entrepreneur in economics? If not, how are we to explain what it is that the entrepreneur does? Whence the value-added by the entrepreneur?

One approach is to treat the entrepreneur’s contribution as simply the unimputable residual; but this does not take one very far (see Baumol 1968). While perennially worrying about it, economists and management scholars have not devoted much attention to the question until recently. In the last two decades, however, entrepreneurship studies have dramatically increased. This started with studies related to the work of Joseph Schumpeter, picked up pace dramatically with the discovery of the work of Israel Kirzner and reached a new level in applications relating to Frank Knight, Ludwig Lachmann, Herbert Simon and others. This last development is closely related to notions of evolution and emergence (Buenstorf, 2007). Entrepreneurship has, in effect, been seen as a kind of catalyst for emergence in economic activities.

¹ The distinction here is between the ontology and the epistemology of production processes.
It is possible to characterize this development as an attempt to resolve what has been seen as the paradoxical nature of entrepreneurship. In what follows I will use this as a springboard to investigate the nature of entrepreneurship and its relation to emergence. In the next section I consider whether, and in what way, entrepreneurship implies emergence. In the section following I consider this further by distinguishing emergence in the social world from emergence in the natural world. I turn then to a consideration of what this implies for the teaching of entrepreneurship and for economic planning.

**Does entrepreneurship imply emergence?**

All productive resources are a kind of capital. That is, they derive their value, and, therefore, command a price for their services, because they, in combination with other capital resources, produce something of value to consumers. A successful entrepreneur is someone who creates value by forming productive capital combinations (Lachmann 1956, Harper and Endres forthcoming, Baetjer and Lewin forthcoming). Success, in this context, means that sales of the produced good or service is (more than) sufficient to pay for the services of the (physical and human) capital resources employed. There is value-added. In order for this to happen there must be uncertainty. That is to say, uncertainty attaches to the productive venture itself, not just to our description of it. An entrepreneurial venture is uncertain in the sense that an entrepreneurial opportunity imagined by an entrepreneur (or a group of entrepreneurs) is idiosyncratic. In paradoxical terms, *an entrepreneurial opportunity for everyone is an opportunity for no one in particular*. Entrepreneurial opportunities must rely on *disparate expectations* – on disagreements about the economic viability of productive ventures. Absent this disagreement the price of the resources involved would immediately rise to reflect the value of the product to be produced and the value-added (the profit) would disappear (or never appear). Rival potential producers of the same product would be paralyzed – an opportunity for all is an opportunity for no-one in particular. Secrecy or fundamental differences of opinion are necessary to salvage the value of the venture (Lewin 2010, Richardson 1960).
It may seem paradoxical to regard ignorance, in its role as a restraint on investment, as actually furthering, in certain circumstances, a successful [exploitation of opportunities for profit]. And yet it is clear that an entrepreneur may undertake a certain project chiefly on the grounds that only he, and possibly a very few other producers, are aware of the impending increase in demand. Ignorance, by checking the response of some, may be a necessary condition for any response by others; an unequal distribution of knowledge of final demand, therefore, may actually promote successful adjustment. A general profit opportunity, which is both known to everyone, and equally capable of being exploited by everyone is, in an important sense, a profit opportunity for no one in particular; it will create the incentive to invest only provided some people are less able to discern it, or to respond to it, than others. (Richardson, 1960: 57-58).²

Thus, it would seem that emergence implies and is implied by the unpredictable nature of entrepreneurial outcomes and the inability to completely impute the value-added. Entrepreneurs are above all innovators. They add value by introducing something new – new products, production processes, modes of organization and resources. They appear to catalyze the emergence of something new.

Working in a similar context, Paul Lewis describes the phenomenon of emergence as follows: “when certain elements or parts stand in particular relations to one another, the whole that is formed

² Also: “[O]ppportunity finds its meaning in the context of human action and human action occurs within the flux of time, making it inherently uncertain (Mises, 1966 [1949]). Thus it seems that one cannot have opportunity without uncertainty but because the human condition is characterized by the passage of time, there will always be uncertainty and therefore, some form of opportunity. … individuals appear to experience uncertainty differently as a function of knowledge, motivation, ability, geography, etc. enabling some but not others to act.” (McMullen, Plummer and Acs, 2007: 279).
has properties that are not possessed by its constituent elements taken in isolation. The properties in question are known as emergent properties, while the corresponding whole is known as an emergent or “higher level” entity. “It is the presence of the constitution elements plus their combination in a particular way that results in this emergence. Or as Lewis puts it: “Emergent properties are structural or relational in the sense that their existence depends not only on the presence of the constituent parts but also on those parts being organized into a structure whereby they stand in particular relations to one another.” (Lewis 2011: 7; Elder-Vass 2007:28). Importantly, the notion of presence plus combination implies interaction. For emergence interaction implies novelty, transcendence.

Lewis goes on to give the example of water – a specific combination of hydrogen and oxygen, whose properties transcend those of its constituent parts in the sense that water can do things, can accomplish things, that bear no resemblance, or seeming relation, to these constituents. Furthermore, it is impossible to explain the process of water formation without invoking the properties of water itself. In other words, the properties of the constituent parts are insufficient to explain the properties of the outcome.

Successful entrepreneurial activity is certainly emergent in this sense. Entrepreneurial activity consists in making capital combinations, in which the constituent capital components interact in novel ways to produce items of value, the total value of the outputs exceeding the total value of the inputs. Looked at in this way, however, the concept of emergence seems a bit elusive, or arbitrary, depending as it does on how we classify and categorize things. As intimated in the introduction above, it may be simply a matter of our lack of understanding of physical process that prevents us from providing a full accounting and being able to impute the whole of the output to the inputs. Emergence may simply be a measure of our ignorance. Moreover, its use smacks of a kind of appeal to ‘magic’ – a spontaneous creative process whose inner workings we don’t fully comprehend.

Thinking about entrepreneurship in terms of emergence, however, takes us beyond this in one
crucial respect; one that is peculiar to the world of economics, the world of human action and social interaction.

**Emergence in the social world**

There is a fundamental difference between the social and the physical world, both in our understanding of them (epistemologically) and in their very nature (ontologically). This can be explained by considering the nature of emergence and entrepreneurship.

Recall earlier that we considered emergence in this context in the comparison between inputs and outputs, noting that the total of the latter exceeded the total of former. Emergence occurs in the sense that something greater is produced. And therein lies the key. The dimension along which inputs are compared to outputs is value. Consider the notion of efficiency – here closely related to successful entrepreneurship. To be successful inputs need to be efficiently deployed. All notions of efficiency, without exception, must employ (implicitly or explicitly) the notion of value. To come up with a metric of efficiency, the inputs and the outputs must be evaluated. Thus it is not so paradoxical to imagine adding value without adding matter. This, in effect, is what happens when innovation is successful. What makes an outcome emergent is that it possesses certain propensities to behave in certain way, to yield services or products that are useful. In a physical sense nothing is “created” – matter-energy is always conserved. Yet, some arrangements of matter-energy are deemed more useful than others. In other words, while matter-energy can be neither created nor destroyed, value can be created and destroyed. There is no “covering-law” of value (Mirowski 1991).

Indeed, value creation is the essence of economic growth, of successful entrepreneurship, and of the spontaneously emerging background institutions, like law, custom, property rights, etc. that facilitate both - of which more below. The properties that emerge are all associated with value-creation. Failure to attribute the full value of the output to the inputs (via the value of their marginal products) is a very real reflection of the fact that value has been created. The result of combining the services of
capital resources in a particular way to produce something has resulted in an increase in total value – there is a value surplus that has emerged from the process. It is not simply a reflection of our inability to understand fully the physical process involved. There is an extra dimension, and that is the fact that consumers attribute greater value to the output than to its constituent parts.

It is of course possible to force the value of the input services to add to the value of the outputs, by sufficiently enhancing the value of their marginal products. There is an inescapable arbitrariness to the attribution of value to the inputs. To do so, however, would be to deprive the analysis of insight. This is best seen by imagining that all of the inputs are rented, rather than owned. In that case, the prices of the input services are contractually given and market-determined. The increase in the value of the output, if any, is clearly profit – emergent value-added. Just because some inputs are owned, rather than rented, does not change this insight (Lewin 1998).

To be sure, physical processes can be emergent in other senses; so that even if the properties of water were not deemed more valuable than the properties of its constituent parts, the outcome could be considered emergent in the sense explained earlier; that it could not be explained without referring to those properties themselves. But, when it comes to economics, this more “mundane” notion of emergence is irrelevant. We do not describe unsuccessful entrepreneurship as resulting in economically relevant emergent outcomes.

The distinction between models of the material world and economic models, or, more accurately between “value” and “matter”, relates to the distinction between neoclassical and heterodox economics approaches, mentioned earlier. Tight input-output models apply naturally to physical models where matter-energy must be conserved. Thus, emergence in the economic world, need not imply a denial of the tight input-output model in regard to the physical phenomena that underlie production processes – though, pragmatically speaking, that model may not work very well when there are “just too many variables” considering all possible mutual and multiple non-linear interactions. Evolutionary models of
selection out of complex adaptive processes may work better in this digital age and may be applicable to entrepreneurship as well.

**Economic emergence and the centrality of capital**

The connection between value creation, entrepreneurship and emergence and be looked at more carefully from the perspective of the concept of capital (Harper and Endres, forthcoming; Baetjer and Lewin, forthcoming). Capital is about the connection between value and time. As mentioned earlier, all productive resources can be characterized as a form of physical or human capital in that their value derives from the fact that their productive services can be combined in certain ways to yield products that have value to consumers. The role of the entrepreneur is to form these productive capital combinations. We have characterized this as an emergent process.

Harper and Endres (forthcoming) have examined this in great detail, cataloguing and examining seven possible characteristics for a process to be called emergent (four necessary plus three additional for a stronger type or emergence). Applying this framework they explain how capital formation at various economic levels (single capital goods, firms, sectors and economies) is an emergent process; and they proceed to illustrated this with an extended case study – the i-phone. I am concerned here to look through the same lens with less detail and more abstraction – to ask, what is it in essence about capital formation that makes it emergent in an economic sense.

We have already seen that value creation is at the heart of it. But this creative process is not spontaneous, it is the conscious result of a production plan (even though plans always turn out in some ways to be different from what was expected (Lewin 1999, Baetjer and Lewin forthcoming)). Entrepreneurs plan. Though there may be (often are) serendipitous results of entrepreneurial value creation processes, without entrepreneurial motives and intentions there would be no such process.

Thus we must say that this kind of emergence necessarily involves *intentionality*. It is the result of
purposeful human behavior, human action in real time. This is a quality of emergence unique to the economic (or social) variety.

Secondly, as noted earlier, human action does not occur in isolation. The capital combinations that are formed crucially involve the interaction of their components. Capital combinations are structures, not mere aggregations. They involve functionally heterogeneous entities in complex complementary ongoing interactive productive processes (Lachmann 1956, Lewin 1999, Harper and Endres forthcoming). Individual (physical) capital goods are composed of tightly structured components that enable them to apply the knowledge of their makers in doing highly specialized tasks (Baetjer and Lewin forthcoming). Combinations of capital goods with human capital thus essentially bring to bear the specialized knowledge of countless practitioners over time. And over time this application of knowledge leads to the generation of new knowledge (experience) in an endless process of knowledge accretion that is the result of the pursuit of profit through value creation. The arrival of new knowledge is an emergent outcome. New knowledge, learning, is a necessary component of value-creation. So, complex interaction of a human variety (essentially of heterogeneous-specialized knowledge components) is an essential aspect of this emergent process.

**Emergent orders**

Value creation, intentionality and human-interaction characterize essentially economic emergent processes. Concerning which we may ask: emergent orders are necessarily spontaneous, unintended outcomes (for example Hayek 1973). What is the relationship of emergent orders generally to entrepreneurship and emergence?

The answer comes in two parts. First, as mentioned, entrepreneurs plan but the outcomes seldom mirror the plan exactly. Some details turn out differently from what was expected and some details could never have been imagined. Of all entrepreneurial ventures only those that successfully create value are emergent in the sense considered here. Though value creation in a general sense is the
intention of the entrepreneur, the many unexpected aspects of any outcome may be said to be unintended outcomes. Human interaction in the marketplace results in the attribution of values to complementary productive resources at various levels. This interrelated web of productive resources is an emergent order. Entrepreneurs may consciously form capital combinations and combine capital combinations in organizations (firms) and, further, plan some types of interactions between organizations (firms) – contracts, joint ventures, mergers, etc. – but the resultant sector- or economy-wide nexus of capital combinations is an unplanned emergent capital structure (Lachmann 1956). A god’s-eye view of the capital structure of a sophisticated economy will reveal a complexly ordered set of multi-layered productive resources whose sole meaning (significance) is to be found in their relationship to each other in multiple processes of creating value for consumers.

Second, all complex human interaction, proceeds within a complex framework of social institutions (Lachmann 1971) - language, law, customs, norms, etc. – that are clearly themselves emergent orders – “the result of human action, but not human design” (Hayek 1967). This is well known. We simply point out here that this is an aspect of the structure different emergent orders. The focal process of entrepreneurial value creation is a uniquely economic process involving intentionality and human-action that could not proceed at all without the complementary background emergent orders of social institutions within which they plan, act, and evaluate the fruits of their actions in a never-ending repetitive process. These social emergent order involve complex human-interaction but not intentionality. Economic emergence thus consists in variable parts of planned and spontaneous outcomes.

Empirical investigation suggests, that innovation as a general phenomenon is predictably related to certain categories of institutions, policies and cultures. Entrepreneurship tends to flourish in environments where property rights are reliable, where contracts are usually honored, where freedom of expression is encouraged, and so on. Even though the outcomes of entrepreneurial action cannot be
accurately predicted, the rules of the game in which such actions are taken crucially influence those actions, their frequency and their degree of success. In this we glimpse the interaction of different complementary types of emergent orders, each one contributing to creation of value (di Zerega 2008).

Figure 1 contains a summary taxonomy of the our discussion. Economic emergence does not occur in nature. In the natural world, where the covering laws of physics apply, emergence is the result of the transformation of material entities into other material entities with properties that are seen to transcend the properties of its constituents – such properties could not be predicted from a knowledge of the properties of the components, and their emergence cannot be explained without invoking them in the explanation (Lewis forthcoming). By contrast, economic emergence is the result of a creative process. Value is created.

The relationship between emergence in these two senses of the word, is that a physical process (like production processes) acquire economic significance only when the properties of the products that emerge are valued and is judged to be emergent when they are valued more highly than the combined value of the separate inputs. Without valuation the process may be judged emergent but it has no economic (or policy) significance. The notion of “greater” or “less” when applied to physical processes imply subjective valuation. Thus, physically emergent processes may be involved in economic emergence, but they need not be. The mere act of exchange creates value. Simple exchange may be the most elementary form of human-interaction in this context. By moving products with their valued properties to the highest valuers, an outcome, perhaps anticipated only by an entrepreneurial minority, emerges in which value is higher. It is the result of purposeful entrepreneurial planning and action. More complex human-interaction, in which physical transformations occurs (more than simply in the spatial location of the finished product), are species of the same genus of emergent processes in which value is intentionally created.
But, as noted, such outcomes are not without irreducible uncertainty. Economic growth occurs in an open ended universe (Buchannan and Vanberg 1971) in which knowledge is continually being created. Successful action in such a universe is possible only because of the ordered results of past and on-going human-interaction in the form of durable (slow changing) social institutions of which the market itself, and particularly the capital structure that reflects the market for capital resources, is a prime example; and laws, customs, practices, are other examples. These are not the result of human intentions, but the bi-product of human-interaction in the individual pursuit of valued outcomes. Entrepreneurship is thus an economic emergent process among others with the special feature that it is the result of human design, of human planning.

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So there are free lunches? Does the creation of value bring us something for nothing? The famous adage “there ain’t no such thing as a free lunch” is a reminder that there is an opportunity cost for the benefits of every action. It is a pointer to the unavoidable budget constraints we face. It does not suggest that there are no benefits, no rewards. Rather the rewards available in alternative course of action have to be compared and accounted for. In that sense there are free lunches all around us. If we are successful we can create more value with the same time and energy as some viable alternative course of action. Entrepreneurship is about discovering the right opportunity to do so (Kirzner 1973, 1979). In the social world there are positive-sum games, while in the natural world, all “games” are zero sum (matter-energy being strictly conserved).
What are the implications for entrepreneurship teaching and policy?

As emphasized, it is in the nature of emergent outcomes that they cannot be predicted – in the usual sense of the word. This places severe limitations on the teaching of entrepreneurship and on economic planning. The same logic that applies to the impossibility of centrally planning applies also to entrepreneurial activity and to the teaching of entrepreneurship. As Roger Koppl puts it:

Some business professors dream of finding a grand algorithm that will allow them to guide entrepreneurial decisions and to judge in advance which decisions are good and which bad. [This has been revealed to be] a form of magical thinking. We need entrepreneurs to make their decisions for themselves precisely because it is impossible for us to make those decisions for them. (Koppl 2008: 925).

To be sure, individuals who have learned certain crucial concepts (like those typically taught in business schools) may be in a better position to exploit perceived opportunities. But this is neither a necessary nor a sufficient condition for successful entrepreneurial practice (Klein and Bullock, 2006). It is surely plausible that an understanding of the workings of a business and its contextual environment could help a creative mind see opportunities that might otherwise elude her. But this relationship is variable and elusive. Enduring generalizations about entrepreneurship seem to be available only at levels of abstraction too high to be of use in the discovery, creation and exploitation of individual opportunities. Indeed Ludwig von Mises tells us that entrepreneurship “defies any rules and systematization. It can be neither taught nor learned.” (Mises, 1949: 585; Klein and Bullock, 2006: 435).

With regard to this last statement, however, there is probably a sense in which aspects of entrepreneurship might be learnt. Much of the knowledge utilized by an entrepreneur in the course of identifying and exploiting an opportunity is tacit. Tacit knowledge is gained, if at all, by experience and observation. Immersion in the flow of actions is often the best breeding ground for entrepreneurship. This is surely the logic behind the use of case-studies as teaching devices, though whether, and to what
extent, they are able to simulate real world situations so that the experience is “real” for the student is another matter. And this is also perhaps what is behind the observation that, much more often than not, successful entrepreneurs have experienced prior failures. Not much has been done in researching the question of entrepreneurial failure and this would appear to be a fruitful area for future work.

**Conclusion**

Successful entrepreneurship is an emergent outcome in a fundamentally economic sense. It occurs within the context of a social situation of human interaction and depends on the emergent orders that constitute civil society. Case by case it is inherently unpredictable. In fact, successful entrepreneurship is the outcome of a contest between competing views of the future world, resulting in competing attributions of value to various combinations of capital resources. Nevertheless, as a phenomenon it is related to certain general conditions. On the one hand, entrepreneurship is indispensible for economic growth and development. On the other hand, it would appear that it is a phenomenon not amenable to economic planning at any detail level. It is elusive in its nature and cannot be taught in any formulaic way.

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