

Performance Architecture: Road Map to Results

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Engineering Series*

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Executive Summary: Ten Critical "Take Aways"

How can we be certain (or at least confident) that the changes we make will lead to the results we desire? Conversely, for a given result, how can we reliably determine the appropriate changes to make? This paper suggests that the answers to these important questions lie in the structures of those situations in which we posit our results and target and effect our interventions.

Ten Take Aways

1. We have known for a long time that **change in complex systems is indirect**. You don't obtain results directly; instead, you change something in one place to realize a result in some other place. Both places can be found in a company's "performance architecture."
2. **All organizations have a performance architecture**, a set of related and integrated structures or domains of performance. These **financial, operational and behavioral structures** link the results sought with the means available for obtaining them. It is this architecture that enables the propagation of actions taken at the Point(s) of Intervention through the structure of the situation, eventually making themselves felt at the Point(s) of Evaluation. **Interventionists who "map" this architecture create a roadmap to results** and thereby increase the reliability and efficacy of their attempts to solve business problems. **They are able to engineer solutions to business problems.**
3. **Financial structures are mathematical**. For example, income minus expenses equals profit. All financial measures of business performance have an underlying mathematical structure.
4. **Operational structures are fluid**. They are characterized by the flows of materials and/or information, and by state changes in these materials and information. Operational structures are often captured in the form of process descriptions, including flow charts and other diagrams.
5. **Behavioral structures are psychological and social**. They are the models and theories we hold regarding the variables that affect human behavior. For many people, the elements, connections and relationships making up the structure of behavior would include goals, perceptions, actions, feedback and consequences to name a few.
6. **Interventionists change things** "over here" and those changes then propagate or ripple through the structure of the situation, yielding the result sought "over there."
7. **Interventions must be based on a grasp of the structure** of those performance domains in which and through which the business results are to be realized.
8. **Investigation and Intervention** are the two phases of the "Solution Engineering Process," a process for figuring what to change and how to change it so as to realize specified results.
9. One reason for investigating and mapping a company's performance architecture is to **make interventions increasingly systematic and reliable**. When we are unsure about the connections between the ends we seek and the means at our disposal, it pays to map those portions of the organization's performance architecture that are relevant to the intervention at hand.
10. If these linkages remain a mystery, our interventions are shots in the dark and our ability to produce specified results must trust to intuition and luck. **Solution Engineering and Performance Architecture provide interventionists with mission-critical problem-solving and decision-making tools.**

The balance of this paper elaborates upon the 10 points listed above.

A Picture with A Thousand Words

One purpose of this paper is to define and explain “Performance Architecture” and to show how mapping the relevant portions of an organization’s performance architecture provides a roadmap to results. A second purpose is to explain the role that mapping an organization’s performance architecture plays in an approach to solving business problems known as “Solution Engineering.” The essence of these two purposes is captured in **Figure 1** below.

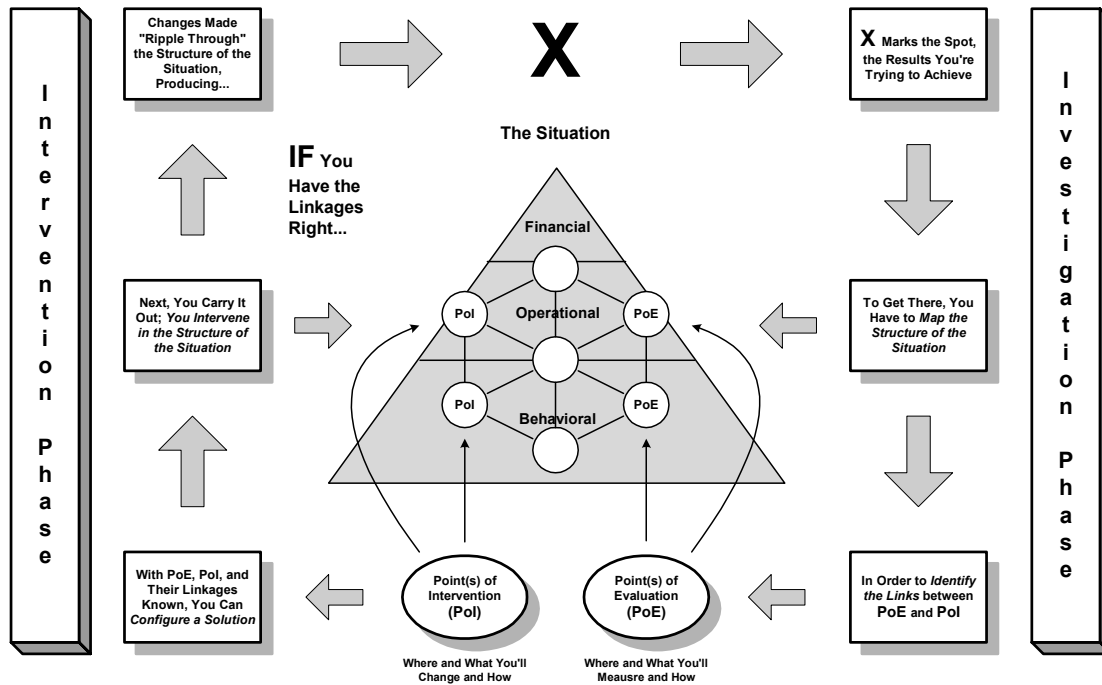


Figure 1 - Solution Engineering and Performance Architecture

At the center of the diagram above lies “The Performance Pyramid” – three related domains of performance: financial, operational and behavioral. Overlaid on the performance pyramid is a diagram meant to illustrate the three qualities of structure: elements, connections and relationships. To achieve the financial, operational or behavioral results we seek in a given situation we intervene – we change things with a purpose or outcome in mind. Moreover, we change things in one place so as to have certain effects elsewhere. The indirect nature of change means that we are intensely interested in three aspects of the situations we face:

1. Points of Evaluation (PoE) – those places in the structure of the situation where we will assess the effectiveness of our interventions; where and what we’ll measure and how we’ll measure it.
2. Points of Intervention (PoI) – those places in the structure of the situation where we can directly change things; where and what we’ll change and how we’ll change it.
3. The Solution Path – those connections and relationships in the structure of the situation that link the elements we can change with the elements we wish to affect.

If we have correctly identified the solution path, the changes we make as a direct consequence of our actions “ripple through” the structure of the situation bringing about the results we seek. The ability to do this in a systematic, reliable way is the essence of “Solution Engineering.” Before elaborating on what has just been presented, allow me to first share a little of my background.

Some Background

I came to the fields of human and organizational performance as a Navy weapons systems technician, not as a behavioral scientist. Indeed, one of my first questions to my Navy colleagues in the Navy’s internal organization development (OD) unit was, “Where the heck are the schematics?” It seemed to me that we were attempting to effect changes in people, processes and organizations without possessing a really good grasp of the structures of the behavior, processes and other phenomena we were trying to change. Consequently, our interventions, at least in my opinion, were not as well informed as they would have been had we more fully understood the structures we were manipulating; hence my eminently predictable technician’s desire for schematics.

In a very real sense, my career as a consultant has been one part practice and one part quest. My quest, of course, has been for those ever-elusive schematics and manuals – diagrams of the structure and explanations of the workings of those phenomena that I was being paid to change, improve and otherwise operate upon. To some extent my quest has been successful. I have found useful diagrams and explanations for various kinds of performance and I’ve created a few of my own. Emerging from my quest is a structural view of organizations that encompasses three domains of performance: financial, operational and behavioral. These three domains of performance are linked to one another and, *in toto*, they both define and determine organizational performance. The structures of these three domains constitute what I call an organization’s “Performance Architecture.” This paper sets forth my view of Performance Architecture and ways in which it can be used as a roadmap to results. I hope the readers of this paper find it helpful in their own attempts to manage and improve various kinds of performance.

Performance Architecture Defined

All organizations have a performance architecture, a set of related and integrated structures or domains of performance. The three domains making up an organization’s performance architecture are financial, operational and behavioral. These three domains of performance are depicted in the Performance Pyramid shown in **Figure 2**. The two numbered tabs or small rectangles represent the *linkages* between the domains.

Each domain has a different kind of structure. The structure of the financial domain is mathematical in nature; it is concerned with counted and calculated values. Chief among these is profit. The structure of the operational domain is physical in nature; it is concerned with stocks and flows, with systems of production, distribution and the like. The operational domain manifests itself in the organization’s processes. The structure of the behavioral domain is psychological in nature; it is concerned with human behavior and performance, with people. A brief discussion of these three domains follows.

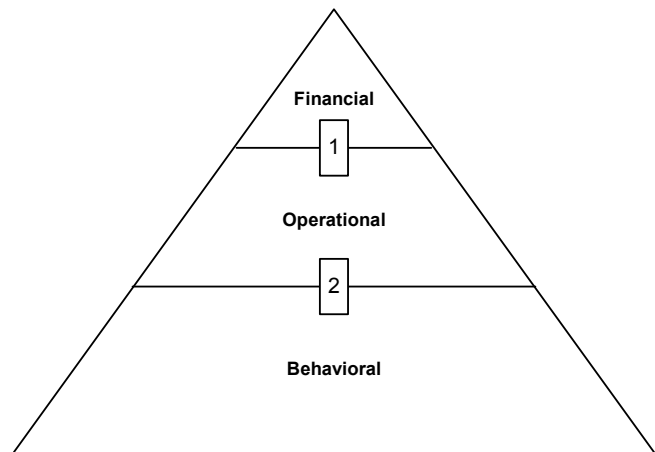


Figure 2 - The Performance Pyramid

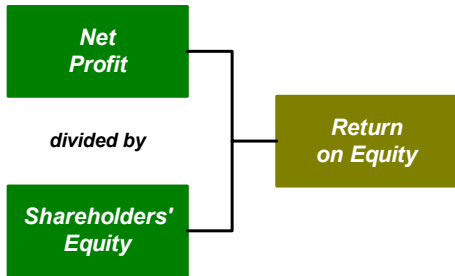


Figure 3 - High-Level Structure of ROE

measures as a gauge of their financial performance. These measures are all mathematical in nature; for the most part, they consist of calculated values. The high-level structure of one measure of business performance – ROE or return on equity – is shown in **Figure 3**.

Tab 1 in the Performance Pyramid (Figure 2) refers to the linkages between the organization’s financial performance, as evidenced by the measures it uses and the organization’s operations, namely, its business processes. The organization’s chart of accounts, revenue booking, cost allocation mechanisms and financial reports are the best starting points for identifying the linkages between the financial and operational domains of performance. The process is basically a matter of identifying the measure and then analyzing its mathematical structure. Carry this analysis deep enough and, sooner or later, usually at the lowest level of analysis, financial measures tie to operational variables. **Figure 4** shows the next level of detail in the structure of return on equity and **Figure 5** on the next page shows even more detail.

Financial Domain

The financial domain is defined by the organization’s chart of accounts, its accounting systems and the measures of financial performance it uses. These vary from organization to organization. In one company, Profit as a percent of Sales might be an important business measure; in another, that measure doesn’t get much attention but Return on Assets Managed does. Publicly traded stock companies might pay attention to earnings per share but that measure becomes meaningless with respect to the financial performance of a nonprofit. In a nonprofit, retained earnings takes the place of profit and contributes not to earnings per share but to the size of the nonprofit’s invested reserves. Regardless of their nature, all organizations use some set of financial

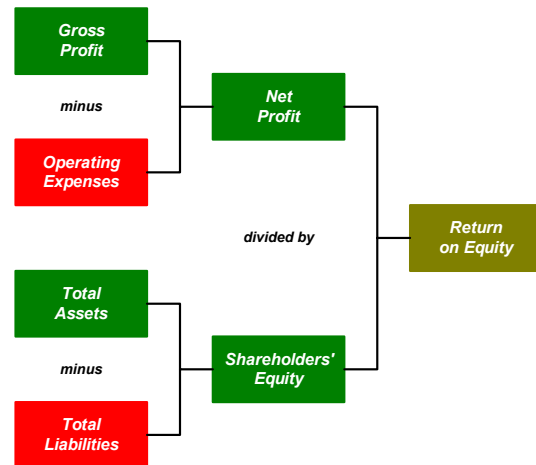


Figure 4 - ROE: Second Level of Detail

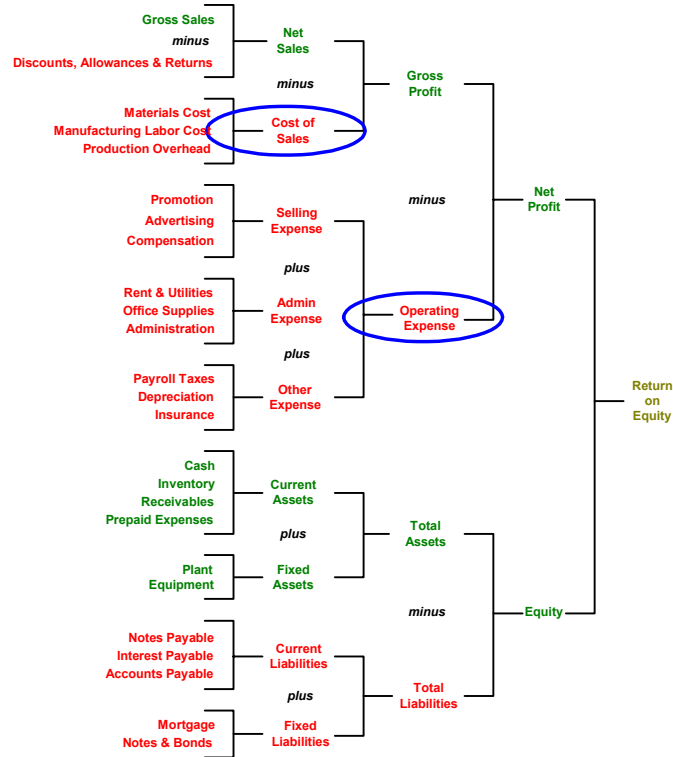


Figure 5 - Detailed View of Return on Equity

The circled items in **Figure 5** illustrate that the linkages between the financial and the operational domains are found in the structure of key financial measures. For example, further decomposition of the Cost of Sales and Operating Expense variables would lead through the organization's chart of accounts and cost accounting system into its operational structures and processes.

Operational Domain

The operational domain, as its name implies, is defined by the operations of the organization, in particular, its processes. Two basic categories of processes are of interest: (1) those that transform organizational inputs into outputs (e.g., raw materials being transformed into finished products by way of the organization's production processes) and (2) the transaction processes that focus on exchanging organizational outputs for new inputs (e.g., finished products or services being exchanged with customers for money as an outcome of the sales and marketing or order fulfillment processes). Both categories of processes can be viewed as systems by which the work of the organization is accomplished. The basic structure of a work system is depicted in **Figure 6**. It shows that inputs are transformed into outputs as a consequence of interactions between those inputs and the system's processor (which might be a machine or a human being).

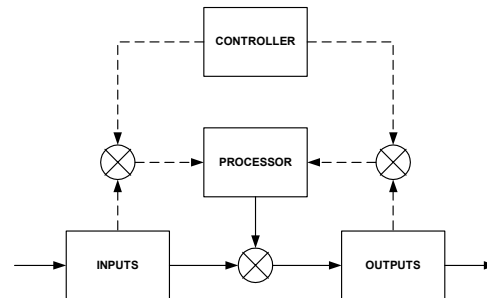


Figure 6 - Work System Structure

Behavioral Domain

This is the domain of human performance. It is essentially psychological in nature. Because people in organizations are there to accomplish the work of the organization, two structural models are of use here. First, the work system model (Figure 6) can be used to examine work processes in which the “processor” is a person. Second, a structural model that depicts people as purposeful, goal-oriented actors also proves useful where the behavior of people is of central interest. This model, **Figure 7**, is a closed-loop, feedback-controlled model.¹

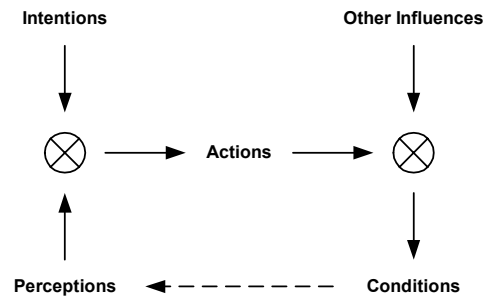


Figure 7 - The Structure of Human Performance

Tab 2 in the Performance Pyramid (Figure 2) refers to the links between the operational and behavioral domains.

People in organizations are process participants and perform work and thus their performance (i.e., the work products they produce and the outcomes of their actions) feed directly into the organization’s processes. In many cases, people are the processors. With respect to performance, the effects or outcomes of human behavior are often more important than the behavior itself.

The three domains and their two links constitute an organization’s “Performance Architecture.” Armed with knowledge of this architecture, an interventionist can, for a given result, specify the actions that will lead to it. An interventionist can also specify the results that a given course of action will produce. The interventionist can change things “over here” and then see those changes propagate or ripple through the structure of the situation, yielding the result sought “over there.” Solutions to business problems can be engineered.²

The next section of this paper addresses ways in which mapping an organization’s Performance Architecture can be accomplished and the role it plays in an approach to solving business problems that is called “Solution Engineering.”

¹ This model is based on the work of William T. Powers, particularly his Perceptual Control Theory (PCT). Interested readers should refer to two of his books for more detail. *Behavior: The Control of Perception* (1973) and *Making Sense of Behavior* (1998).

² As used here, the phrase “engineering a solution to a business problem” draws on the definition of *engineer* as a verb meaning “to bring about through skillful or artful contrivance,” as in, “He engineered a turnaround of his company.”

The Two Phases of Solution Engineering

Whether dealing with problems or opportunities, we eventually reach the point of action, we intervene, which is to say, we change things with some purpose, outcome or result in mind. Typically, intervention is preceded by and derives from some kind of investigation or analysis. This is especially true in the case of problems, which, by definition, are situations wherein we do not know immediately what to do. Investigation and intervention, then, are the two phases of the Solution Engineering process (Figure 8).

The Solution Engineering Process

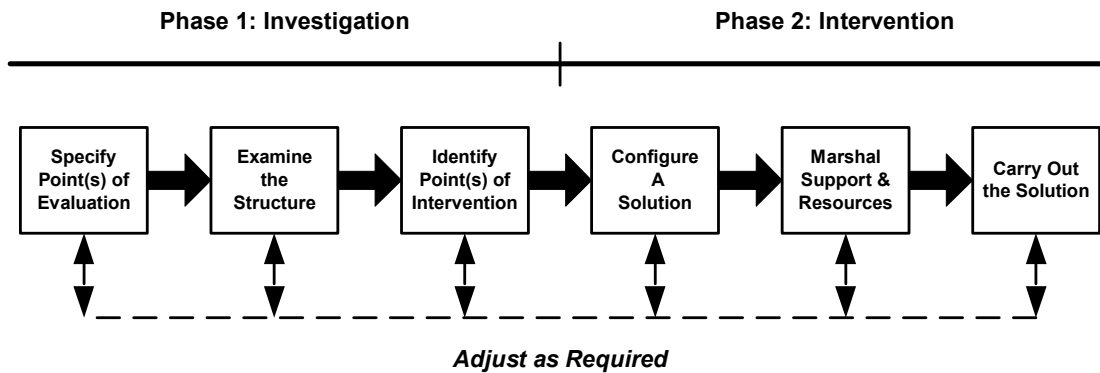


Figure 8 - The Solution Engineering Process

Interventions aimed at realizing business results must be based on a grasp of the structure of those performance domains in which and through which the business results are to be realized. In many cases, there is a good grasp of these structures and interventions go well. However, in other cases, there is minimal knowledge of the relevant structures and the intervention is barely more than experimentation.

In many cases, the grasp of the structures in which interventions are made is largely intuitive, built up over years of experience and experimentation. No matter how robust this grasp of structure might be, it is a form of tacit knowledge, difficult if not impossible to articulate and communicate. Thus, one reason for investing in investigating and mapping a company's performance architecture is to make interventions increasingly systematic and reliable. Another reason is that the interventionist might be an outsider or new to the organization and thus not possess a good grasp of the structure and dynamics of the organization's performance architecture.

This is a good place to make clear some important points about mapping an organization's performance architecture.

1. There is no need to map an organization's performance architecture in its entirety. Indeed, such an effort is probably prohibitive in terms of time and cost.
2. There is no need to map an organization's performance architecture when that structure is already well understood, even if only intuitively so.

3. There is no need to map an organization's performance architecture when the intervention in question is tried and true, proven in practice and, for all practical purposes, almost guaranteed to succeed without any offsetting and unforeseen circumstances.

It is when we are unsure about the connections between the ends we seek and the means at our disposal that it pays to map those portions of the organization's performance architecture that are relevant to the intervention at hand. This is usually the case when we are not certain about how to achieve a particular result or we suspect that the changes we are contemplating might have effects and consequences beyond those we intend.

Linking Ends and Means

It was just noted that to intervene is to change things with some purpose, outcome or result in mind. In other words, we are trying to create, establish or bring about some set of conditions that does not currently exist. These envisioned conditions, whether they take the form of increased profits, improved process performance or altered individual behavior patterns, define the results we are after. These are the ends we pursue.

The means at our disposal include a wide array of tools and techniques; for example: process re-engineering, job redesign, reorganizing and restructuring, modifying reward and compensation systems, introducing new tools and equipment, and providing training to name only a very few. We have known for a long time now that change, especially in complex systems, is indirect; that is, you don't change *it* directly, you change something else and *it* changes as a result.³ Changes made in one place must propagate through the system and make themselves felt elsewhere. The issue confronting us is how to link the ends we seek with the means at our disposal. What do we change, where, how and when? How can we be certain (or at least confident) that the changes we make will lead to the results we desire? Conversely, for a given result, how can we reliably determine the appropriate changes to make?

This paper suggests that the answers to these important questions lie in the structures of those situations in which we posit our results and target and effect our interventions. Consider again the Solution Engineering diagram in Figure 1 at the beginning of this paper. It illustrates the basic structure of the problem alluded to above; namely, that there are *Points of Intervention* (i.e., places where we can directly change things) and there are *Points of Evaluation* (i.e., places where we can assess how well we've achieved the results we seek). Somewhere, somehow, these two must be linked if we are to say with any degree of certainty that a given action will produce a given result or, conversely, that a given result calls for a given action. If these linkages remain a mystery, our interventions are shots in the dark and our ability to produce specified results must trust to intuition and luck.

Structure: The Missing Link(ages)

It does not require much imagination to realize that the links between ends and means, between the actions we take and the results we seek lie in the structure of the situations we wish to affect. Less obvious, perhaps, is that several different structures might be involved in the pursuit of a given result. As this paper suggests, three basic types of structures are involved in solving business problems: financial, operational and behavioral. To recap the earlier discussion:

- *Financial* structures are mathematical in nature; for example, income minus expenses equals profit. All basic financial measures of business performance have an underlying mathematical structure.

³ *It* refers to whatever it is that we wish to change, improve or realize.

- *Operational* structures are characterized by flows of materials and/or information, and by state changes in these materials and information. Operational structures are often described in the form of process descriptions, including flow charts and other diagrams.
- *Behavioral* structures refer to the models and theories we hold regarding individual human behavior. For many people, the elements, connections and relationships making up the structure of behavior would include goals, perceptions, actions, feedback and consequences to name a few.

It is frequently the case that the business results being sought are financial in nature and their attainment is reflected in one or more financial measures (e.g., an increase in net profit before interest and taxes). Such results illustrate perfectly the indirect nature of change. Net profit is a calculated value; it cannot be affected directly. Nor, for that matter, can the component elements — income and expenses. One can raise prices and hope that income increases, however, if sales are lost, income could decrease. One can also increase the level of advertising as a way of increasing sales and thus income, however, there is an increased expense for advertising that must be taken into account also.

Because many business results are expressed in calculated form and because actions must be taken in the associated operational structures, it is important to be able to identify the connections between the financial and behavioral structures. Behavioral structures must be modified to effect required operational changes. Even when business results are expressed as operational performance data (e.g., yield or reject rates, productivity levels and so on), operational changes necessitate accompanying changes in behavioral structures.

Performance Architecture Summarized

The term “performance architecture” refers to any, some or all of the financial, operational and behavioral structures that connect the result sought with the means available for obtaining it. It is this architecture that enables (or precludes) the propagation of actions taken at the Point(s) of Intervention through the structure of the situation, eventually making themselves felt at the Point(s) of Evaluation. Interventionists who “map” this architecture create a roadmap to results and thereby increase the reliability and efficacy of their attempts to solve business problems. They are able to engineer solutions to business problems.

Conclusion

If we are to intervene “over here” so as to realize some desired result “over there” we must be able to say how the actions we contemplate will make their way from those points or places where we intervene to those where we will measure the achievement of results. More important, we must be able to work our way backward from a given result and determine the changes and corresponding actions that will lead to it.

The ends we seek and the means at our disposal are linked through at least three different yet related domains of performance: financial, operational, social and behavioral. For any given result, there are one or more paths through, between and across all or some of these three domains that defines the “architecture” of that result. Mapping and being able to trace our way through this architecture makes the probability of identifying suitable changes and interventions much higher than would otherwise be the case. It allows us to say, for a given result, the actions that will lead to it; and, for a given action, the result it is likely to produce.

Links to Related Information

There are other articles on my web site that explore the issues above in more detail. The more relevant ones are accessible via the links below.

1. “What is Your Intervention Logic?” This paper details a process, including examples, for analyzing financial and other quantitative measures so as to identify possible Points of Intervention. It is particularly useful in identifying the links between financial and operational results and between operational and behavioral results.

http://home.att.net/~OPSINC/intervention_logic.pdf

2. “Making Work Productive.” This paper sets forth a model useful in improving operational or process performance. The model can also be used to examine performance at the individual and team levels where the processor is an individual or a team. A companion piece, “The Difficult Process of Identifying Processes,” examines why that isn’t as easy as everyone makes it sound.

http://home.att.net/~OPSINC/making_work_productive.pdf

<http://home.att.net/~OPSINC/difficult.pdf>

3. “Reengineering the Problem Solving Process.” This critiques and integrates various problem-solving approaches, a necessary first step in undertaking to engineer solutions to business problems. “Choosing the Right Problem Solving Approach” discusses three basic problem-solving approaches and the conditions under which each is appropriate.

<http://home.att.net/~OPSINC/reengineering.pdf>

<http://home.att.net/~OPSINC/choosing.pdf>

4. “Solution Engineering in Action: A Really Good Example” presents a real world instance of the Solution Engineering approach. “Solution Engineering: Basic Terms & Key Concepts” discusses key concepts and presents a high-level model of the Solution Engineering process. A third paper, “Forget About Causes; Focus on Solutions,” explains, among other things, why the concept of “cause” is of limited utility in engineering solutions to business problems.

http://home.att.net/~OPSINC/good_example.pdf

http://home.att.net/~discon/solution_engineering_process.pdf

http://home.att.net/~OPSINC/forget_about_causes.pdf

5. “The Autonomous Performer,” “A Better Model,” and “A Control Theory View of Human Performance.” These three papers present and explain a model of behavior and performance useful in effecting changes in the behavioral domain. All three are based on the perceptual control theory of William T. Powers.

<http://home.att.net/~OPSINC/autonomy.pdf>

http://home.att.net/~OPSINC/A_Better_Model.pdf

<http://home.att.net/~OPSINC/controltheoryview.pdf>

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