

# ENTREPRENEURIAL ALERTNESS THROUGH COGNITIVE SCHEMATA

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This article is an investigation into the causes of entrepreneurial alertness, the ability of entrepreneurs to spot new business opportunities in the environment. By drawing from decision theory and schema theory, a model is developed to show how changes in the environment are mediated by entrepreneurial alertness and brought to the situated attention of entrepreneurs for evaluation. Entrepreneurial alertness is seen to be the application of unique schemata that allow the entrepreneur to impute meaning to environmental change that would not be imputed by other managers. It is argued that this arises from differences in schematic richness, schematic association, and schematic priming. These three antecedents may therefore form a basis on which enhanced entrepreneurial alertness can be developed.

**Field of Research:** Entrepreneurship; Entrepreneurial alertness, Opportunity spotting; Growth and innovation; SME development

## 1. Introduction

Innovation and growth in small and medium-sized enterprises (SMEs) is the result of an entrepreneurial process in which managers spot new market opportunities, develop plans to exploit the opportunities, acquire the resources necessary to implement these plans, and execute these actions in their firms. This process is most contingent on the critical first step – the ability of entrepreneurs to be alert to changes in their environments and to the business opportunities that may be hidden within these changes. Empirical observation suggests that individual people can differ widely in their ability to see new business opportunities within a given environmental situation. Some see nothing but constraint and status quo, while others see attractive new opportunities lurking everywhere. The social and economic impact of these differences is enormous, as the economic actions taken by entrepreneurs can have wide-ranging effects on the provision of valued products and services, on the creation and smooth operation of new markets, and on regional socio-economic development. Entrepreneurial actions matter in the commercialization of the fruit of R&D efforts, the satisfaction of marketplace needs, and the creation of high-value jobs.

The possibility of these many benefits is contingent upon an individual entrepreneur noticing some change in the environment and discerning within that change an opportunity for profit. The ability to spot opportunity is the critical first step in the entrepreneurial process. The critical question of the initial discernment remains. Our current best understanding of this phenomenon is “entrepreneurial alertness”.

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According to Kirzner, entrepreneurial alertness refers to “the ability to notice without search opportunities that have hitherto been overlooked” (Kirzner, 1979: 48), or “a sense of what might be ‘around the corner’, i.e., the sense to notice that *which has hitherto not been suspected of existing at all*” (Kirzner, 2008: 12). These definitions, while intuitively illustrative, lack a clear theoretical underpinning. Clearly, though, entrepreneurial alertness is conceptually distinct from the subsequent assessment, evaluation and development of an opportunity, and the activities undertaken to subsequently exploit the opportunity. This alertness is not solely the domain of the equilibrium-seeking arbitrageur-entrepreneur commonly ascribed to Kirzner, but applies equally to the equilibrium-destroying creative-destruction entrepreneur of Schumpeter (1942). Both types of entrepreneur need to be alert to opportunities for arbitrage, whether in the conditions of the present or in the hypothesized conditions of the future (Kirzner, 2008).

While arguing persuasively that entrepreneurial alertness is the critical economic driver of a dynamic and competitive entrepreneurial process, Kirzner did not attempt to explore the determinants of this alertness. And in later work, he explicitly indicates that the antecedents of entrepreneurial alertness remain unclear. To-date there has been little work done towards a theoretical foundation for the antecedents of entrepreneurial alertness (Yu, 2001).

This gap in our understanding is important precisely because the social and economic effects of entrepreneurial alertness are so large. The primary contribution of this article will therefore be to suggest a theoretical base for entrepreneurial alertness and to use this to identify determinants. The article will first discuss cognitive and structural influences on the attention of entrepreneurs and their ability to interpret changes in the environment, and then introduce schema theory as an explanation for the differences in their ability to notice these changes without search. Finally, it will use this theoretical basis to identify specific antecedents to heightened entrepreneurial alertness.

## 2. Alertness and Attention

The alertness perspective on entrepreneurial behaviour begins with the occurrence of changes in the environment, such as technological or economic shifts that have potential to change the value of products and resources in some market (Kirzner, 2008). Some of these changes are very subtle while some are of sufficient magnitude or salience to be noticed by individuals who are paying attention and are immersed in the corresponding knowledge corridors (Kaish & Gilad, 1991). These individuals are able to discover opportunities within these changes, and to pursue these opportunities through entrepreneurial business actions.

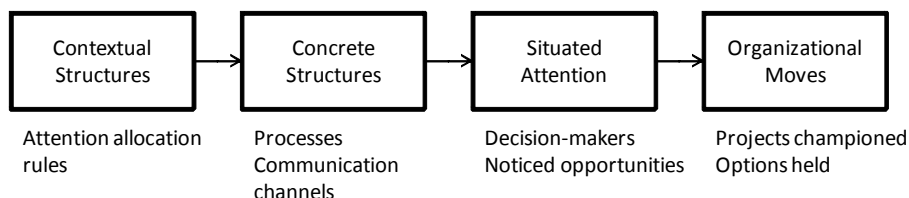
The key role that is played by individual attention and the noticeable difference suggests an approach based on the psychology of strategic management functions, and particularly that of Herbert Simon (1947). Simon’s view was that the challenge of matching of problems, solutions, and actors within an organization is constrained by the limited attention capacity of individual decision-makers, and that organizations therefore allocate and channel environmental stimuli to the attention of individual decision-makers. The nexus of interest is the allocation of external stimuli to

attention-processing channels. This allocation is constrained both by limitations in cognitive capacity and by structural influences. Of these, the role of cognitive-capacity constraints is relatively well-understood. As Simon explained, the allocation of attention is primarily constrained by bounded rationality of decision-makers. It is also constrained by the cognitive routines of these individual actors (March & Simon, 1958).

## 2.1 Structural Constraints to Attention

In contrast to the cognitive-capacity constraints of decision-makers and their effects on attention allocation, the structural constraints are much less well-understood. Ocasio (1997) presents an initial argument wherein structural influence follows three steps: (1) the existing allocation rules of the organization (both formal and informal) influence the distribution of the attention of actors among potential channels, (2) this organizational allocation combines with contextual factors to instantiate a “situated” attention, and (3) this results in a specific focus of attention for each actor, ready to notice and respond to environmental changes. Employing a more precise terminology, Barnett (2008) then improves upon this model by revising the steps: (1) contextual structures (e.g., culture and informal rules) influence whether opportunities are enacted, (2) these enacted opportunities are then processed through concrete structures (e.g., business processes and tools) which allocate the opportunities to specific attention channels, and (3) actors within those channels use their situated attention to evaluate the opportunities and determine the appropriate organizational response. Figure 1 provides the visual representation of a combined Ocasio-Barnett perspective on structural influence.

**Figure 1: Structural influence**



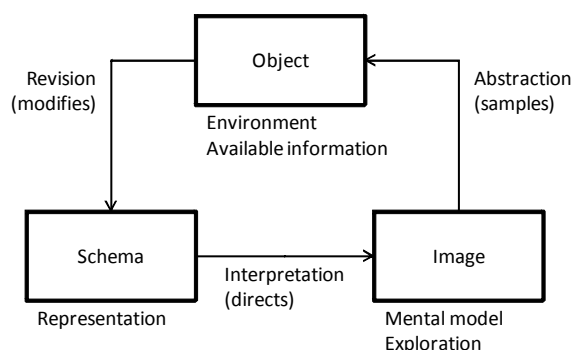
The enactment of situated attention is the key organizational requirement for noticing environmental change; the organization is dependent on a situated or contextualized attention to bring the environmental change forward for evaluation by the constrained cognitive capacity of the decision-makers. It is at this point that attention provides the foundation necessary to recognize any opportunities latent in the change (Hayek, 1952; Kirzner, 1973). Thus, it must be at this point that entrepreneurial alertness somehow comes into play. For this, we turn to the theory of schema.

## 3. Schema Theory

Human beings use a variety of strategies for dealing with the volume and complexity of sensory information streaming in from the world. One powerful technique is the use of rules, scripts, and categorizations (called “schemata”) to interpret incoming

information and make sense of it (Neisser, 1967). These interpretations are combined with task requirements to create the mental models that we use to solve problems. As figure 2 illustrates, a schema is a mental framework with “slots” to represent some set of real characteristics and relationships, which shapes or directs our interpretation of sensory phenomena. The invoked schema causes us to apply a particular mental image or model that ascribes meaning to what is happening, which we can then use to guide our subsequent reactions or behaviours. Through these actions we explore the objective environment and gain additional information about it, such as the degree to which it conforms to the causal expectations inherent in the activated schema. Finally, this new information becomes part of the “prior knowledge” that can influence the invocation of particular schemata in future situations (the choice of invoked schema turned out to be astute or not) or can cause revision or modification to schemata (the new information reinforces or contradicts the structure of existing schemata).

**Figure 2: Application of schema**



When faced with a novel situation in the world, we invoke schemata to understand the meaning and relationships among the various sensory stimuli. For example if an adult toss a ball to a child in the park, these characteristics are sufficient to invoke a “parent playing with child” schema – we recognize them as parent and child even if we have not met them before. We can then use schemata to make predictions about future behaviours, as we can expect they will enjoy each other’s company and then leave the park together later. The invoked schema stipulates the relationships among its elements (the adult is responsible for the well-being of the child, and not the reverse) and the range of actions that can be expected (the adult will not throw the ball so high or far that the child cannot reasonably catch it). These schemata are particularly useful to us because they reduce the attentional burden of making sense of the world, as this sense-making and prediction of future behaviour can happen automatically without conscious effort (Neisser, 1967, 1976). In another example, when you are in a busy restaurant it is neither necessary to keep conscious track of the actions of every patron nor to negotiate a way of transacting with the waiter to get food in exchange for money, because the “restaurant schema” stipulates the roles and behaviours for every participant, leaving you free to focus your attention on making your meal selection and enjoying it when it arrives.

Schemata are both situated and individuated – different people may interpret and react quite differently to the same situation, depending on their surrounding contexts and on the content of the schema they apply to the situation. Within the restaurant

context your schema and mine may differ significantly based on our own prior experiences in restaurants, so our expectations and actions might also differ; if you happen to have worked as a waiter before, your schema is also likely to be more complex and developed than my naive patron version, making you aware of a greater range of relationships and possible actions. We might also differ in how a given set of observable characteristics invokes one particular schema and not another. The innocent childhood ball-playing might invoke in you a schema in which you are likely to wave at the child and retrieve for her any ball that she misses. But if I have recently been involved in preventing a nearby attempted child abduction, the same scene might invoke a protective schema in which my preferred action is confirm that the adult is indeed the parent of this child and not someone dangerous. The invocation of a “child protection” schema, rather than “join in the play”, has been primed by my recent bad experience.

Our schemata are not static entities, but are constantly being updated in the face of new information about the world. In particular, when some phenomenon does not accord with our existing schema we must make some changes to incorporate this new reality, the extent of which depends on how fundamentally the new phenomenon disagrees with our existing schemata (Neisser, 1967). If the change is very minor, it can be assimilated through simple accretion of new attributes of a schema (if the game ends and I am surprised that the child sits on the ball while having lunch, I adjust my “playing ball” schema to indicate that the ball has many other possible uses too). If the change is more substantial it may be necessary to make a more substantial accommodation or tuning of schemata (perhaps the players abandon the ball in a ditch, showing that it was just a found object of little value, used for some impromptu play). And if the change goes to the root of my schema a complete restructuring of it and related schemata might be necessary (perhaps something bizarre occurs, like it is the adult who throws a tantrum when the child decides that play time is over, which forces me to completely re-examine many of my preconceptions about age, maturity, and family roles).

Because schemata are subject to this constant updating and refinement as we learn new things, they broadly reflect the prior knowledge, experience, and culture of individuals. In the case of entrepreneurs, their prior knowledge, experience, and culture may dispose them to schemata that differ from other people. This potential for schematic difference may be viewed as a significant example of entrepreneurial information asymmetry (Hayek, 1945) and may explain the influence of their being embedded into specific information corridors (Shane et al., 2000).

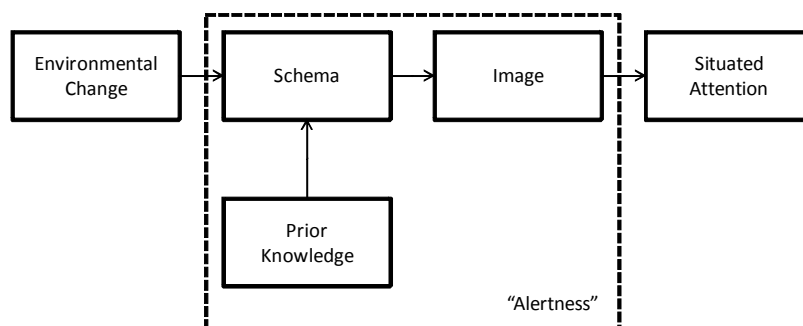
### **3.1 Schemata and Entrepreneurial Alertness**

Kirzner's theory of the alert entrepreneur attempts to explain how it is that some individuals are able to see and exploit entrepreneurial opportunities. But it is silent on exactly how these entrepreneurial individuals are able to make the leap from a noticed change in environment to a recognized opportunity for present or future arbitrage. This is the gap that schema theory is able to fill.

Since individuals can differ in the schemata they employ and they can differ in the context and priming effects of specific environmental stimuli they may encounter,

they can therefore impute very different meanings to the same observed phenomena. For example, two people both observe a long queue of people waiting for the cashiers at a grocery store. One invokes a customer-service schema and interprets the situation as a retailer who does not care enough about customer service to pay the cost of providing additional cashiers. The other, however, invokes a problem-solving schema and interprets the situation as a non-optimal resource dependency in the business. The second individual therefore is more likely to recognize the latent opportunity in this phenomenon, and therefore to see it as evidence of a market opportunity for alternative retail payment resources (e.g., self-serve technology). This effect, whereby schematic differences influence the ability of an individual to interpret a phenomenon in a way that highlights opportunity, is the first and most significant way in which schemata may influence entrepreneurial alertness. Figure 3 suggests a fully mediating role that entrepreneurial alertness plays between noticed change in the environment and the situated attention that recognizes or infers any latent opportunities.

**Figure 3: Alertness as schema application**

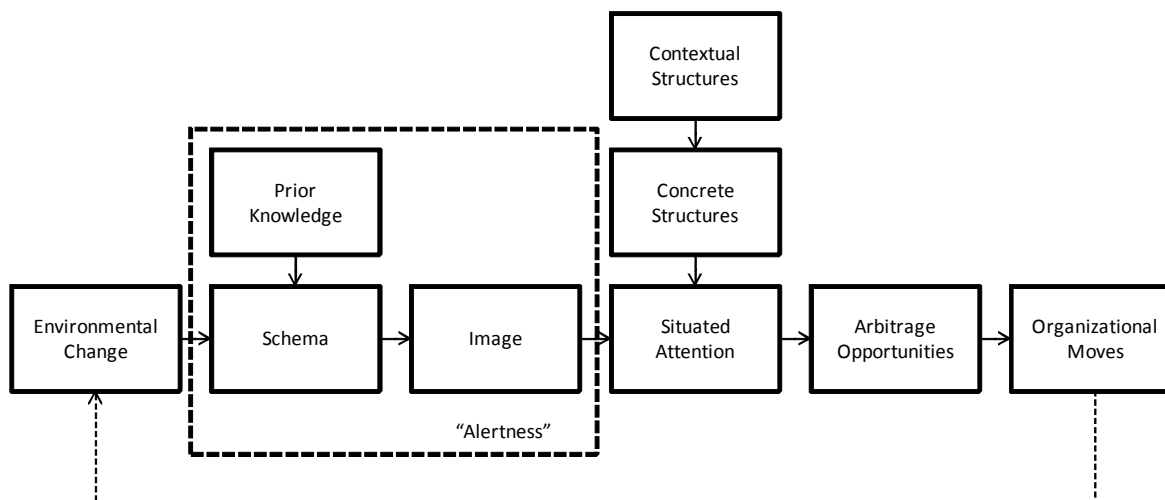


Schemas do not sit passively in the mind waiting to be consciously invoked to make sense of a given situation; they actively influence the filtering and detection of sensory stimuli – the selection of which changes in the environment become noticed, and what magnitude of change is required to be noticeable. For example, two individuals driving past a neighbourhood street sale may see people walking past the displayed goods without buying anything after checking pockets/purses and discovering that they are not carrying any cash. The first observer, who lacks a schema for retail selling, may not consciously notice the situation at all. But the second, having a finely developed retailing schema, is more likely to notice the passers-by as being lost sales, and then to interpret the situation as a need for alternative payment mechanisms (such as an ability for homeowners to rent wireless credit-card POS terminals for the day). This means that individuals having different schemata will notice different environmental changes, and will be alert to different things. From this perspective, variation in entrepreneurial alertness is a manifestation of individuals having different schemata.

Figure 4 presents a complete model of how the application of schemata combines with the structural influences of the Ocasio-Barnett view to create a situated attention that is alert to entrepreneurial opportunities. The alert entrepreneur, having formed a contextualized intent to seek new business opportunities, and by participating in concrete activities such as gathering market intelligence or assessing currently available resources, presents a situated attention ready to investigate and evaluate

the opportunity potential of any phenomena that are brought to it. The alert entrepreneur also, by virtue of prior knowledge and the priming effects of experience, possesses schemata that relate various types of environmental changes to various types of potential opportunity (for example, entrepreneurs familiar with Drucker's sources of innovation (Drucker, 1985) would be aware that every process must have a weak link and that profits may be available to anyone who replaces this weak link with something better). The alert entrepreneur is thus able to form mental images of the environment that are rich in potential opportunities. When these mental images are brought to the situated attention their latent opportunities are recognized and can then become the basis for entrepreneurial actions.

**Figure 4: How entrepreneurial alertness supports the spotting of opportunities**



The model developed above is an attempt to provide a theoretical mechanism for the effects long attributed to entrepreneurial alertness, and to thereby suggest some antecedents for heightened entrepreneurial alertness. It provides a much more detailed and specific description of the cognitive nature of entrepreneurial alertness and its relationship to the attention-channelling of Simon and others, one which integrates prior theoretical perspectives of entrepreneurship, prior knowledge, experience, environmental scanning, and entrepreneurial cognition. From this model three potential antecedents of entrepreneurial alertness can now be identified:

**Schematic Richness.** A single schema can differ between individuals by having representation of more attributes or more complex relationships to other schemata, and in particular by whether it includes representation for business opportunities that are commonly associated. This difference is sometimes used to explain the differences in how experts and novices perceive situations (e.g., Chi & Feltovich, 1981; Krueger, 2005). If a schema for “malfunctioning business process” has representation for “weakest link” then the individual will be specifically attuned to notice the weak link and to consider whether replacing it constitutes an opportunity. But if, for someone else, the schema lacks such an attribute, then that individual will fail to notice the weak link and any associated opportunity. Similarly, an individual is more likely to see opportunity in a new social fad if their schema for fads includes representation for how money was typically made from previous fads. As a result, two individuals exposed to the same environmental change and ascribing the same

meaning to it may still differ dramatically in the opportunities they perceive and in the subsequent actions they take. From this we can suggest the following proposition:

*P1 Entrepreneurial alertness is heightened by having richer schemata with more explicit representation for economic opportunities.*

**Schematic Association.** Individuals can differ in the schemata that they possess and how those schemata are associated with external stimuli such as environmental changes. It is therefore possible that a shared stimulus will invoke a different schema in one individual than in another. Moreover, a schema that is habitually used may become automated to the degree that it is activated without choice by the individual, in response to key attributes of the environmental situation (Gaglio et al., 2001). In the earlier example of a grocery store with long cashier queues, the two observers differ in the degree to which they possess schemata associated with retail payments. These two individuals, on being exposed to the same environmental change, differ dramatically in the meaning they ascribe to it and the actions they could take in response. From this we can suggest the following proposition:

*P2 Entrepreneurial alertness is heightened by more strongly and habitually associating environmental stimuli to those schemata that have representation for economic opportunities.*

**Schematic Priming.** Individuals can also differ in the availability and ease of activation of the various schemata they possess. Two people may be walking in a shopping mall and entering into the food court area. Although they possess identical schemata, their responses may be very different. A hungry person will be acutely aware of this environmental change and may perceive it as an opportunity to satisfy their hunger, while a person who is not hungry but is desperately searching for a replacement mobile phone will notice only that this part of the shopping mall is annoyingly devoid of telephone stores. The two people differ in which schema has been primed for activation and so, in response to the same environmental stimulus, one smiles while the other scowls. Among entrepreneurs such differences are sometimes referred to as keeping your “antennae” tuned (Gifford, 1998: 483), or looking at world through “opportunity-spotting glasses” – both of which underline the deliberate nature of this priming by the entrepreneur. From this we can suggest the following proposition:

*P3 Entrepreneurial alertness is heightened by taking actions to prime schemata that have representation for economic opportunities.*

#### 4. Conclusions

The foregoing understanding of entrepreneurial alertness as the application of richer, more diverse and primed schemata, may have significant implications for the development of alertness and the resulting spotting of opportunities. As noted earlier, schemata are not static for an individual entrepreneur, but are subject to accretion, accommodation, or restructuring the face of new non-conforming information from the world. An individual schema can be expanded or changed based on the individual's experience with the application of that schema (e.g., new attributes can



be added, and exception cases can be noted). And sets of related schemata can also be changed through experience (e.g., boundaries among schemata can be redefined, and relationships such as generalization/specialization can be defined or modified). In particular, an individual entrepreneur can learn to develop and apply schemata that are richer in their attributes and connections, or can learn to associate and habitually invoke new and different schemata in response to environmental stimuli. And the entrepreneur can deliberately take steps to prime particular schemata for activation.

On all three of these antecedent dimensions, it appears possible for the entrepreneur to heighten alertness. This means that it should be possible to learn, develop, and enhance entrepreneurial alertness through cognitive strategies of schema modification. These modifications may be achieved through education, such as the inculcation and development of more complex expert schemata, and the deliberate association of expert schema with environmental stimuli through enhanced prior knowledge and practice. Schematic modifications may also be achieved through increased entrepreneurial experience, such as formalized and highly repetitive practice in opportunity spotting sessions, or through the positive feedback regarding the value of specifically enacted schema through serial entrepreneurship behaviours. But a necessary precursor to any such activities will be the empirical testing of the propositions and antecedent relationships that have been developed above, to see whether and to what degree these factors have influence over the level of alertness prospective entrepreneurs have for new opportunities.

These conclusions provide important support for public policy objectives to develop increased levels of entrepreneurship in the population through educational and experiential methods. Through education and experiential support activities it may be possible to increase entrepreneurial alertness among managers and business operators, and thereby to encourage greater entrepreneurial activity in the economy.

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