

**DESIGNING NATURAL TENSION INTO  
THE DESIGN OF ADAPTIVE ENTERPRISES --  
"CONTEXT AND COORDINATION" IN THE  
SENSE & RESPOND ORGANIZATION**

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## Abstract

The *sense-and-respond* organization, as described in Haeckel (1999), is an approach to designing adaptive enterprises. One part of the design requires a shift from an orientation towards activities to an orientation towards outcomes. This "context-and-coordination" approach is suggested as an alternative to the traditional "command-and-control" model which is common in many businesses.

Using the categorization of purposefulness from Ackoff & Gharajedaghi (1996), the context-and-coordination approach to designing a social system is depicted as a natural tension between an animate model and an ecological model. This tension is considered to be a desirable property for the enterprise, and is refined in view of the model of shearing layers observed by Brand (1994).

The article concludes with a discussion of future research directions.

Keywords: Adaptiveness, purpose, social systems, sense-and-respond, context and coordination, shearing layers

## 1. Introduction

Organizational models based on the socio-technical systems and socio-ecological systems perspectives have had a long history, with the largest body of research conducted from the

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1950s into the 1980s, often originating from the Tavistock Institute.<sup>1</sup> Most recently, techniques for defining a common desired future such as The Search Conference<sup>2</sup> and Future Search<sup>3</sup> have been developed, and applied primarily to communities, or small groups of people.

Multinational business today, however, is usually a highly dynamic and dispersed social system. Tens of thousands of individuals working within a single enterprise are scattered around the globe. Widespread face-to-face communication to discuss a common desired future is both infeasible and impractical. Business now works via telephone messages, e-mail, and other asynchronous, electronic media. Further, the form of enterprises now varies greatly -- ranging from the traditional structure of a business legally registered as a single corporation, to an alliance or "virtual organization" of multiple companies. The concept of work has also changed. The practice of "lifetime employment" by a single employer is exceedingly rare, and highly mobile workers hop from one company to another. In the "network economy", an enterprise is challenged to act as a purposeful whole, while at the same time empowering individuals with the autonomy to add value through the purposeful expression of their personal choices.

It is towards many of these issues that *Adaptive Enterprise: Creating and Leading the Sense & Respond Organization* is directed. Steve Haeckel proposes that an enterprise should be designed as an adaptive system, with purposefulness recognized as a key feature.<sup>4</sup> This article builds on Haeckel's work, by providing some additional details based on experiences gained in implementing a Sense & Respond Support System, and by reframing some of the constructs in the spirit of General Systems Theory.<sup>5</sup> The move away from a *make-and-sell* conception towards *sense-and-respond* requires two major (and interdependent) conceptual shifts:

*from behavior as firm-forward scheduling to customer-back dispatching,*  
where the operations of the business are triggered by requests from customers, as opposed to the firm's plans to produce offers that customers are predicted to want;  
and

*from structure expressed as the design of activities to the design of outcomes,*  
where the functions of the organization in its parts is coherent with the purpose of the organization as a whole.

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<sup>1</sup> On the socio-technical systems and socio-ecological systems perspectives, see Trist, Emery & Murray (1993) and Trist, Emery & Murray (1997).

<sup>2</sup> In a Search Conference, "20-35 people from system participate". See Emery & Purser (1996), p. 290.

<sup>3</sup> In Future Search, "We find 60-70 stakeholders is optimum, providing ample diversity. [...] We have used our model in groups numbering from 30 to 100, and 64 or fewer is what we like best". When more folks must be involved, we recommend sequential conferences". See Weisbord & Janoff, (1995), p. 44.

<sup>4</sup> Haeckel (1999) provides the foundations on which this article is based.

<sup>5</sup> Some linkages to General Systems Theory (and Social Systems Science, in particular), are outlined in Ing (1999).

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From a General Systems Theory perspective, both of these conceptual shifts can be expressed as the enterprise considering the function (or end) to be provided to its primary constituency ahead of the structure of action (or means) required internally.

In the era where the major issue in the marketplace was the sufficient production of supply to meet demand, the behavior of *firm-forward scheduling* was the norm. Companies defined themselves by the products they produced, and consumers made choices from a small number of alternatives. By the 1950s, however, as the number of choices available to consumers broadened, the marketing concept was born. The ability to maintain loyal customers has gradually become more important, making the conception of the enterprise starting from the *customer*, and working *back* to production through the *dispatching* of appropriate capabilities critical.

The behavior of the enterprise (either as firm-forward or customer-back), however, is not the focus of this article. This article instead examines the expression of structure, as the shift from design of activities to design of outcomes. The context-and-coordination model is proposed as a replacement for the now-obsolete command-and-control approach. The design of the sense-and-respond model is explored both in a categorization of purposeful systems, as well as in a framework of shearing layers, where levels of hierarchy change at different rates. This article concludes with a discussion of implications of applying the model towards maintaining adaptiveness in the enterprise.

### 2. Command & Control is based on an organismic conception of the enterprise

The traditional hierarchical corporation, which became the standard for large enterprises beginning in the 1950s, operated through *command-and-control*. Commands from the highest-level executives would be translated down through layers of management as activities for the next level below, until the chain reached the worker who would actually carry out the task. Control would take place by each superior acting as an inspector, ensuring that results met specification. If the quality of the result was insufficient, the supervisor would determine either that rework was required, or that the procedure would have to be redesigned. As the amount of work associated with control increased, supervisors began to grow staff organizations.

Russell Ackoff describes this conception of the organization as organismic, noting that the "chief executive came to be called 'the head' of the organization".<sup>6</sup> Bruce Harrald describes this as the "we say, you do" model of management.<sup>7</sup>

#### 2.1 Command & Control, when ineffective, becomes Communicate & Hope

The slow demise of command-and-control can be seen as the result of two trends, one external and one internal. Externally, the shift from a supply-oriented economy to a demand-oriented economy resulted in suppliers competing for the attention of customers

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<sup>6</sup> Ackoff (1994), p. 12.

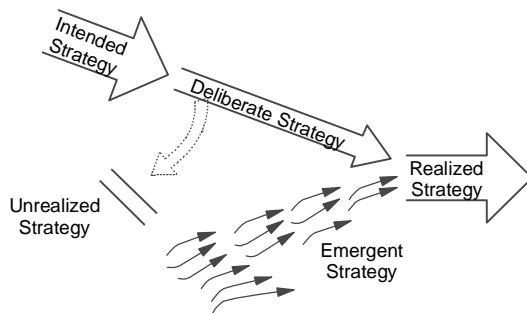
<sup>7</sup> Bruce Harrald is IBM's senior vice-president of strategy. The idea of "we say, you do" and alternatives is discussed in Haeckel (1999).

in search of the "best value". Command-and-control organizations are notoriously inward-looking and slow to change, both in their product offerings, as well as the quality of those products. Internally, as the population became better-educated, individuals wanted to exercise more choice in their work, resulting in the concept of empowerment.

Enterprises that have tried to retain the Command-and-Control paradigm in the 1980s and 1990s have followed a number of fads. Vision statements, the quality movement, and re-engineering are examples of some "quick fixes". The major problem with these approaches has been the lack of systemic follow-through. Individuals will no longer blindly follow commands. In large enterprises, downsizing decimated the staffs who would maintain control, or divisions were "spun off" so that the management could "let the market decide". Management can only *communicate* the direction that they think the enterprise should take, and *hope* that the message is sufficiently compelling that individuals will follow.

## 2.2 Emergence produces a challenge in coherency of purpose and consistency of response

In today's business environment, large enterprises should not be designed from an organismic conception. Strategies emerge not only from the whole, but from the parts. Henry Mintzberg, Bruce Ahlstrand, and Joseph Lampel categorize the directions from the leadership as intended strategies, some of which become deliberate strategies<sup>8</sup>. These, combined with emergent strategies, result in the realized strategies that may be observed after-the-fact.



[Mintzberg, Ahlstrand & Lampel (1998)] Figure 1-2, Strategies Deliberate and Emergent

In his view of the enterprise, Steve Haeckel suggests that the effective organization must have two properties:

- > coherency in purpose, as the organization as a whole; and
- > consistency in behavior, within the organization.<sup>9</sup>

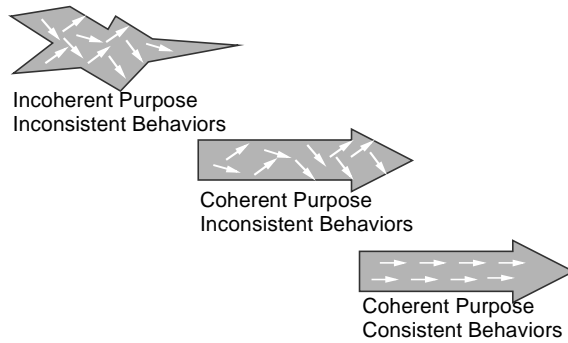
An enterprise that does not demonstrate these properties will not be seen as highly performing.

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<sup>8</sup> See Mintzberg, Ahlstrand & Lampel (1998), p. 12.

<sup>9</sup> See Haeckel (1999), Chapter 6.

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**Figure 2. Coherency in purpose and consistency in behaviors**

From an external perspective, the enterprise with incoherent purpose and inconsistent behavior can be described as "lost", as it doesn't know where it's going. Alternatively, the enterprise with coherent purpose but inconsistent behavior can be described as "strong in vision, weak in execution", as the quality of outcomes produced is likely to be highly variable. It is only the enterprise with coherent purpose and consistent behaviors that can be described as a reliable, highly performing system.

Coherency and consistency can be fleeting properties in a highly turbulent environment. The ability of the enterprise to restore coherency and consistency is directly related to its ability to adapt.

### 3. Context & Coordination is based on a social system conception of the enterprise

This section describes the categorization of systems in terms of purposefulness, and describes the context-and-coordination model.

#### 3.1 A social system acts purposefully both in its parts and as a whole

Russell Ackoff & Jamshid Gharajedaghi categorize systems by their ability to act purposefully (i.e. demonstrate "choice", or free will) in their parts or as a whole. Social systems are unique in having choice both in their parts and the whole.

Systems and models	Parts	Whole
Deterministic	Not purposeful	Not purposeful
Animated	Not purposeful	Purposeful
Social	Purposeful	Purposeful
Ecological	Purposeful	Not purposeful

**Table 1: Types of systems and models** [Ackoff & Gharajedaghi (1996)]

Social systems -- for example, corporations, universities, and societies -- have purposes of their own, contain parts (other social systems or animated organisms)

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that have purpose of their own, and are usually parts of larger social systems that contain other social systems (for example, corporations and nations).<sup>10</sup>

Although enterprises *are* social systems through this definition, Ackoff points out that many business people continue to conceive of them otherwise.<sup>11</sup> An organismic conception of the enterprise is incompatible with the increased educational level of employees. Increased self-awareness of individuals results in purposeful behavior within the enterprise, which can conflict with the intended purpose of the whole. Most recently, there has been interest in representing enterprises as systems, but with an ecological conception. This view is of some relevance in considering economies, consortia and other interorganizational forms, but is in conflict with the unitary nature of a legal entity. Indeed, mergers, acquisitions and divestitures are transactions that maintain a balance within an ecology of purposeful, commercial social systems.

The characterization of an enterprise as a social system makes explicit the tension between the enterprise as a whole, and the social system and animate systems contained within. The high degree of interdependency between purposes makes agreement at all levels difficult -- between the whole and its constituent parts, as well as between one part and another.

To apply the understanding of social systems to a large, geographically dispersed organization, a pragmatic approach to this problem is required. One way is to initially separate out the parts while maintaining an eye on the whole. Thus, we propose treating the purpose as fixed at one level, while changing purpose(s) at other(s), and then checking to ensure coherence. This reduces a dynamic optimization into a sequence of static optimizations. In terms of the categorization suggested by Ackoff and Gharajedaghi, this means viewing the enterprise from two different perspectives (i.e. animated and ecological), and then resolving the differences between the two:

- > the animated perspective is that of leadership, who should be primarily concerned about the purpose of the whole.

- > the ecological perspective is that of teams and individuals, who can only be held accountable for purpose specified for their parts, and not the whole.

In the sense-and-respond organization, the animated perspective is represented by organizational context; the ecological perspective is represented in the coordination of outcomes. The various tensions within the enterprise are discussed in greater depth later in the paper.

### **3.2 Organization Context includes Purpose & Bounds, Capabilities and Role Structure**

While recognizing that many strategies are emergent outcomes from the parts of the enterprise, the leadership needs to ensure that at least a small number of intended

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<sup>10</sup>Ackoff & Gharajedaghi (1996), p.14

<sup>11</sup>This idea is most fully developed in Ackoff (1994).



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outcomes are produced by the whole. The organizational context is thus composed of four parts:

1. the purpose for the enterprise as a whole -- the defining function to its primary constituency;
2. bounds on acceptable behavior within the enterprise -- functions produced to meet the constraints imposed by constituencies (other than the primary one named in the purpose)
3. capabilities -- organizational resources with the potential for producing specified outcomes which are sufficiently important to the purpose and bounds that the leadership needs to prescribe them; and
4. roles to be filled that will subsequently be held accountable for producing outcomes with one or more capabilities.

Each of these parts is discussed briefly, below.

### *3.21 Purpose is the primary function of the enterprise as a whole*

After providing a clear definition of the boundaries of the system to be designed, the direction in which the enterprise is to be optimized must be declared. The sense-and-respond model requires that a primary constituency for the enterprise be identified. The function that the enterprise is to provide to that primary constituency is defined as the purpose for the enterprise as a whole. This procedure does not mean that other constituencies are not important, but it does recognize that ambiguity about purpose is counter-productive to the coherent functioning of the organization.

The primary function is called the "Reason for Being" because it defines the function that the enterprise exists to produce, as opposed to the functions it must produce in order to exist. Andrew Campbell and Marcus Alexander see this as a recurrent problem in how executives develop strategy.

We fail to distinguish between *purpose* (what an organization exists to do) and *constraints* (what an organization must do in order to survive). That confusion results in directionless strategies.<sup>12</sup>

The demands of other constituencies can be recognized as constraints to the organizational context for the enterprise. The magnitude of these constraints is a different issue from optimization: once the constraints have been satisfied, the enterprise should continue to pursue further development towards its purpose.

### *3.22 Bounds are expressed as governing principles*

The bounds for appropriate behavior within the enterprise can be clearly articulated in two categories. The first category is *governing principles*, which can be expressed as "always" and "never" statements. Within these bounds, individuals within the enterprise should be empowered to make commitments to produce outcomes.

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<sup>12</sup>Campbell & Alexander (1997), p. 42.

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The enterprise may also provide a second category of bounds, as *guiding principles*, which are expressed as "should" and "shouldn't" statements. These are unlike the more rigid organizational bounds, in that they may be applied as rules of thumb for conduct, when trade-offs are to be made.

### *3.23 Capabilities are the subsystems with potential to produce outcomes*

Within the declared purpose and bounds, the leadership prescribes capabilities with which the most important outcomes can be produced. This set of capabilities is not the exhaustive set required for the enterprise, but instead represents the level of decomposition that the designers deem necessary as a high-level business design. These capabilities should be structured in a (recombinant) modular form, so that they can be assembled in a variety of ways to meet the particular requests of each customer. Capabilities should be expressed as requirements from the perspective of the customer, with attributes of value that reflect an end for the customer (e.g. an enjoyable family experience) rather than means by the supplier (e.g. a ride in a theme park).<sup>13</sup>

At the system level, the designers of the enterprise do not need to specify the details of all of the capabilities required. Further decompositions can be left to those roles accountable for producing the outcomes specified by the designer. In addition to the capabilities described in the high-level business design, capabilities can emerge in an ad hoc manner, to accomplish specific outcomes.

### *3.24 Accountabilities for capabilities are mapped into roles to be filled*

The accountabilities for capabilities to be established within the enterprise must be associated with some prescribed roles. When an individual negotiates to fill a prescribed role, he or she is held accountable for their providing the capability. The decoupling of modular capabilities to roles provides some roles with sufficient authority to carry out functions on behalf of the enterprise. Roles are not job titles. A person can have multiple roles, and several people may occupy the same role.

In some cases, roles are designed so that teamwork is required in order to coordinate the design of an outcome. In other cases, a single person may take multiple roles with conflicting goals, so that trade-offs can be made as a mental calculation, rather than a group discussion.

### *3.25 Adaptation of the context is the accountability of the leadership*

The declaration of purpose and bounds, and the design of capabilities and role structure comprise the organizational context. In the sense-and-respond model, the interests for the enterprise as a whole are represented by the leadership.<sup>14</sup> The primary functions of

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<sup>13</sup>This differentiation between ends and means is treated more formally as the *function of outcome* and *structure of action*, in Ackoff & Emery (1972).

<sup>14</sup>The sense-and-respond organization is defined for a group of people conceived as a social system. Methods such as The Search Conference, Future Search, Participative Design and Open Space Technology are often applied towards the design of future communities, which are ecological systems, in the categorization of purposefulness. (Bunker & Alban, 1997 provides

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leadership are to determine the appropriate attributes of value from appropriate constituencies to be sensed and interpreted, decide on the capabilities and role structure that must be established to form a "high-level business design", and then act by populating the roles with appropriate individuals.

### ***3.3 Coordination of Outcomes includes Commitments to Fill Roles, and Commitments to Deliverables***

The coordination of outcomes between individuals within the enterprise occurs through the negotiation of commitments between roles. A series of negotiated commitments will result in a linked network of outcomes, as a supplier seeks subordinate suppliers to support his or her primary outcome. There are two types of outcomes: the filling of roles; and the production of deliverables.

#### *3.31 Coordination occurs through "Conversations", and "Coupling" of the Outcomes*

In order to leverage the creative energies of an empowered workforce, the focus for business processes in the context-and-coordination model is on outcomes (ends) rather than on procedure (means).

In *Conversations about Outcomes*, individuals are required to specify a primary outcome, as well as conditions of satisfaction (both for the customer role and supplier role). As suggested by Allan Scherr, the negotiations of commitments should follow a standard protocol of speech acts.<sup>15</sup> These speech acts resemble the communications of contract law, in transactions such as buying a house: offers or requests, counteroffers and counter-requests, acceptance or withdrawal, report of completion, and acceptance or rejection of the outcome. Since the activities are not prescribed, they are emergent from the perspective of leadership.

In the *Coupling of Outcomes*, the supplier couples an upstream outcome to downstream commitments to which he/she is a customer. If the supplier of an outcome is the end producer, then the "buck stops there". However, in most complex organizations, it is likely that a large number of internal commitments (to "subcontractors") are made. This means that the supplier of outcome X may become a customer to outcomes Y and Z in order to produce X. It's unlikely that the supplier of outcome X can completely pass on the accountability to another individual (which would require a renegotiation with the customer for outcome X), but that accountability for integration continues to rest with him or her. (After Y and Z have satisfactorily been delivered, the failure of the customer for outcome X to accept becomes an issue only for the supplier of X).

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descriptions of these methods). The large enterprise requires an unambiguous purpose of the whole, to maintain coherence.

<sup>15</sup>The speech acts described by Scherr (1993) are derived from the research of Winograd & Flores (1986). The notion of speech acts have deeper roots, from the work of J. L Austin and John Searle.

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In order to maintain coherence within the enterprise, important commitments must be handled rigorously. The registration of commitments in a database reduces ambiguity about outcomes and conditions of satisfaction.<sup>16</sup>

### *3.32 Conversations can be about two types of outcomes*

Two types of commitments can be made:

1. commitments to fill a role; and
2. commitments to produce a deliverable.

Commitments are usually about producing deliverables. However to provide a linkage from the organizational context down through a deliverable important at a system level, a key intermediate step is the acceptance, by an individual, of the accountability for a providing an outcome by using a capability or capabilities. Deliverables may or may not be prespecified by leadership (i.e. appear on the high-level business design). In practice, it is expected that only a small proportion of the outcomes specified will appear on a system-level definition of capabilities and role structure. Most individuals will make both types of commitments naturally, when an atmosphere of good faith is present in the enterprise.

### *3.33 Adaptive coordination loops emerge through commitments and renegotiations*

In contrast to most business processes, which emphasize means (or procedures), the sense-and-respond model emphasizes ends (outcomes), and the accountability of individuals to produce outcomes. It is recommended that commitments should be freely negotiated and renegotiated without penalty to either the customer or supplier. Severe penalties should only be the consequence for either customers or supplier who renege unilaterally. The maintenance of authenticity in communications is critical to the success of a hierarchy of commitments. Between and within teams of the enterprise, coordination is maintained through empowered individuals negotiating, agreeing upon and executing on commitments.

## **4. Structuring for adaptiveness recognizes layers of differing rates of change**

It is not sufficient to aim for a coherence between *organizational context* and *coordination of outcomes* at only a single point of time. The coherence is subject to ongoing natural tensions that must be maintained continually. The enterprise as a whole needs to monitor its external constituencies for changes in purpose, maintaining an open systems perspective. At the same time, purposes both within the teams as well as the individuals within the enterprise are likely to shift, and may cause further tensions that lead to shifts in purpose either at the level of the whole or at the level of the parts.

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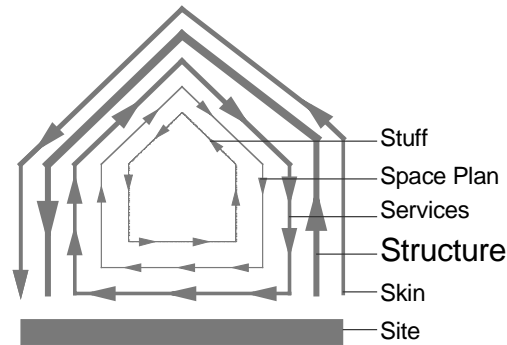
<sup>16</sup>Although it is technically possible to allow a person access to see the entire tree of commitments for an organization, this is both impractical and undesirable. It is impractical to maintain any semblance of empowerment in an organization when a leader can see all of the recorded activity down to minutiae. It's undesirable because most individuals would prefer some level of privacy in their individual dealings.

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### 4.1 Layers which change at different rates "shear" against each other

At the most coarse-grained level, the most obvious layers that must be coherent are organizational context and coordination of outcomes. In a perspective that is more finely-grained, however, we can often probe into inconsistencies with greater detail. A deeper understanding can be achieved by a representation of the enterprise as a greater number of layers, which continually shear against each other.

Stewart Brand uses the term "shearing layers" to make the point that different levels of hierarchy change at different rates. In buildings, he suggests seven different layers, which change at different rates.



**Figure 3. Shearing Layers of Change.** [Brand (1994)] Because of the different rates of change of its components, a building is always tearing itself apart.<sup>17</sup>

Once a site has been determined, the structure of a built environment should be the slowest evolving layer. The skin faces the external environment, and may be replaced as it is weathered, or in response to a change in fashion. Services include facilities such as plumbing and electrical wiring, which are not as difficult to change as the structure, but are more difficult to change than the space plan (e.g. non-load-bearing walls). Stuff, such as furnishing and books, is the easiest to change, and might be reconfigured daily or hourly.

The origins of this idea comes from the study of ecosystems.

Buildings rule us via their time layering at least as much as we rule them, and in a surprising way. This idea comes from Robert V. O'Neill's *A Hierarchical Concept of Ecosystems*. O'Neill and his co-authors noted that ecosystems could be better understood by observing the rates of change of different components. Hummingbirds and flowers are quick, redwood trees slow, and whole redwood forests even slower. Most interaction is within the same pace level -- hummingbirds and flowers pay attention to each other, oblivious to redwoods, who are oblivious to them. Meanwhile, the forest is attentive to climate changes but not the hasty fate of individual trees. The insight is this: "The dynamics of

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<sup>17</sup>Brand (1994), p. 12.

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the system will be dominated by the slow components, with the rapid components simply following along."<sup>18</sup> Slow constrains quick, slow controls quick.<sup>19</sup>

This idea of shearing layers can also be applied to the design of enterprises.

### **4.2 The time horizon of ends can be expressed as shearing layers**

Although Stewart Brand applies the concept of layers for structures (which, in the systems literature, would usually be recognized as means), this concept may be applied to ends, as well. As an example, Russell Ackoff suggests three types of ends, based on the time horizon for planning.

There are three types of ends that people pursue.

1. Goals: those ends that we can expect to attain within the period covered by planning.
2. Objectives: those ends that we do not expect to attain within the period planned for but which we hope to attain later, and toward which we believe progress is possible within the period planned for.
3. Ideals: those ends that are believed to be unattainable but towards which we believe progress is possible during and after the period planned for.

Planning ought to involve explicitly all three types of ends, but it seldom does.<sup>20</sup>

The maintenance of coherency of purpose and consistency of behavior can be similarly categorized. Recognizing multiple layers of function -- with the purpose of the enterprise as the ultimate function -- allows outcomes at a coarse-grained layer to change at a rate slower than those at a fine-grained layer.

### **4.3 Understanding of Context & Coordination can be refined with more layers**

The number of layers by which a system should be viewed depends on the purpose of the representation. In a "sound-bite" introduction to the Sense & Respond organization, two layers -- Context and Coordination -- are usually sufficient. Pedagogically, four layers -- purpose, bounds, roles and commitments -- provide more detail and add to the richness of classroom learning.

In the design of a technology-support infrastructure for the Sense & Respond organization, an incremental amount of detail has proved helpful. Thus, in a formal specification of the Context-and-Coordination model, six layers are listed:

1. organizational purpose;
2. bounds on acceptable behavior;

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<sup>18</sup>The embedded citation is from O'Neill et al., 1986, p. 98.

<sup>19</sup>Brand (1994), p. 17.

<sup>20</sup>Ackoff (1981), p. 63.

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3. capabilities;
4. role structure;
5. commitments to fill roles; and
6. commitments to produce deliverables.

Enterprise adaptation is expected to occur in shearing layers, with organizational purpose as the slowest changing, and commitments to produce deliverables as the fastest changing (with person-to-person renegotiations). If it is possible to retain coherency on the slower-changing layers by an adjustment on a faster-changing layer, this is preferred, and less disruptive to the enterprise operating as a system.

### **5. Tension occurs as a faster-changing layer shears against a slower one**

The implications of the six layers changing at different rates is discussed below, ordered from the faster-changing to the slower-changing.

#### **5.1 Tension 1: Is the volume of deliverables consistent with the number of individuals in roles?**

The pure sense-and-respond organization can be represented in contrast to the pure make-and-sell organization: conceptually, it does not produce goods or services for the customer until the customer has made a request. Therefore, although capabilities may already have been put into place so that the enterprise may respond rapidly, those capabilities are not triggered until a commitment from a customer has been reached. This creates a circumstance such that the number of instances of customer requests is unpredictable.

When individuals accept a commitment to fill a role, the conditions of satisfaction to the commitment should usually include some range of expectation on the number of customer requests for deliverables. The desire of the leadership to have a role with high throughput is usually negotiated against an individual who is cautious that he or she is overloaded.

If the volume of deliverables is lower than expected for an individual in an instance of the role, future periods may see the individual encouraged to take on additional roles, or a redesign of the role structure. If the volume of deliverables is higher than expected, more individuals filling instances of the role are required, or the role might be redesigned to redistribute the work.

In an adaptive enterprise, deliverables should naturally be renegotiated by either the customer or supplier, when large and discontinuous change occurs. This should be relatively straightforward if the next layer, the individual in the role, changes at a slower rate. If the individuals in the role of customer or supplier changes more rapidly than the specification of deliverables, there usually is a loss of "organizational memory" on why particular conditions of satisfaction were negotiated. This may be reflected in a loss of trust between the customer and supplier, and therefore, longer negotiation times.

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### **5.2 Tension 2: Have individuals agreed to fill roles essential to the enterprise design?**

Agreements by individuals to fill roles should be for a period, with a start date and end date. Leadership has an accountability to fill roles on the high-level business design with appropriate individuals. It is possible that a high-profile or prestigious role may have many individuals interested in filling it, so that some procedure for selection is required. However, what happens if the leadership is unable to successfully negotiate so that role remains unfilled? The inability for the leadership to find a supplier may suggest that the role is unattractive due to a high risk associated either with the structure of action specified in the conditions of satisfaction, or availability of the resources required as inputs.

One view of unfilled roles would be that the pool of possible individuals to fill the role should be increased, possibly to persons in adjacent departments, or even as outsourcing to external parties. Another view would be that the accountabilities for the role are too onerous, and individuals can find better offers in other positions. Although the conditions of satisfaction on each commitment are negotiated individual by individual, the inability to get a person to fill a role probably means that the specifications as conditions of satisfaction are too stringent.

It would normally be expected that the conditions of satisfaction for people filling the roles would change more frequently than the definitions of primary outcome for the type of role. If the definitions of roles change more rapidly than the individuals assuming them, a workforce with high diversity is required: a large number of individuals with adaptive dispositions are needed. In practice, it is more likely that roles should be designed to evolve over time, easing the disruption of production of deliverables. If a large number of roles are simultaneously changed, the individuals who fill those roles will not only be confused about their own activities and outcomes, but will probably also be confused about the interactions with other roles.

### **5.3. Tension 3: Is the structure of roles appropriate to capabilities established?**

The specification of roles is in a many-to-many relationship with capabilities. A role may have many capabilities, or a capability may be produced by multiple roles. The structure of roles, with respect to capabilities, may be seen as a design between two extremes:

- For an important outcome where a check-and-balance structure is required, a capability may be distributed across multiple contributing roles, so that a well-thought-out, high quality outcome is produced.
- For an outcome where greater speed is required, a capability may be assigned to a single role, so that the individual has the resources and authority to make the trade-offs on a personal (rather than social) basis.

The definition of roles permits a decoupling of capabilities from the individuals who are accountable for them. The two extremes above suggest that there is more than one way to assign accountabilities for capabilities. From a design perspective, however, the capabilities prescribed by leadership must be well-defined before accountabilities can be



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assigned. If the capabilities change faster than the structure of roles, the accountability mechanism breaks down.

### **5.4 Tension 4: Are capabilities appropriate to organizational purpose and bounds?**

Capabilities are subsystems with the potential to produce outcomes. The primary outcomes that the enterprise produces are the organizational purpose (for the primary constituency), and functions that support the governing and guiding principles (for secondary constituencies).

In a rigorous specification, the expression of purpose and bounds as ideals (i.e. desirable, but not attainable) is encouraged. Commitments represent goals that are attainable within a period with a short horizon. Capabilities are in the range in between: they are not completely used up with single commitments, but, simultaneously, are not enduring over an infinite horizon. They are potential, but become instantiated when commitments are made.

Capabilities are a transform between the function (or purpose) to be provided to a constituency, and the structure of action by which the enterprise creates the outcome. They are the means for the organization, towards the ends of the customer. Since it is possible to reach an end by more than one set of means, capabilities should change at a faster rate than purpose or bounds. Technological progress is a prominent method by which capabilities change.

If the organizational purpose changes faster than capabilities, the enterprise becomes ineffective.

### **5.5 Tension 5: Are the bounds placed on the enterprise appropriate with its purpose?**

Of the major functions that are produced by enterprise, only one may be categorized as the purpose, for a primary constituency. All other functions become bounds or constraints, being what the enterprise "does to exist" rather than "exists to do".

Although it is possible to change the purpose of the enterprise, it should be the most slowly changing of any of the layers. The organizational purpose provides the "tie-breaking vote" on any question as to the value of an intermediate outcome towards the ultimate outcome. Under the understanding that the constraints imposed by secondary constituencies have been satisfied, all outcomes should be coherent with increasing the measure of effectiveness towards the primary outcome.

Organizational bounds can and do change at a rate faster than the organizational purpose. Governing principles, with "always" and "never" statements may be changed if they make progress towards the organizational purpose infeasible.

## **6. Appropriate adaptiveness is not a natural tension, and requires inquiry**

Context-and-coordination is the aspect of the sense-and-respond organization that ensures that the enterprise is both adaptable and coherent. Adaptability comes from its design as a

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number of shearing layers. Coherence comes from the system-level statement of purpose and bounds defined by leadership. Tensions between the various layers ensure that changes will be noticed and that requisite adaptation can occur on an appropriate scale.

A second aspect of the sense-and-respond organization needs to answer the question: "In which direction should the enterprise be adaptive?" This is the function of customer-back orientation, and is not present as a tension in the layers reviewed above. It does, however, lead us back to the question: "Is the enterprise satisfying its defined purpose?" In order to answer this question, inquiring systems need to be designed as part of the enterprise structure.<sup>21</sup>

Adopting the context-and-coordination approach improves the adaptability of the enterprise, but this does not guarantee adaptiveness to the changing environment. Steve Haeckel and Richard Nolan compare the process of adaptiveness to a pilot's ability to learn, in the United States Air Force, through the mental processes of "observe, orient, decide and act".

This iterative sequence constitutes [an adaptive] loop. It contains the four essential functions essential to any adaptive organism: sensing, interpreting, deciding and acting.<sup>22</sup>

For organizations, the "sense-interpret-decide-act" loop is proposed as a method for institutional learning. The key questions should be: "learning about what?", and "how should we learn?".

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<sup>21</sup>The works of West Churchman and Ian Mitroff look promising in this area.

<sup>22</sup>Haeckel & Nolan (1993), p. 128 originally read "a learning loop". In a personal communication with Steve Haeckel, he says that, in hindsight, this should have been phrased as "an adaptive loop"

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