

The Sensory Order and the Structure of Production: Entrepreneurial Planning as a Cognitive Process

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1. Introduction

Consumers and entrepreneurial planners form and revise plans and expectations on a day-to-day basis. This activity is intimately connected with the sensory order, the interpretive process of cognition thorough which the brain constructs and refines internal and subjective models of external reality (Hayek 1952a). The brain has emerged as an adaptive classificatory apparatus which selectively categorizes experience, including sophisticated complexes of related sensory impulses, and thus constructs provisional models of external reality. Our mental categories enable us to draw causal connections. Experience conditions our ability to act in the face of uncertainty because it is the basis for our expectations and our understanding of their limitations.

This paper analyzes entrepreneurial planning as a cognitive activity in the context of the sensory order. Entrepreneurial planning occurs within firms to minimize the transactions costs of information discovery, acquisition, and processing (Coase 1937). The dichotomous nature of the firm's short-run cash-flow constraint, and the need to contribute deeper value or economic growth in the long-run, differentiates modes of entrepreneurial success and strategy. Informational asymmetries enable entrepreneurs to successfully implement product differentiation to better satisfy consumer preferences.

The paper is organized as follows: following this introduction, part 2 discusses Hayek's construction of the sensory order as a spontaneous order; then part 3 develops the role of entrepreneurial planners in designing and maintaining the structure of production; part 4 discusses the role of business firms as design orders which must fit together through coordinated entrepreneurial plans, and thus must contribute to a spontaneous order of

market development; part 5 argues that different kinds of spontaneous order emerge over different timescales, and finally part 6 presents concluding comments.

2. The Sensory Order as a Spontaneous Order

Spontaneous order is best understood as a metaeconomics which encompasses market structure, the emergence of prices, entrepreneurial plans, legal and governmental institutions, human language, religion, and ethics, as well as biological evolution. Spontaneous orders are undesigned, unintended consequences which emerge through the accumulation of separate, decentralized, random actions. As opposed to design orders, spontaneous orders accommodate behavioral indeterminacy and free will, as well as preference and value subjectivity, and the subjectivity of expectations, entrepreneurial awareness, and planning.

Plato originated spontaneous order in *The Laws* (IV, 4), where he states that legislators cannot create laws arbitrarily, they must draw on and give expression to the divinely-ordained moral order to which even the gods are subject. Although Plato conceived of the divine order as static, final, and perfect, temporal human laws evolve over time as new circumstances arise and legislators add minor practical innovations. In the *Nicomachean Ethics* (V, 9: 1136a-1137a), Aristotle (1934) draws a similar distinction between primordial justice or natural law, and legal justice, the legislative enactments special to particular states and times. Thus, from its origination, spontaneous order has been associated with theories of legal criticism. It is especially fascinating that the doctrine seems to originate with the ontologic absolute of immutable, divinely-ordained moral precepts.¹

Spontaneous order was a central doctrine of the Scottish enlightenment, receiving major elaboration and extension (Ratnapala 2001). Spontaneously-evolved orders were considered natural as opposed to the artificial design order of despotism. Hale (1713) continued to apply spontaneous order to analyzing legal history, while Mandeville (1729) and Smith (1776) applied it to market phenomena. Hume (1739, 1777, 1779) explored social behavior as evolving spontaneously, and along with Smith (1759), applied spontaneous order to morality and religion. Ferguson (1767) first applied spontaneous order to the evolution of government as opposed to legal institutions. Spontaneous order achieved a central place in the social sciences when Adam Smith described the interaction of market forces as the working of an invisible hand.

Roughly contemporaneously with the Scottish enlightenment, French anthropologists, biologists, philosophers, and natural historians were applying evolutionary principles in biology. Maupertuis (1745, 1751; Glass 1947) and de

Maillet (1748), followed by Buffon (1749-1778) and Lamarck (1802, 1809, 1815-1822) elaborated increasingly sophisticated theories of biological evolution. Erasmus Darwin (1792-1796) joined Lamarck in proposing a theory of evolution based on inheritance of acquired characteristics (Eiseley 1958: 48-52). All were important precursors of Charles Darwin (1859, 1871) and Wallace (1864). Although Lamarck and the elder Darwin erroneously applied inheritance of acquired characteristics to biological evolution, it clearly does apply to other forms of spontaneous order, where inherited or learned characteristics can be transmitted, as described in Darwin's (1871) theory of social evolution presented in the *Descent of Man*.

In the Austrian school of economics, Menger (1871, 1892) extended the application of spontaneous order to the emergence of commodity money in a primitive barter economy and also provided a rudimentary account of the spontaneous evolution of the state (Menger 1883: 156-158). Mises (1912) contributed the regression theorem, which explains how fiat money evolves from commodity money. Hayek (1960, 1973, 1976, 1979) developed a theory of the evolution of democratic political and legal institutions responding to historical influences without the intelligent design of an authoritative legislator.

Rizzo (1985: 882) showed how spontaneously-emergent and value-neutral Anglo-American common law is superior from a welfare perspective to policy-oriented positive legislation and activist jurisprudence based on balancing competing social and economic interests. The common law is a natural and spontaneous order, contrasting with the design order of activist jurisprudence. Spontaneously-evolved law, including common and customary law, is related to positive legislation in that an accretion of positive legislation can contribute to the evolution of spontaneous law (Mulligan 2004a, 2005). Legal scholars have long identified primitive customary law, which is neither natural nor wholly artificial, as "the result of human action, but not the execution of any human design (Ferguson 1767: 122)."

More recent scholarship (Berman 1983; Friedman 1989, 2000; Benson 1990, 1998, 2002; Stringham 1999, 2002, 2003; Stringham and Boettke 2004) analyzes the evolution of social institutions from a public choice perspective. Institutions which evolve spontaneously change more slowly over time, better encourage economic progress, and facilitate coordination of entrepreneurial plans (Harper 1996, 1998, 2003). Entrepreneurs benefit from the slowly-evolving institutional environment which minimizes the information burden they face as they form expectations. The distinction between the spontaneous order of common law, and the designed order of positive legislation, can be likened to the distinction between market and centrally planned economies (Sugden 1998: 489-490).

Hayek (1952) suggests the sensory order we construct in the mind is a spontaneously-evolving order which the organism adapts to address its evolving needs. The external environment may change, eventually requiring revision of the sensory order, or the organism may mature through experience to revise the sensory order even in the absence of external change. The mind constructs overlapping hierarchical classification schemes to accommodate the staggering diversity of experience. Conscious thought is inadequate for receipt of all primary sensory impulses, thus most of the apparatus of perception operates automatically most of the time (Dijksterhuis et al 2006: 1006; Gifford 2007: 270). This sensory order focuses and directs our memory, awareness, and sensitivity to new impressions.

Socialization enables us to benefit from the experience of others, granting us not only a vastly larger and more valuable stock of experience from which to draw, but also distills and condenses this immense volume down to a manageable digest. "History's task is not to record all past things and events but only those that are historically meaningful (Mises 1957: 286)." We rely on language, social intercourse, and literature to broaden the range and perspective of our experience far beyond what we could incorporate on our own. This is an essential achievement of civilization.

Slowly-evolving behavioral regularities and social institutions offer the dual benefit that they can self-adapt to changing conditions, and they generally avoid the massive instability of catastrophic change, which design orders unsuccessfully attempt to plan out of existence.² Entrepreneurs can also benefit by having prior assessments which differ from the mainstream to the extent these assessments constitute real opportunities overlooked by others (Casson 1982, 1995). Darwin (1872: 86) explains the benefits of diversity in enabling a population to occupy more biological niches, and to occupy these niches more fully, and therefore to adapt more rapidly to conditions changing on more margins. Design orders attempt to banish uncertainty, and may succeed on a local and temporary scale, but only at the expense of greatly increased global, long-term risk (Peters 1999).

The literature on constitutional political economy recognizes three stylized facts for identifying Hayekian spontaneous orders:

(1) the state of practice at any point in time can be placed in an evolutionary context, such as by comparison with past behavior (Hayek 1973: 82-84, 98). This means that entrepreneurial plans and firm structures, to constitute spontaneous orders, must be subject to change, and must be engaged in responding to their environment through adaptation or feedback.

(2) the accumulation of a large number of incremental changes. When entrepreneurial planners inaugurate a new product or design a new firm, this will not generally constitute spontaneous order in and of itself, but when the

production plan is altered repeatedly over time and the structure of the firm evolves, spontaneous order will be evident. Again, it will result from repeated applications of feedback mechanisms.

(3) limitation of intelligent design to process, as opposed to outcome, which remains free to actualize individual preferences (Hayek 1973: 116-117; Rizzo 1985: 871). If firms and entrepreneurial planners are conceived of as maximizing profits or some other objective function, they are necessarily undertaking an adaptive response to opportunities afforded by the business environment as planners become aware of them. Fallibility and selective awareness precludes any possibility of behavioral determinism. Furthermore, limitations on our awareness of business opportunities provide incentives for alert entrepreneurs.

Business firms are designed as command organizations, and therefore do not constitute spontaneous orders in the short run. Some firms encourage a culture of entrepreneurship where all employees are empowered to contribute--these entrepreneurial organizations are most likely to constitute spontaneous orders. Over the longer run, in even a very top-down-managed firm, leadership will pass from person to person, and thus the evolutionary history will constitute a spontaneous, undirected order, though an ossified, slow-motion one.

3. Stages in the Hayekian Structure of Production

The Hayekian production structure is a sequence of productive activities which add value at a rate which must at least equal the market interest rate; otherwise the productive activity should not be undertaken. Garrison (2001: 46) provides an illustrative example of a production structure composed of mining, refining, manufacturing, distribution, wholesale, and retail. Arbitrage ensures that the resources used in any stage of production yielding a return different from the market rate of interest will have their value bid up or down, adjusting the rate of return on all resources to the market interest rate in the long run. In this paper we consider entrepreneurs as engaging in only one productive activity at a time, limited to a single stage of production, because this construction accords best with the natural limitations of sensory perception.

First, we consider the case of pure arbitrage, where the entrepreneur's inputs and outputs are unchanged, but are moved to a different market for sale, perhaps geographically separated from the input market. This case covers the situation where incidental passage of time allows asset value to appreciate without the active processing of additional inputs by the entrepreneur, for example, as the value of lumber in a forest increases as the trees grow, and the

value of wine is enhanced as it ages. Even in this most stylized construction, entrepreneurs must make the critical decisions of when and where to buy, how long to hold, and when and where to sell. Entrepreneurial profits are earned to the extent that the entrepreneur is able to buy low and sell high. We assume the entrepreneur perceives the market structure of the input and output markets, that is, whether these markets are perfectly competitive, monopolistic-competitive, oligopolistic, or monopolistic. Economic theory distinguishes among different kinds of market structure based on the size and number of firms, market concentration, product differentiation, barriers to entry of new firms, intellectual property, trade secrets, and government intervention. It is generally obvious to market participants in each case whether each of these attributes is present—these are things which can be observed by market participants, and which effective entrepreneurs necessarily employ to categorize different market opportunities.

If the input market where the entrepreneur is a buyer is perfectly competitive, the entrepreneur benefits from being able to purchase relatively unlimited amounts at a relatively low competitive price. If the output market where the entrepreneur is a seller, is also perfectly competitive, there is likely to be no structural advantage. In such a combination of perfectly competitive input and output markets, while arbitrage opportunities are common, they are not likely to persist. If the output market is or can be made to be monopolistic-competitive, for example, through branding, certification of quality or standards, or advertising, the entrepreneur now realizes enhanced opportunities to earn some long-run monopoly profits. This advantage is likely further enhanced if the output market is oligopolistic, and is almost certainly enhanced further if the entrepreneur is able to establish a monopoly in the output market. If oligopoly partners are able to collude successfully, each earns monopoly profits, but under oligopoly, there is a well-known incentive for collusive partners to cheat. Furthermore, oligopolistic firms sometime attempt to gain market share by undercutting their competitors, preventing them from earning profits.

This introduces an interesting complexity phenomenon—generally speaking, it is more desirable from the producer's perspective to enjoy greater market concentration in the output market than the input market, and the greater the difference in concentration between these two markets, the greater the advantage to the producer. However, oligopoly introduces potential instability on both ends, which can wipe out or amplify, producer advantages, seemingly at random.

If, where the input market facing entrepreneurs is monopolistic-competitive, the output market is also, entrepreneurs can earn long-run monopoly profits, but must also contribute to paying long-run monopoly

profits to the sellers in the input market. If the output market is oligopolistic, entrepreneurs can sometimes earn relatively high, long-run monopoly profits, but this situation is relatively volatile and unstable, a characteristic highly unattractive to entrepreneurs, provided they anticipate it through either theoretic understanding, or discovery through experience with oligopolistic cheating. If the output market is monopolistic, entrepreneurs earn relative high monopoly profits there.

If the input market is oligopolistic, this is generally undesirable from the perspective of entrepreneurs who buy in this market. When the oligopolists are successful in colluding to extract monopoly profits, entrepreneurs pay persistently high input prices, which they may not be able to recoup in the output market. Entrepreneurs who have never experienced oligopolistic cheating are unlikely to be aware of its potential impact, and may welcome such a market. This enthusiasm will last until oligopoly partners respond to their own incentives and start cheating on collusive arrangements. However, input-market oligopoly offers entrepreneurs the opportunity that sellers will periodically undercut their competitors to gain market share, sometimes even at a temporary loss. Alert entrepreneurs, especially those limiting their activity to arbitrage, would always be receptive to such opportunities, even understanding they will not normally persist. Entrepreneurs who buy inputs in oligopolistic markets are most likely to earn the most persistent profits when they can maintain a monopoly in the output market. If the input market is monopolistic, the output market needs to be at least monopolistic-competitive to earn long-run profits. If the output market is oligopolistic, competitor undercutting may result in losses. The discussion above suggests the general rule of thumb that the degree of market concentration must generally increase the lower the order of production, as production approaches the final consumer.

Next, we consider the complications introduced by moving from the case of pure arbitrage to the case where the entrepreneur engages in a productive activity which transforms inputs into a more highly-valued output. If the input market is less than perfectly competitive, again, entrepreneurs most likely will be unable to earn even short-run profits if the output market is perfectly competitive. Thus, entrepreneurs will either avoid this situation, or try to ensure the output market is at least monopolistic-competitive. Because under this construction, entrepreneurs produce a materially different output from the inputs, their opportunities to effect product differentiation through branding, design, trade secrets, trademarks, etc., is much greater than when they engaged merely in pure arbitrage.

At this point it becomes helpful to distinguish between primary and secondary entrepreneurial innovation. A primary innovator does something as

a response to a business opportunity she is the first to perceive, not as a response to the behavior of established competitors, or an imitation of it. Market structure is largely determined by the responses of secondary innovators and their mass responses. Clearly it is much easier to attain product differentiation when the firm engages in production than when it merely engages in arbitrage. Entrepreneurs must shape the way inputs are combined and can target their final product at the preferences of underserved—or perhaps previously unknown—consumer niches.

Entrepreneurial strategies determine market organization, though in this analysis we take the market organization as a given and ask how the entrepreneur discovers and explores the business opportunity set, and how their awareness of this environment becomes further extended and deepened. Briefly it would appear that perfectly competitive markets, with large numbers of similarly-sized producers and little or no product differentiation, arise because entrepreneurs entering these markets imitate established small enterprises. This is primarily a matter of strategic responses, and therefore of secondary innovation.

Monopolistic-competitive markets arise because entrepreneurs imitate each others' established branding, advertising, and product differentiation strategies. Entrepreneurs cannot imitate a competitor's brand, unless their plan is merely to profit from buyer confusion, but their strategy is to offer branded products which can be accepted as "just as good" as established brands. Pricing strategy comes into play here—in some cases a higher price can successfully be charged because it helps signal to buyers "this brand is better than the established substitute." Similarly, a lower price can also be used to signal "this brand meets your needs but at lower price." Some level of primary innovation must be applied to create monopolistic-competitive markets, though if products are not drastically differentiated, the degree of primary innovation may be low.

Oligopoly arises where entrepreneurs achieve a certain degree of market concentration through successful competition, and then imitate, respond to, and evoke strategic responses from, other major players. Oligopolistic markets arise because at least one firm with high market share contributes primary innovation. The primary innovating firms may contribute to secondary innovation as well.

Monopoly arises when one enterprise, perhaps through employment of trade secrets or patents, grows through successful competition to the point where the firm's size acts as a barrier against potential competitors, or the firm successfully seeks a government grant of monopoly. Achieving monopoly through competitive success seems to depend on the firm contributing primary innovations, often in several dimensions and in temporal succession, but the

allocation of firm resources to preserve monopoly rents through protective legislation is a form of secondary innovation—a strategic response to actual or anticipated competitors.

4. The Firm as a Design Order

Coase (1937: 38-46; 1988: 7) suggested the division of labor occurs within firms to minimize transactions costs, and extending his argument slightly, we can conjecture that entrepreneurial planning normally occurs within firms for the same reason. The firm is structured or designed by entrepreneurial planners to facilitate the earning of profits over a Hayekian stage of production. It would appear that design of a firm for pure arbitrage would be relatively trivial compared to designing a firm to engage in production. The founding entrepreneurial planner designs the firm for a particular time and place. Anticipated contingencies may be accommodated by the initial design with some built-in flexibility, but generally it will be necessary for the entrepreneurial planner to recognize the need for change as it arises, in the firm's conduct, structure, staffing, product lines, production technology, capital installation, etc. The firm is a design order governed by the entrepreneurial planner subject to limitations imposed by the entrepreneurial planner's perception of the business opportunity set. Because the firm is a design or command order, though one in which all individuals cooperate voluntarily—otherwise they quit or are fired—it is very difficult to place the firm within the context of spontaneous order. They seem to behave spontaneously in some ways but not in others (Khalil 1995, 1996, 1997, 2002).

The most salient characteristic of firm design is the curious introduction of bureaucratic inertia as an unintended consequence. Although entrepreneurs design firm organization, like capital installations, for maximum flexibility, firm structure is less multiply-specific, and more easily subject to reallocation, than physical capital. Thus it is particularly troubling that the design order of the firm should so resist change. The underlying reason for this may be laid at the feet of the employee's incentives.

Once employed by a firm, the employee's interests are job security and aggrandizement of income and position within the firm. Actual change, and even the acknowledgement of a need for change, should generally be resisted by the employee—at least in the short run—because of the greater risk and uncertainty change implies. Preexisting business strategies formulated for static environments prove inadequate in dynamic environments calling for development of new strategies (Carpenter and Westphal 2001). While the most entrepreneurial individuals characteristically do not shirk change, attempting instead to exploit it for profit opportunities unforeseen by others, the vast

majority of employees exploit their position in the firm as a vehicle to *avoid* facing the uncertainty of the future—their comfortable position within the firm insulates employees and takes the edge off uncertainty.³

In addition, employees typically attempt to consolidate their position within the organization through a strategy of acquiring additional subordinates, resources, and income. This behavior all but guarantees firms grow until they become fully calcified and worthless. A firm's endeavor should focus on its field of competence. Firms seek to exploit their business environment as competent teams coordinating inputs in a dynamic process (Eliasson 1990a), thus production cannot be captured by a static production function (Johansson 2001: 15). The coordination performed by entrepreneurial planners adds value in each stage of production (Mises 1949: 480-485; Rothbard 1963: 323-332; Garrison 1985: 169, 2001: 46). The firm's actions are experimental, responding to the uncertain business environment (Eliasson 1996: 110). Just as a static environment leads to the repetition of established strategies, a dynamic environment characterized by the challenging prospect of an uncertain future calls for new strategies (Carpenter and Westphal 2001). Entrepreneurial planners face uncertainty because no individual or combination of individuals can make use of all available information. Individuals necessarily filter out most of the information they encounter in order to make intelligent and effective use of a limited subset, as Hayek (1952a) describes, forming what Eliasson (1990a) calls a competence bloc.

Piore and Sabel (1984) suggest market instability promotes competitiveness, and provides an advantage to small firms which can react more quickly in response to uncertainty, market volatility, or rapid technological or institutional change. Highly competent, highly innovative firms are engines of Schumpeterian creative destruction (Schumpeter 1912) and should contribute to greater market volatility. Firms allocate resources in experimentally-organized economies which are themselves spontaneous orders which are continually engaged in being reorganized. Competent resource allocation is not a conventional optimization process, but a search activity aiming at better uncovering inherently unrealizable optima. Entrepreneurial planners allocate resources found in the state space to the business opportunity set of profitable outcomes (Eliasson 1996). They compete to reach the best optima within the partially unexplored business opportunity set. Entrepreneurial incompetence can result in both financial and physical capital being misallocated toward unprofitable uses outside the business opportunity set. Furthermore, the very activity of invention, innovation, learning, informing competent consumers and venture capitalists, etc., transforms the business opportunity set and makes better optima possible. "Both the state

space and the business opportunity set are, however, at each point in time bounded (but expanding through exploration)" (Johansson 2001: 18).

4a. Incompetent money and resource misallocation

Transactions costs include information costs. This implies that the transactions costs avoided through organizing production in firms more than offset inefficiencies imposed by bureaucratic organization. The mere existence of firms presumptively demonstrates it successfully minimizes transactions costs, at least over the long run. Competence blocs can only persist if resource allocation is flexible, ongoing, and competently informed. If a firm's core practices remain unchanged in a dynamic context, lowered performance outcomes are likely (Schumpeter 1942; Hannan and Freeman 1984; Tushman and Anderson 1986; Levinthal 1994).

Financial intermediaries serve the vital function of recognizing and valuing competent entrepreneurial planning and innovation (Eliasson and Eliasson 1996b; Eliasson 1997).⁴ "Incompetent money," that is, "capital not bundled with market knowledge, *probably has a negative effect on firms, since the financial capital then confers power and authority to actors who do not understand the business* (or the competence of the entrepreneur) (Johansson 2001: 23, emphasis in original)." Johansson suggests government as the primary supplier of incompetent money (see also Carlsson et al 1981; Bergström 1998) but during the unsustainable expansions which precede recessions, the private sector dominates in this role.⁵

Innovation includes the allocation and combination of competencies for which no one understands the full extent or implications (Johansson 2001: 25). Resource misallocation is inevitable, and an essential part of economic progress. It is necessary to contrast locally unbalanced growth with the global misallocation induced by an expansionary monetary policy. Competence possesses the unique property of being self-allocating (Pelikan 1993; Eliasson 1996); incompetence, in contrast, is *self-misallocating*. Where allocation is not sufficiently flexible, misallocation must result and must be persistent.

Heiner (1983) and Kaen and Rosenman (1986) proposed the competence-difficulty (C-D) gap, a discrepancy between investors' competence to make optimal decisions and the complexity of exogenous risk. A wide C-D gap leads to habitual repetition of established behavior, which can lead to a resistance to innovation, and even a resistance to revise plans in the face of disconfirming market information. A static business environment would allow agents to narrow the C-D gap over time, but a dynamic environment results in a wide and persistent C-D gap. Due to irregular arrival of new information, Kaen and Rosenman argue persistent resource allocation and entrepreneurial plans may appear unstable and suddenly reverse direction, leading to non-

periodic cycles in entrepreneurial behavior. This often happens as a sufficient run of bad luck results in replacement of discredited management. Persistence in production plans should be expected for larger, more established, less entrepreneurial firms, in contrast to smaller firms with more effectively defined—often narrowly focused—competence blocs. Competent firms are alert to disequilibrium prices which signal opportunities for entrepreneurial discovery (Kirzner 1984a: 146, 1984b: 160-161, 1997) and exploit the information contained in disequilibrium prices to adjust the production structure.

4b. Firm size, age, and innovation

Researchers have identified the importance of small and medium-sized firms, which are the source of, and haven for, most primary entrepreneurial innovation, in driving economic growth (Birch 1979, 1981, 1987; Davidsson et al 1994a, 1994b, 1996), as well as documenting negative relationships between firm growth and firm size and/or firm age (Evans 1987a, 1987b; Dunne et al 1987, 1988, 1989). A related line of inquiry has documented decreasing shares of production and employment by large, old, well-established firms, being displaced by increasing shares to large numbers of newer, smaller firms (Brock and Evans 1986, 1989; Carlsson 1989, 1992; Loveman and Sengenberger 1991; Acs 1996a; OECD 1996).

Virtually all these findings are readily integrated through recognizing the extent to which the perceptual limits of entrepreneurial awareness coincides with those required for a single entrepreneur managing a small firm. Small firms tend to be more innovative (Acs 1992) than larger firms, which often suffer from more bureaucratic organization (Acs and Audretsch 1987a, 1987b, 1988, 1993). Small, innovative firms typically gain "first-mover advantages" (Thomas 1985). The level of bureaucratic inertia a firm experiences increases with age and size (Hannan and Friedman 1984). Though large firms have comparative advantage in extending existing innovations they originally pioneered (Almeida and Kogut 1997; Almeida 1999), eventually diminishing returns must set in. Milking old primary innovations to preserve established strategic advantage is a form of secondary innovation, but it can only be considered an innovative process when initially implemented. Johansson (2001: 71) suggests large firms look for innovative processes, trying to improve what they already do well, whereas small firms look for innovative products, which are more important for long run growth (Acs et al 1999). The manager of a small firm can seize opportunities as she perceives them, without having to build political support within a bureaucratic organization. Lombardo and Mulligan (2003) note that established firms tend to allocate resources along historical, as opposed to dynamic, patterns.

Small firms' less bureaucratic organization enables them to better exploit new knowledge and information (Link and Reese 1990; Link and Bozeman 1991). In reality, however, innovations are neither random nor exogenous, but result from entrepreneurial planners' response to their environment, including uncertainty and technological change. Managers of small firms are less overtaxed by the information overload of a large organization with many interconnections, and are better able to focus on the relevant information which a bureaucratic organization may deny them. Entrepreneurial planners starting new firms or directing small firms are better able to focus on the external environment of consumer wants, without the protective insulation of extraneous layers of bureaucracy. In a large firm, decisions are constrained by the firm's culture, where a higher degree of conformity necessarily limits entrepreneurial innovation. Acs et al (1997) suggest small firms contribute more innovation also because they better respect and protect the property rights of innovators, compared with large firms.

5. Spontaneous Orders over Longer Time Frames

The Hayekian sensory order operates on a day-to-day basis, classifying impulses, experiences, memories, and concepts according to their similarities and differences. Price adjustment occurs on a similar schedule. Entrepreneurial plans are generally intended for long periods of time, but generally must be adjusted and refined more frequently in response to frustrated expectations and unanticipated opportunities. Though some plans intentionally target short-duration profit opportunities, the vast majority must be subject to frequent adjustment or maintenance prior to the end of the period originally foreseen. This is an inevitable and logical consequence of the fact that entrepreneurial activity—human action—occurs in the face of uncertainty (Mises 1949: 871). This paper has focused thus far on the interface between the day-to-day maintenance of the entrepreneurial plan, and the evolution of firm organization and the production structure. Each stage of production may be considered an aggregate of entrepreneurial plans in a particular industry, and the aggregate or sequence of all production stages constitutes the production structure which transforms resources into consumable output to satisfy human wants.

1 year or less	1-10 years	10-100 years	100-1000 years	1000-10,000 years	10,000-100,000
Sensory Order (day-to-day) (Hayek 1952a),	Sensory Order (life of organism) (Hayek 1952a),	Philosophical Thought & Scientific Theory	Evolution of Existing Languages,	Emergence of Language (Dunbar 1996), Emergence	Brain Evolution (<i>actualized through the Sensory Order</i>)

Price Formation (Hayek 1931), Entrepreneurial Planning (Kirzner 1973), Production Structure (Lachmann 1956)	Market Organization (Mises 1949), Schools of Literature (<i>Literary Darwinism</i> (Carroll 2004; Gottschall & Carroll 2005))	(Polanyi 1945), Common and Customary Law (Hale 1713), Government & Social Institutions (Ferguson 1767)	Further Evolution of Philosophical Thought & Scientific Theory (Polanyi 1941; Hayek 1952b)	& Evolution of Religion, Ethical Norms, & Behavioral Regularities (de Waal 1996, 2006; Atran 2002)	(Wallace 1865; Darwin 1871; Potts 2001, 2007; Dopfer & Potts 2008), Biological Evolution (Darwin 1872)
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Different spontaneously orders appear over different time scales (Table 1). If the time under consideration is sufficiently long, institutions nearly always evolve spontaneously, even though that evolution may include a succession of intelligently designed acts, because the results of conscious choice must be environmentally selected to be passed on—they must enhance survival and reproductive opportunities. Accumulation of design, a form of path dependence, helps explain spontaneously evolved social order, and also why custom, tradition, and social context are so useful for interpreting evolutionary processes working through social institutions. Furthermore, such leaps as do occur in behavioral regularities, institutional structure, etc., generally will appear insignificant over a sufficiently long time frame.

The concept of temporally-scaling feedback loops which are self-reinforcing (Bernstein 2008) helps explain the extent to which each of these spontaneous order responds to orders of longer or shorter duration (Table 2).

Darwin's description of natural selection can be applied directly to the variety of experimental innovations attempted by entrepreneurial planners, as well as the competitive environment which selects some strategies for fulfilling consumer wants, while rejecting others:

It may metaphorically be said that natural selection is daily and hourly scrutinizing, throughout the world, the slightest variations; rejecting those that are bad, preserving and adding up all that are good; silently and insensibly working, *whenever and wherever opportunity offers*, at the improvement of each organic being in relation to its organic and inorganic conditions of life. We see nothing of these slow changes in progress, until the hand of time has marked the lapse of ages, and then so imperfect is our view into long past geological ages, that we see only that the forms of life are now different from what they formerly were (Darwin 1872: 63).

Darwin's quote seems to apply equally well to the evolution of the structure of production as entrepreneurial planners experimentally adjust resource allocation and the ends to which productive activity aims in their small areas of authority. When engaging in secondary innovation, entrepreneurial planners

imitate the successful planning of their competitors in an effort to gain strategic advantage. This is an intentional rather than a blind activity. Every innovation they offer on the market is experimental. Though to stagnate is ultimately to die as an entrepreneur, like the shark which must swim forward or drown, the fact of acting in the face of uncertainty clearly biases the incentive structure facing entrepreneurs in firms large or small, and even those who work in no firm, against innovation. Innovations are always experimental, and many must fail, though generating useful knowledge through that failure.

<i>Spontaneous Order</i>	<i>Short-end Boundary Loop ("fast feedback")</i>	<i>Long-end Boundary Loop ("slow feedback")</i>
Day-to-day Sensory Order	Sensory experience, coherence and understanding	Medium-term memory, life efficacy
Price Formation	Experimental changes in price offers	Changes in Supply and/or Demand
Entrepreneurial Planning*	Existing profit opportunities	New profit opportunities, efficacy of plan and/or firm
Production Structure*	Resource allocation to earn highest yield	Changes in demand for firm's output and/or supply of inputs
Sensory Order over the life of the organism	Medium-term memory	Death of individual (or loss of long-term memory)
Market Organization	Entrepreneurial Planners' strategic responses	Technological or institutional change
Schools of Literature	Publication, several literary works and a body of criticism	Critical and popular success, New schools of literature and criticism
Philosophical thought and scientific theory	Publication and review, several works of empirical research and/or pure theory	Paradigm shift
Common and Customary Law	Precedents set and followed	Permanent positive change
Government and Social Institutions	Past practice or model, election	Drastic structural innovation, revolution
Language	Changes in vocabulary and usage	Migratory interaction with other language groups
Religion and Behavioral Norms	Ostracism of deviant behavior	Moral entrepreneurs (innovators) effect behavioral change
Brain Evolution	Improved connectivity within and between existing structures	Development of new brain structures
Biological Evolution	Variation within established populations, species variation, diversity, adaptation to environment	Emergence of distinct populations which do not interbreed, eventually becoming separate species, species evolution
*Note: Firms, entrepreneurial plans, and the structure of production (within a single firm) are design orders which seem to possess some features of spontaneous order. If it serves no broader purpose, this table illustrates why this can be the case—the bounding feedback loops constraining entrepreneurs in the design of firms, plans, and production structures, are themselves spontaneous orders. The macroeconomic production structure remains a spontaneous order because it operates through the interaction of many separate design intelligences.		

The sensory order evolves in grosser extent over the life of the organism, though this change is only the cumulative effect of day-to-day

classificatory adaptations necessitated by, and responding to, fortuitous experience. Market organization emerges spontaneously through the uncoordinated actions of entrepreneurial planners, though it is also noteworthy that entrepreneurial plans are intentionally constructed to exploit existing market structures, often ensuring that greater market concentration can be attained in the product than in the input market.

Because of the long life of a significant work of literature in our intellectual environment, as well as the time it takes to digest, criticize, study, and interpret what has come before and respond to it by producing even a single new work, it takes at least a number of years for a particular school of literature to be recognized. Schools of criticism emerge, but also go out of fashion among their more rarified body of partisans, more rapidly—they are evanescent compared to the works of literature they champion and criticize.

The exceptionally rich literature on spontaneous orders offers a tremendous volume of material on which literary Darwinism (Carroll 2004; Gottschall & Carroll 2005), an emerging school of literary criticism, can draw. Chiefly inspired by biologists such as J.B.S. Haldane (1932), Desmond Morris (1967), and especially E.O. Wilson (1975, 1978, 1998), literary Darwinism proposes that storytelling, or the construction of narratives, both exercises and appeals to particular parts of the brain, providing valuable opportunities for mental recreation, but also enhancing the individual's stock of sensory experience and memory. Although Atran (1990, 2002) attributes evolutionary benefits to the construction of "minimally counterintuitive narratives," esthetic sensibilities argue for an ideal mean between a predictable narrative offering no surprises and confirming our expectations, and a jarringly novel narrative offering nothing familiar and completely overturning expectations. The esthetic principles of narrative construction are analogous to those for musical composition—we enjoy pattern recognition, but the pattern must not be so familiar to be dull, ideally incorporating subtle variations rendering it just unfamiliar enough to fully engage our intellect, memory, and esthetic senses. We find too monotonous a tune boring, and reject too novel a composition because we cannot relate it to what pleased us in the past (Lehrer 2007: 120-138). Engaging music builds up and surprises our expectations, mimicking the broadening of experience which comes with time (Meyer 1956, 1967, 1973, 1989, 2000; Grosvenor & Meyer 1960). In writing, a composition is judged weak both when it lacks a literary context for the reader, and when it is too mundane or predictable.

Schools of philosophical thought take longer to be constituted even when they center around a particular work or thinker, and once recognized, are bound to be less transitory than schools of literature and literary criticism. Scientific theories, which may take significant time to overthrow prevailing

orthodoxies, will generally persist until overthrown by a paradigm shift (Kuhn 1957, 1962). According to Mises (1957: 109), "...technological innovation is not something material. It is the product of a mental process...." Common and customary law evolve in a manner similar to governmental structure and other social institutions.

Language evolves naturally over time, as our adaptive classificatory structures call for new words for new concepts inconceivable at earlier realizations of historical experience. Language itself emerged from prehuman behavior which communicated in a primitive way and served to coordinate behavior. Darwin (1872: 384) conjectures that a perfect historical record—at present still unattainable—would enable us to classify human languages according to levels of affinity, historical origin, and antecedents, without reliance on speculative forensic analysis. Because language is one of the most significant of spontaneously-evolved artifacts, its evolution is of particular interest. In Darwin's view, gaps in the fossil record confront biologists with the same difficulties as missing stages of language development present philologists. Clearly, however, languages evolve gradually, and certainly do not emerge or change greatly overnight.⁶

6. Conclusion

This paper has focused on the cognitive task undertaken by entrepreneurial planners. Basically this consists of discovering unmet consumer wants and identifying corresponding opportunities in the relationship between input and output markets over a Hayekian production stage. Entrepreneurs must successfully anticipate various characteristics of market structure in both input and product markets they consider entering. They must employ the adaptive classificatory apparatus of the sensory order to apply causal models which can evaluate the likelihood of the future consequences of their actions. Entrepreneurs do this in the face of uncertainty, where their expectations are incessantly being overcome by adverse events, but in general, they adapt to new conditions as they arise.

Firms were analyzed as design orders subject to a pernicious incentive structure which seems to lead employees to avoid making decisions in the face of uncertainty. Sometimes this results in the death of the firm, but over a sufficiently long time-frame, as the firm passes from the management of one set of leaders to another, it may constitute a spontaneous order which escapes the control of any one planning intelligence. Business firms are design orders which must fit together through coordination of numerous entrepreneurial plans, each of which is adaptive, and thus must contribute to a spontaneous

order of market development. As firm plans are coordinated in various ways, market structure emerges.

Hayek's construction of the sensory order is one of a variety of spontaneous, natural orders which arise independent of conscious intention. It is probably the one which operates most frequently and incessantly as a part of our everyday experience, though over longer time frames, it also forms the basis for all the other spontaneous orders which operate more slowly. The paper discussed some of the relationships among the longer-time-scale spontaneous orders. Though works of literature are designed artifacts, they adopt and sometimes expand, emergent and evolving aesthetic standards which resulted from the design of no one writer or artist. Language is a spontaneous order to which we all contribute, determining its evolution through our usage.

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Notes

¹ Although primordial justice was conceived of as absolute and unchanging, the Greeks were keenly aware that imperfect human justice changed over historic time (Hayek 1960: 432, n.17). A central feature of both Plato's and Aristotle's analysis of human justice was the emergence of isonomy or the rule of law, and the occasional retreat from it under both tyranny and democracy (Hayek 1960: 164-165).

² Peters (1999: 11-14) suggests futile efforts to project a design order on the external reality contributes to amplifying the chaos and uncertainty which inhere there. This is the kernel of the Mises-Hayek theory of the business cycle, though Peter's view of the source of economic fluctuations seems to owe more to Schumpeter.

³ Entrepreneurs who do not seek to avoid future uncertainty organize their own firms or work as independent contractors or investors.

⁴ Appraisals of the value of an entrepreneurial plan or production activity are subjective and experimental. Those whose appraisals are subsequently validated by the evolution of market data are rewarded with the highest profits, but it would be misleading to suggest these appraisals could be ex ante ontologically correct or incorrect in any sense. Ex post, some appraisals will turn out to have been more fortunate than others.

⁵ Unsustainable expansions are created by policy-induced credit expansion which overburdens financial intermediaries with more loanable funds and investible resources than they can intelligently allocate.

⁶ The most popular and successful artificial languages, particularly Esperanto, Interlingua, and Volapük, were designed based on evolved natural languages. Extrapolation from the existing literature on spontaneous orders suggests that the relative success of these languages is attributable less to their design according to scientific principles than to their foundation in spontaneously-

evolved natural languages. For less successful designed alternatives like Solresol, the connection to natural languages was more tenuous.

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