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Plumbing the Agile Organization

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Adaptability in a living organism is built into its genes and expressed in a system of separate interacting organs. Adaptability in a living organization is also determined in its plumbing.

Though Agility is a broad enterprise issue, looking at the production impact of product realization will provide some fundamental insights into these plumbing issues that we can generalize later.

Decreasing innovation cycles in all market sectors are increasing the product introduction frequency.

The process of bringing new or improved products to market involves changes in the production area. Whether these changes are fairly small or quite sweeping, there is usually a transition period of adjustment and settling-in.

During this transition period two principle sources of turmoil are at work: 1) as changed items are put to the test of actual use, some fine-tuning is required before they satisfy their purpose, and 2) the interaction of the changed item with its environment has some undesirable side affects that need to be resolved.

We speak of change here in the total production-environment sense. Thus, we do not limit a change to the modification of some item that exists, but include both the addition of something new and the elimination of something old as these too are changes in the total production environment.

"Learn how to build new product with old proven process -- reusable process, reconfigurable for a new purpose."

Simply stated, after a change is designed, built, and installed, there is a transition period that must be dealt with before we have what we want, or decide to settle for what we got. In the Agile ideal we strive for, this transition period takes no time, incurs no cost, is not artificially terminated, and is not an inhibiting factor on the latitude of change we are willing to consider.

A closer look is revealing. Introducing a new product requires that we change the production environment. Making this change incurs cost and takes time. Some of this cost and time is pure design, acquisition, and development; and some is transition turmoil from integration and shakeout.

In the past these changes occurred infrequently and the transition costs were easy to ignore. But product introduction frequency in all markets continues to rise, and in many markets has already passed the point where continued transition cost and time ignorance is tolerable.

A new machine or production cell introduced into the production environment requires shakeout of the machine itself, integration of the machine into its interactive environment, operator training, maintenance training, and service training, to name the easy parts of the turmoil. Then we have the operational idiosyncrasies and failure modes that get learned the hard way with surprises and experience.

We've been talking about production machinery so far; but everything we've said applies to changes of any type: new procedures, new personnel, different personnel, introduction of teaming concepts, a change in work instructions, etc. All incur a transition period of integration and fine-tuning before the turmoil is settled.

And the toll of the transition period for each of these changes affects product cost, product quality, and market responsiveness.

An obvious way to reduce the toll of transition is to reduce the quantity of things in transition. If we want to do this while accommodating more new product than ever before, we have to learn how to build new product with old proven process -- reusable process, reconfigurable for a new purpose.

Reusability and reconfigurableness are construction concepts -- they have to do with the way things are built -- no matter whether these things are manufacturing cells, work procedures, production teams, or information automation systems.

To bring a new or improved product to market we want to introduce as little new process as possible. For instance, instead of designing and building a completely new welding cell we might duplicate and modify an existing well-understood cell. This cell will surely have some new elements in it to accommodate the variations of the new product, but a good bit of the cell will be time tested and familiar. It may not be as technically appealing as a completely new design -- but it will be up and running a lot faster, a lot cheaper, with less scrap and rework, and more predictably.

This does not mean an end to capital investment or a continuous cannibalism of used equipment. It means an important new focus on the structure of the production elements which must be reconfigurable. And it is physical reconfigurableness we need, not programmed reconfigurableness. We need the ability to make unanticipated new things from reusable pieces, not simply select some predefined subset of flexible capability or imbedded options.

Reconfigurable structures, whether they organize sub-units in a piece of equipment, equipment relationships in a cell, cell relationships in a production area, or production areas in a plant require some form of module reusability.

For maximum change proficiency these structures must be scalable as well as reusable and reconfigurable. Scalability eliminates size restrictions imposed by the structure, allowing any number of reusable modules to be included or omitted as desired.

Our objective of change proficiency has led us to an organizational strategy of reusable, reconfigurable, scalable systems. The engineering principles for this strategy must contribute directly to the objective. Before we can evaluate candidate principles we need to understand the nature of change proficiency in the business sense. We will talk more about this next time.