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# Effects of Information Flow on People-Driven Processes within a Remote-Based Field Staff

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Effects of Information Flow on People-Driven Processes  
within a Remote-Based Field Staff

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Submitted in partial fulfillment of the  
requirements for the degree of  
Master of Arts in Leadership

AUGSBURG COLLEGE  
MINNEAPOLIS, MINNESOTA

2006

MASTER OF ARTS IN LEADERSHIP  
AUGSBURG COLLEGE  
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Certificate of Approval

This is to certify that the Non-thesis Project of

James M. Hennen

has been approved by the Review Committee for the Non-Project requirement for the  
Master of Arts in Leadership degree.

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## Abstract

Effects of Information Flow on People-Driven Processes within a Remote-Based Field Staff

James M. Hennen

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This study examines the potential of open information flow in leading autonomous and decentralized field staffs. Research questions focus on participant perceptions of access to useful information and whether a participant's more positive organizational outlook compared favorably to their actual process performance. A chaotic model of people-driven processes formed the framework that explored these effects. A set of perception-based questions centered on the goals, roles, processes, and relationships held within a field organization created the model's structure. An assessment tool collected participant self-reported views of their organization and compared them to the high and low participant performance groups of four unique processes. Operational and financial measures defined the metric categories of each process. The results identified consistent patterns of perception differences between the high and low performance groups within processes that utilized more operational metrics. Processes with only financial metrics did not show the same effect. Significant differences in perceived quality of information flow structures, and its content, were process dependent. These patterns provided insight and helped answer the study's research questions. The study lends general support for the model's usefulness in formulating effective processes within an organization. A suggested method to create and maintain people-driven processes was produced by integrating the model and study findings.

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## Information Flow and its Influence on Process Fulfillment

Leaders set direction and provide guidance for diverse groups who must actively collaborate to achieve desired results. These same leaders face a persistent challenge when confronted with dynamic versus static processes. The chosen ‘process’ can paradoxically be both the solution and the problem. Leaders well timed in their coaching promote momentum toward goals. They also induce adaptations within work groups to attain even better results. Fluidity in the business environment should precipitate some instability in processes operating within the business. What behaviors best describe the resulting process disequilibrium? Can these behaviors be described as responsive? Reactive? Latent? Destabilizing? A “best practice” for a particular operation is a popular topic of industry trade magazines. Yet, the path to attain this lofty plateau often only reveals itself after an organization has already improved. Leaders are responsible for learning what to choose along the path to best practice. The degree to which the leader can help an organization learn from a process influences its potential to adapt to changes in the business environment.

People-driven processes are those processes where the participants have the autonomy to make decisions and take action based on the complexity of a dynamic situation. A model constructed within this paper illustrates the dynamic nature of people-driven processes. An empirical study proceeds to test the model’s relevance by investigating the following questions within the organization participating in this study:

- On average, do higher-performing process participants hold a more favorable perception of access to useful information as compared to their lower performing colleagues?
- Does a positive performance effect exist when process participants hold a more favorable perception of what they value in their organization? (Perceptions with regard to a sense of purpose, involvement, collaboration, consistency, customer orientation and adaptability for learning and change.)



*Creating a Model of a Chaotic Process*

The model focuses on typical questions held by process participants with regard to organizational goals, roles, processes, and relationships required to execute and adapt a strategy. The model illustrates chaotic interconnections among these parameters amplified by what participants perceive as useful information in their daily work. A simple allegory of “Burt’s WIP” (work in progress) helps illustrate a people-driven process dynamic, a small portion of which this research attempts to investigate.

*Allegory of Burt’s WIP.* Burt is a field engineer who operates as a remote-based employee for a high technology firm. Burt is part of a team of similarly dispersed field engineers doing comparable work. The core function of Burt’s job involves active participation with a sector of customers that both rely and place demands on his particular skills in resolving equipment problems. Burt’s company contains various interactive groups that both influence and become directly affected by Burt’s performance. These groups create processes to manage select aspects of the business and place expectations and responsibilities on Burt for his direct participation. For a variety of disjointed reasons, these individual groups will often establish processes later found to be incompatible, counter-productive, or just plain redundant to another group’s process. This often requires Burt to reactively arbitrate what is most important in the pursuit of his daily work. Burt may choose to react in linear fashion by just working harder as a way to satisfy the competing demands. Burt’s linear actions amplify the energy-absorbing effect of the circular treadmill he is running on. Burt may be incrementally more productive but also increasingly less efficient. If this cycle of amplification continues, the likely outcome becomes a serious negative impact in some if not all processes.

The information Burt has access to and the content he uses in his decision-making drives his corresponding actions. Burt's actions influence the primary process results. These actions also create a stream of secondary data when triggered by a collection of chaotic organizational behaviors. This secondary data represents an unexpected byproduct of Burt's work.

Working harder to overcome or avoid a problematic element within a process, rather than reconciling the troubling resistance, will produce a byproduct result. The quantity of desired process results is a productivity measure. A measure of byproduct results may be more reflective of how efficient the process truly performs. However, the usefulness of secondary data in quantifying byproduct results is dependent on finding consistent patterns. These data patterns are typically obscure or appear chaotic.

Quantifying "lost time" within a field process is an example of secondary data stream. The ability to measure lost time often limits itself to finding coherent patterns in what drives it and when. The challenge is to repetitively measure lost time and get congruent results each time. You may find that the information appears too chaotic each time you attempt to extract the data. One cannot assume that all decision and resulting actions follow a prescribed logic path. Some decisions are more perception or value driven than guided solely by fact-based logic.

*Symptomatic leadership responses.* A chaotic process often consumes a leader's attention when deemed too problematic. A common response is to apply control that is more predictable in the attempt to simplify the process interaction. Simplifying process methods can provide better pathways to build cost-advantage strategies, but only if based on implementing fundamental solutions toward a goal. Symptomatic responses tend to

be more typical as illustrated by the allegory of Burt's WIP described above. Senge (1994) cautioned to "Beware the symptomatic solution. Solutions that address only the symptoms of a problem, not fundamental causes, tend to have short-term benefits at best. In the long term the problem resurfaces with increased pressure for symptomatic response" (p. 104). Symptomatic solutions tend to alleviate the "smoke" of a problem rather than the "fire" smoldering beneath. The tendency to first increase predictable control is often symptomatic. A shift to simpler and less human energy-absorbing processes inherently involves seeking and finding relevant information. This information relates to how processes truly perform from a field engineer's perspective. Forrester (1995) describes this dynamic in his work-study of "lean" organizations. The organization's employees form the core of a people-driven process because only they can precisely identify ways to improve processes in which they directly participate.

### *The Ecology of Team Dynamics*

How we each experience our work is a unique human endeavor. No two people experience work in exactly the same way. At the individual level, *work* can be defined as exerting oneself physically or mentally in a direction we personally intend. May (1965) described the power of intended actions, as the heart of human will.

In every intention there are two things, the meaning and the movement toward something, that is, the act ...[when] you have a human being intending something, you cannot understand the overt behavior except as you see it in relation to, and as an expression of, its intention. Each act of consciousness tends toward something, is a turning of the person toward something, and has within it, no matter how latent, some commitment to an action. (pp. 204-205)

The effort we put forth represents our applied force to move in that intended direction.

Kenneth Boulding (1985) held the view that economists tend to regard work as an unemotional “disutility” that simply affects an organization’s bottom line cost. The term disutility is used here to imply that people will expand the quantity of work done, or time spent, only up to the point where the counterproductive cost of doing a little more work is just balanced by the utility benefit of the product produced. Boulding contends that this is an oversimplification of the rather complex dynamics of the typical work environment. “ The disutility of work very much depends on its total environment –on personal relationships fellow workers have with those they interact with” (pp.163-164).

Nestled in Boulding’s concept of work, are opportunities for stewardship within the organization. Stewardship helps foster a natural “give and take” form of reciprocity among members, which in turn, helps sustain economic well being of the organization. Peter Block (1996) describes the higher role of stewardship in fostering team building as much more than just creating good partnerships and improving communications in small groups. “The intent [must be] to create a balance of power. Accountability exchanged in both directions. Demands and requirements flowing both ways” (pp. 28-29).

Kenneth Boulding is recognized as one of the prominent 20th century figures in economics (Szenberg, 1992, p.ix). He authored many books including *Ecodynamics* and *Evolutionary Economics*. Boulding helps place teamwork in an economic perspective as a form of personal stock exchange in his argument for the study of one-way transfers, especially of potential exchangeables. As Boulding stated:

This [concept] edges toward the phenomenon of reciprocity, which is perhaps more in the domain of sociologists than of economists. Economists usually think of exchange as contractual. Reciprocity, as

in marriage, involves subtle non-specified exchanges and each party's view of what may have been gained or given up may be different (cited in Szenberg, 1992, p.744).

This implies a synergy between people-driven processes and their relationship with teamwork dynamics.

Genuine teambuilding requires a series of personal investments from each member without a guarantee of personal benefit. Teamwork is propelled by a basic faith that an effort donated in support of another will reciprocate at an unspecified time and place. At the incremental level of work, a person may often find it less conflicted to individually toil a bit harder than to assert oneself into the complexity of group dynamics. By their nature, group dynamics require close association with a number of persons to align efforts. Authentic teambuilding is a virtuous pursuit; yet attaining it is no guarantee your success will sustain itself. The test of time tends to add some validity to such a melancholic claim as we can see in the tale of Petronius.

We trained hard—but it seemed that every time we were beginning to form up into teams, we would be reorganized. I was to learn later in life that we tend to meet any new situation by reorganizing, and a wonderful method it can be for creating the illusion of progress while producing confusion, inefficiency, and demoralization.

Attributed to Petronius Arbiter, AD66 (cited in Sewell, 1994, p. 2).

Petronius strikes the personal chord of disdain for wasted effort and squandered teamwork. Given our faster rates of change, these timeless words may even be more relevant today. But for what purpose was Petronius striving when he addressed the Roman Senate? Was he in search of the meaning of change or just being a stalwart of the

status quo; setting up defenses against the dreaded *change agents*? Under the scrutiny of these questions, Petronius' words read more like an epitaph for an inert/inept state of affairs. In simpler terms, Petronius may just have been a frustrated investor who saw his efforts in teambuilding squandered by external disruption. These external forces affected the processes that were forming as Petronius' team learned new ways of working together. What was the flow of information, or the lack thereof, that triggered their chaotic work group reorganizations?

### *People-Driven versus Mechanistic Processes*

Given the Roman fate, Petronius likely missed the opportunity to better learn why a team, formed through hard work, fails to adapt to new disturbances coming from outside their sphere of control. A paradox exists in a process method based on the potential to achieve or surpass the business result rather than driven solely toward predictable outcomes. The predictable path may appear safer until the point where too much conservatism has hidden the creative path to meet new requirements for sustainability.

Selected personality theories have particularly strong connections to the dynamics of people-driven processes. It follows that people form the very core of process potential. Noted American psychologist Rollo May adds some context to this human experience: "... in the process of knowing, we are *in-formed* by the thing understood, and in the same act, our intellect simultaneously *gives form* to the thing we understand" (cited in Monte, 1999, p. 598). May's view resembles the concept of cognitive dissonance. A specific cognition is as a bit of knowledge or a belief we have. When it disagrees with another

cognition triggered by exposure to new information, a psychological discomfort occurs. Our most natural desire is to end this cognitive dissonance; we change the weak cognition to conform to the stronger one (Safire, 2003). Intuitively, it seems natural that cognitive dissonance is a common state in a people-driven process. Yet, this condition goes almost entirely unnoticed in conventional methods of process control.

People-driven processes offer high productivity, but simultaneously, often suffer gross inefficiencies. These inefficiencies tend to compound within organizations unable to distill useful information that reflects the realities of its process performance. Best practices reveal themselves after a group experiences the continuous learning of tapping into these upstream realities. The primary appeal of a people-driven process is in its potential for self-adaptation triggered by meaningful information. Participant access to relevant information is conducive in forming group consensus. Participant consensus is a prerequisite to realizing the full effectiveness of an ethically sound people-driven process.

Mechanistic processes are the polar opposite of people-driven processes. A purely mechanistic process relies heavily on predictability for its success with actions controlled by restrictive conformance to firmly defined procedure. It does not rely on, nor desire, participant consensus. In addition, mechanistic processes typically do not possess the agility for self-adaptation when the business climate changes. Arguably, many human tendencies have highly predictable qualities. Sefton (2003, p. B8) described some of these habitual predictabilities:

Millions of people do the same things the same way, every day, over and over, for weeks, months, years. Experts say this is normal and healthy — as well as stultifying and dangerous. "The safety of routines protects you from the risk of failure. But it can also be a trap," said Mihaly

Csikszentmihalyi, director of the Quality of Life Research Center at the Claremont Graduate University in California. A set routine is "convenient, we can do it with our eyes closed," said Dale Bond, an expert in health behavior change at Virginia Commonwealth University in Richmond, Va. "But if that's the case, it means metaphorically we're also going through life with our eyes closed".

In this context, our own habitual human tendencies frequently lead us to apply machine metaphors to predict our actions. These tendencies often create organizational blind spots by applying the same machine metaphors as descriptors of people-driven processes. Organic metaphors are intuitively a more natural fit. Such as how a flower bends to the light, we bend to the meaningful information that sustains us. The symptomatic solution, as expressed by Senge, is often rooted in the misapplication of the machine metaphor.

#### *The Constructed Model*

Figure 1 (see Appendix A) provides a graphical representation of the model. The model illustrates how a set of organizational structures are interrelated and interact with each other via information flow dynamics that interconnect them. The overall shape is of a conical spiral. The *management vortex* occupies the center ring. This ring defines the target area where process management has its optimal influence but only when aligned with the people-driven process ring. Fundamentally, a remote field-based staff should gravitate toward a customer-oriented focus. Employees operating in different geographies, and serving different industries, will form unique operational environments around themselves. This implies that geographically dispersed field staff will likely develop variations of customer focus based on these different operating environments. Aligning and balancing these various field perspectives with the organization's overarching customer focus is a critical factor in the success of the management vortex.



George (2003) provides clarity by stating, “The first purpose of any corporation is to serve its customer” (p.153). Alignment around this perspective gives focus to participant questions that relate to processes in which they are involved or in some way affected by. Higher potential for organizational learning and adaptation is the result of holding a clear and centered purpose. This increases the potential to drive toward building better cost-advantage within business processes.

Additional conical rings expand around the centerline to illustrate the other organizational structures. Within this model, each ring has the potential to influence every other ring and vice versa. The conduits interconnecting these rings twist and curve as they carry information thru the conical spiral.

The model illustrates the subtle importance of multiple pathways for navigating relevant information throughout the conical spiral. Information is shown as transversing through the rings en route to its destination. The information influences each ring and visa versa. Conduits disperse information within the people-driven process ‘ring’ and feed information back to the management vortex ring. The viability of these conduits promotes organic conformance and adaptation within a thriving process. Wheatley (1999) provides insight into the viability of this model’s chaotic structure by stating:

A well-centered organization has enough invisible structure to work well ...systems achieve order from clear centers rather than imposed restraints. If we are interested in effecting change, it is crucial to remember that we are working with webs of relations, not with machines. ...To bring health to an [organic] system, connect it to more of itself (p. 132,145).

Within each ring, reside unique sets of questions held by the participants:

Management Vortex

Are we aligned to an overarching customer focus?

Goals that Compete or Support

What is my interest in supporting these goals?

Do they conflict with my desires or values?

Participating Roles

What is my role and how is my participation rated?

Am I only a small cog in a larger machine or something more?

People-Driven Process

How do I fulfill my role in a given Process?

How can I contribute?

Relationships that coalesce or disengage

What are the team dynamics I participate in?

How will these dynamics affect me?

What is the emotional IQ within this work group?

Attempts to answer these questions can drive cognitive dissonance. New information promotes increased knowledge. This new knowledge may increase tension when it contradicts with present beliefs or the merits of past actions. Festinger (1957,1999) proposed that people form cognitions in two ways: directly from their own experience and via indirect experience from communication with others. The impact of direct and indirect experience exert pressure on the cognitions to conform to the experience:

In other words, there will be forces acting on the person to have his cognition correspond to reality as he experiences it. The result of this will

be that, in general, persons will have a correct picture of the world around them in which they live. This is, of course, not surprising since the organism would have a hard time surviving if this were not the case. (Festinger, as cited in Harmon-Jones & Mills, 1999, p. 356)

Cognitive dissonance theory suggests that we have an inner drive to hold all our attitudes and beliefs in harmony and avoid disharmony (or dissonance). The feeling of disharmony results when there is imbalance in one's beliefs or values. For an individual to reduce their particular dissonance, a change is required in value-based attitudes or the resulting behaviors (Underwood, 2003). Festinger (1957; 1999) further proposed that:

Behavior or cognition will change in the presence of a dissonance if the strength of the dissonance is greater than the resistance to change either the behavior or the cognition in question. ...Whether the behavior or the cognition changes will be determined by which has the weakest resistance to change. (Festinger, cited in Harmon-Jones & Mills, 1999, p. 361)

Aesop's *The Fox and the Grapes* provides a descriptive example of irrationalizing such dissonance to minimize the tension it creates.

A famished fox saw some clusters of ripe black grapes hanging from a trellised vine. She resorted to all her tricks to get at them, but wearied herself in vain, for she could not reach them. At last she turned away, hiding her disappointment and saying: "The Grapes are sour, and not ripe as I thought." (Translated by Townsend, 2005)

Aesop described the fox's original cognition that grapes were delicious. However, the desire to obtain them conflicted with the realization that she could not reach the grapes. To resolve her cognitive dissonance, the fox persuaded herself that the grapes were sour and trotted off with her mind at ease (Safire, 2003).

By its nature, decision-making and rationalizing within a people-driven process does not conform solely to a prescribed logic path. It is reasonable to assume that attitudes and behaviors affect decision-making at the individual and group level. How participants interpret what their organization values, plays a role in shaping attitudes and behaviors. Actions resulting from these influenced decisions impact process fulfillment. Clear communications to and from the management vortex helps express and re-affirm what the organization values. Consistency in these communications helps shape what we know and understand and, in turn, how attitudes may form as a result. The method and rate of communications is an expression of how the organization adapts to changes in its operating environment.

Reconsidering the merits of one's past actions in the presence of new knowledge creates the potential for learning through reflection. Cognitive dissonance has a positive effect on people-driven process when it induces such participant reflection.

## Literature Review

This literature provides critical analysis of research studies relevant to the effect of information flow dynamics on group decision-making and process fulfillment. This review covers a summary of five research areas. Specifically, it examines literature on: decision-making with shared and unshared information, subordinate information inquiry, cybernetic control theory as a predictor of workplace behavior, studies in lean thinking, emotional intelligence, and flow theory, as process influencers, and finally research focused on corporate information dispersal via intranets.

### *Decision-Making with Shared and Unshared Information*

A number of empirical studies have investigated various aspects of how groups handle the information available to them and how their information-handling capabilities affect the decisions they make (Larson, Christenson, Abbott, & Franz, 1996; Larson, Foster-Fishman, & Franz, 1998; Larson, Sargis, Elstein, Schwartz, 2002; Wittenbaum, Hubbell, Zuckerman, 1999). Past research in this area indicates a group tendency to initially spend their meeting time discussing information all participants had in common before the conversation. These studies define this as the decision-relevant *shared* information held by many or all group members. Conversely, *unshared* information is decision-relevant information others in the group do not possess. The assumption in these studies is that real-world group members often possess different, though usually overlapping, subsets of information about the problem or decision at hand (Larson et al., 2002). This provides some insight into the likely effect a steady flow of open information has on both formal and informal group dialogue. A closer examination of

these empirical studies shows how the authors operationalized and controlled the variables to reach their conclusions.

Larson, et al. (1996) studied information flow during group discussions as a means to observe how effective group discussions are in pooling information in the decision-making processes. Their experiment consisted of 3-person teams of randomly selected physicians and given two hypothetical medical cases to diagnose. All three team members received some of the information about each case before discussion (shared information). The remaining packets of information divided equally among them (unshared information). The participants consisted of 24 medical residents, 24 interns, and 24 medical students. The resident member was the designate leader in all groups. Videocassette recordings distributed the two unique sets of shared and unshared information. The controlled distribution of tapes allowed for a unique dispersal of information referred to as “fixed content.” The group discussions were then videotaped. Two coders trained to collect the data later reviewed these tapes.

This study showed that shared information was, overall, more likely to be discussed and to be brought into discussion earlier than unshared information. The study also found that team leaders repeated substantially more case information than did other members and that, over time, they repeated unshared information at a steadily increasing rate providing evidence of the leaders' information management role in problem-solving discussions.

Larson, Foster-Fishman, and Franz (1998) conducted a variation of this study using 303 undergraduate students organized into 101 three-person same-gender groups. In this study, they examined the effects of directive and participative leadership style in

relation to the accuracy of the information and its shared and unshared distribution among participants.

Each group consisted of two students recruited from an introductory psychology course and one recruited from an advanced psychology course and designated as group leader. The psychology majors were trained to enact one of two leadership styles and told the importance of leading their group in a standardized way, and that the purpose of the training was to teach them exactly what to do as leaders.

The authors found that during group decision-making discussions, shared information (i.e., information held by all group members) was brought into discussion earlier and was more likely to be mentioned overall than was unshared information (i.e., unique information held by just one member or another). They also found that groups with a participative leader discussed more information (both shared and unshared) than groups with a directive leader, but that directive leaders were more likely to repeat information (especially unshared) than participative leaders. Evidence showed that groups are not always effective at pooling their unshared information. Rather, group discussions tend to focus more on members' shared than unshared information. The primary results of this experiment did compare favorably to the previous study (i.e., Larson, Christensen, Abbot, and Franz 1996).

Wittenbaum, Hubbell, & Zuckerman (1999) constructed three experiments in a similar manner to Larson, et al. (1998) study. In these experiments, the authors focused on the potential for social influence associated with information pooling in small groups. They investigated the tendency for group members to more positively evaluate one

another when mentioning shared information during initial group discussions. The authors referred to this as “mutual enhancement.”

Experiment one focused on whether partners rate themselves and each other more favorably when they discuss more shared information. The participants included 128 undergraduate students randomly formed into four person groups. Within each group, they took turns meeting in all combinations of two-person pairings to discuss their unique packets of information. Each packet was unique and contained combinations of shared and unshared information about hypothetical job candidates. Some of the groups received expert training in the task of reviewing job candidates. This set up pairings to compare the more task-experienced groups with the less experienced groups. The pairings also included combinations of more and less amounts of shared and unshared information. Each person rated their partner and themselves after each meeting relative to their effectiveness. The results from this experiment showed that participants rated both their partner and themselves higher when more shared information were discussed. Indication was that mutual enhancement did relate to partners' exchanging the same pieces of information.

Experiment two attempted to identify the type of validation process affecting mutual enhancement. Specifically, to assess whether participants' perceptions of their partners candidate preferences was a function of them liking the communicator of shared information better than those of more unshared information. Forty-eight undergraduate students participated in this experiment; each randomly assigned to the experimental conditions. In addition to using the same method as in the previous experiment, participants also completed an assessment of similarity and liking of each of their three



partners with inferences regarding their partners' candidate preference. The results of experiment two showed that mutual enhancement did not relate to whether participants liked partners or saw them as having similar opinions.

Experiment three tested whether mutual enhancement occurs in ad hoc face-to-face interactive pairings. One hundred sixty undergraduate students participated in this experiment; each randomly assigned to the experimental conditions. The experimenters verified that selected pairings were unfamiliar with each other. Methods were similar to the previous experiments but without prior distributed information. Distribution of job candidate packets produced combinations of shared and unshared information among the pairings. The packets also included biases that supported the same or different job candidate. Experiment three showed that mutual enhancement in face-to-face pairings existed primarily when the majority of the discussion contained shared information.

The combined analysis across the three experiments illustrated the effect of mutual enhancement in promoting the pooling of shared information over unshared information. Groups tend to discuss and repeat information known by all members (shared) more than they do information known by only one member (unshared). The authors conclude that one reason groups collectively prefer shared information during discussion is because it validates members' knowledge and eases the interaction by helping members relate to one another. They propose that those who communicate shared information received positive evaluations from other members for doing so. Moreover, recipients of shared information feel better about their own task knowledge when another member mentions their information. Wittenbaum, et al., also noted that mutual enhancement may be limited to communication between group members who are

not well acquainted. Members who do not know each other well may expect each other to establish credibility and expertise through the communication of shared information.

Studies focused on the discussion patterns of shared and unshared information illustrate how open dispersal of information prior to discussion likely influences what is most discussed. It follows that the degree to which this dispersed information is accurate, and sufficient in content, will foster decision-making toward a preferred shared vision. Polluted information, or that which is too sparse in content, can conversely foster the less productive attribute of ‘groupthink’. In a groupthink situation, each member of the group attempts to conform his or her opinions to what they believe to be the consensus of the group. This results in a situation in which the group agrees upon an action, which each member might individually consider unwise (Wikipedia, 2004). Groupthink can also occur when strong personality styles drive a consensus for group action in the neglect of more relevant information that better reflects the present reality of a situation.

#### *Subordinate Information Inquiry and Supervisory Influence*

Individuals periodically need information to proceed effectively in whatever form their work takes. How one seeks that information can vary widely. In an organizational setting, a logical source of information is one’s supervisor or manager. The rapport established between supervisors and subordinates, by its nature, influences the dynamics of information inquiry. The management vortex described within the chaotic people-driven process model, illustrates this as a management challenge. The challenge is to align the management vortex’s smaller sphere of influence in a manner that promotes desired results through the collective efforts of people. This brings into question the

influences both supervisor and subordinate have in seeking and dispersing information within a people-driven process.

Mazder's (2001) tested the hypothesis that a superior's leadership style affects the content and frequency of subordinates' information inquiry. The research also investigated the information-seeking tendencies of learning-oriented and performance-oriented subordinates who participated in this study.

The participants were employees of a leading US therapeutic medical technology company. Data were collected from seventy-five electrical and/or software engineers who assessed a supervisor to whom they reported for at least three months. Participants initially completed a questionnaire. This subordinate questionnaire included items related to perceived leadership style of their supervisor, organization-based self-esteem, and job related tolerance for ambiguity, work-domain goal orientation, as well as demographic information. The collected survey responses determined the Supervisor's leadership style as either transformational/transactional. The same survey responses classified subordinates either learning-oriented or performance-oriented. After completing the initial questionnaire, Participants attended a training session to learn how to complete a daily behavior checklist. The checklist recorded the frequency of each type of information they sought from their supervisor. This was done at the end of each day for the next 20 workdays as the method to record subordinate information-seeking patterns.

Leadership style emerged as a significant influence on subordinate inquiry of all information types. Transformational leaders received a much higher level of subordinate inquiry events over and above their transactional counterparts. The results also

that learning-oriented individuals sought significantly more process performance feedback than did performance-oriented individuals. This finding supports VandeWalle and Cumming's earlier study (as cited by Mazder, 2001), which built on the distinction between two types of individuals –those with learning goals, focused more on improving their ability, and those with performance goals, focused mainly on simply proving their ability. They found that learning oriented individuals seek more feedback about their work, even under challenging conditions (p. 222).

Differences in leadership style was shown to also influence the extent to which subordinates looked for sources other than their supervisor to find meaningful information. The study indicated a tendency for subordinates to limit their supervisor inquiries when they perceived some risk of uncertainty or insecurity in a task they felt expected to be able to do. Subordinates often reported seeking alternate sources for this type of information, such as fellow co-workers or from a supervisor other than their own.

The challenge with subordinate inquiry avoidance is that it reduces the number of opportunities supervisors have for timely interactions with direct reports. In turn, this likely reduces the degree to which supervisors have a realistic understanding of process performance from the employee's perspective. Subordinates will likely always be prone to seek information from multiple sources. Fellow process participants, whether having the same supervisor or not, are natural secondary sources of information for each other. Having more shared information dispersed in these secondary sources will likely increase the accuracy of information discussed. The mention of openly shared information should also increase in the wider spectrum of informal participant dialogue.

This study creates interest to consider possible factors that motivate process participants to tap into open channels of information such as Intranets. One such motivator could be from organizational expectations placed on them. It follows that when employees sense a strong expectation that they should clearly know certain things, their interest in learning those things increases. This may trigger process participants to spend more time accessing open source information to improve on what they know. In turn, their perceived need to prove what they currently know might decrease. A subordinate's open access to decision-relevant process information may also negate some of the inquiry avoidance influences caused by variations in leadership style.

*Cybernetic Control Theory as a Predictor of Workplace Behavior*

Cybernetics can be defined as the science of communication and control theory that is especially concerned with the comparative study of automatic control systems. Lord and Hanges (as cited by Sandelands, Glynn, & Larson, 1991) suggested that intrapersonal theories of self-regulation and performance control can be extended to explain the management of performance in organized work settings (p.1108). Sandelands et al. carry this further by stating: "At the intrapersonal level, control theory describes the self-regulation and control of performance in terms of a linear sequence of machine-like functions that operate in a manner analogous to that of a common room thermostat" (p. 1108).

Sandelands et al. (1991) specifically sought to refute the theoretical statements made by Lord and Hanges in 1987 (as cited by Sandelands et al.) that workplace behavior can be primarily predicted by considering only the prescribed interaction of role

responsibilities between supervisor and subordinate. They conducted two experiments to examine how supervisors respond to the work performance of their subordinates. Both experiments focused on the null hypothesis to show that role responsibility alone could not explain the inconsistency in why supervisors sometimes provided corrective feedback to subordinates and at other times did not.

Experiment one investigated supervisors' tendencies to give various types of feedback to subordinates working on a multiple trial task. Forty undergraduate students, twenty females and twenty males, participated in this study. These students' recruits served as the supervisors and paired with a subordinate student within this experiment. The subordinate student was a confederate of the experimenter thus allowing control of the experiment manipulation. The subordinate was given a stack of 30 sheets of paper each containing a 10 X 10 matrix of characters and instructed to circle as many numeric characters as possible within 60 seconds. The subordinate immediately handed each completed form to the supervisor and continued to the next sheet.

Each supervisor had performance goals within the experiment and was required to monitor the subordinate's performance. The supervisor was to give performance feedback whenever she/he deemed appropriate. The supervisor had a master key for each sheet, an error collecting form, and a calculator. The supervisor was required to keep track of the past, current, and overall performance of the subordinate to track changes over time. Supervisors received seven different stacks of pre-printed feedback messages. Supervisors also had instructions to regulate the use of feedback to ensure that it was not too much or too little.

The results of this experiment showed that participants' decisions to give feedback were not determined solely by the level of subordinate performance but were influenced by whether performance improved or declined from the preceding performance. There was no evidence of an effect of goal specificity on supervisor feedback. Sandelands et al. considered these results consistent with the view that supervisors do not respond in a simple way to subordinate performance, but respond more so on what they interpret the observed performance to mean. The authors observed that, apparently, performance that has improved does not mean the same thing, or warrant the same feedback, as performance that has declined to the same level. Hence, the thermostat metaphor falls short as a descriptor of this feedback behavior.

Experiment two attempted to show that supervisors do not respond to performance unless it is meaningful. Twenty-six undergraduate students (17 females; 9 males) participated in this experiment. The subordinate was again the confederate of the experimenters similar to the previous experiment. Manipulation of performance patterns created scenarios where half of the participants supervised a subordinate with a highly variable performance and without a clear trend in performance. The other half of the participants supervised a subordinate with a detectable and less variable improving trend. The supervisory roles were also more realistic. They were not required to keep a separate written record of subordinate performance. However, participants did have to perform another task of their own while monitoring the subordinate's work. Participants, in the role of supervisor, also had the goal of keeping the error rate at 10% or less.

Results from experiment two showed that the direction of performance change strongly induced positive feedback to subordinates in the trending performance condition.

Current performance or the interaction of current performance and performance change had a lesser affect toward inducing positive feedback. In the non-trending performance condition, current performance primarily influenced supervisors to give positive feedback, whereas direction of performance change more often induced negative feedback. This was in direct contrast with supervisors in the improving performance condition. These results were similar to that of experiment one. More interesting was the finding that participants in different treatment conditions used different information when deciding to give feedback.

This study showed that supervisors provide performance feedback according to how they interpret subordinate work performance, instead of responding in a manner predicted by cybernetic control theory. The authors of this study contend: “the differences between human social systems and mechanistic control systems are such that prevents either from being the metaphor for the other” (pg.1110 1991). This research showed cybernetics control theory to be a poor social predictor because it tends to neglect that the supervisor or manager regulating the process is also human.

The Sandelands et al. (1991) study is useful because it illustrates a dimension of human behavior inherent within people-driven processes, which differs significantly from a more mechanistic view of systematic predictability. More recent academic research by Yolles and Guo (2003) describes a “viable systems model” that expands cybernetic theory to better embrace the complexity of relating people-driven processes to autonomous behavior.

Viable systems participate in the autonomous development of their own futures. In turn, a viable organization acts in an automorphosis relationship when it is responsible



for first surfacing dissatisfaction with its present state and then participating in changing its own form as a result. In this context, Automorphosis is defined as putting something into motion where you can then not stop what happens to it. It mutates; it cannot really help but take a different form or shape. According to Yolles and Guo, this enables the organization to maintain appropriate operational behavior within a changing environment and survive.

However, one could contend that what Yolles and Guo are describing as automorphosis, is what Senge (1994) terms as a reinforcing feedback loop, where based on human behavior, an event snowballs either constructively or destructively. Senge puts this in a more pragmatic organizational perspective: “all too often, ‘proactiveness’ is reactiveness in disguise. ...[by becoming] more aggressive fighting the ‘enemy out there’... True proactiveness comes from seeing how we contribute to our own problems” (1994, p. 21). These adaptations to cybernetic modeling reinforce the dynamic complexity within people-driven processes, explaining why it is of diminishing return to proliferate mechanistic control practices.

### *Process-Related Studies*

Many studies have examined the human dynamics of process fulfillment that either promote or inhibit the efficiency of attaining organizational goals. This research tends to look at the relevance of social interaction in getting results through people. This is particularly germane to people-driven processes. Literature in the areas of lean thinking, emotional intelligence, and flow theory delve deep into these human dynamics.

*Lean Thinking in the Autonomous Field Service Environment*

Toyota's success in optimizing production processes propelled the concept of lean thinking. The term "lean" derives from Japanese business methods that strive to use less of everything from human effort and capital to facilities, inventories, and time (Womack & Jones, 1996). At its core, lean production is a people-driven process, as only an organization's employees can identify ways of improving existing organizational processes (Forrester, 1995).

The majority of our most critical processes are, by this definition, people-driven. Intelligent people, not centralized planning, best implement a rapidly moving schedule. Lean thinking focuses the management challenge on organizing work so that the people have the training, tools, capacity, and motivation to deliver reliable, repeatable results (Poppendieck, 2003, p. 16).

Most recently, lean software development has emerged from the application of lean thinking. Poppendieck (2003) published a study that examined the challenges of meeting predictable outcomes as forecasted for software development projects. The paper described a method for implementing lean thinking to overcome the constraints of an overly zealous and myopic drive for reliability in software development.

The author introduces the concept of a *Predictability Paradox* where trying too hard to create predictability produces the opposite effect. Poppendieck described this latent disruption to order and stability as triggered by the practice of increasing to a level of too much institutional rigidity. The latent effect is a decrease, rather than an increase in predictable outcomes. "Predictability is a funny thing; you cannot build with confidence on a shifting foundation. The problem with conventional approaches is that

they assume the foundation is firm; they have little tolerance for change” (Poppendieck, p. 2). Studies on lean thinking practices suggests that more emphasis needs to be placed on creating environments that will motivate participants and leaders to become active and remain engaged in the process beyond the role individuals occupy.

### *Emotional Intelligence*

Goleman (1995), in his work with regard to *emotional intelligence* (EI), stresses the importance of harmonizing emotion and thought as the better indicator of who can withstand adversity and who can reach their potential. These characteristics include the ability to be self-motivating, persistent in the face of frustration, control one’s impulses, delay gratification, regulate negative feelings, and empathize with others. The concepts of EI have an intuitive connection to how we each experience our work as a unique human endeavor.

Petrides and Furnham (2003) performed empirical experiments to examine traits attributed to EI. Their study focused on a pre-identification of ten high and ten low trait EI individuals. Eighty-five first-year psychology students participated in a computerized experiment involving the recognition of morphed emotional expressions. The experimenters used psychometric analysis to select twenty participants considered to have measurably high and low EI traits. Selections came from unequal parts of the distribution, roughly above the 75th and below the 30th percentiles. The mean age for the sample was 20.3 years.

The aim of this study was to examine whether there is any correspondence between people’s self-perceptions of their ability to recognize, process, and utilize emotion-laden information and their specific actual ability to identify facial expressions.

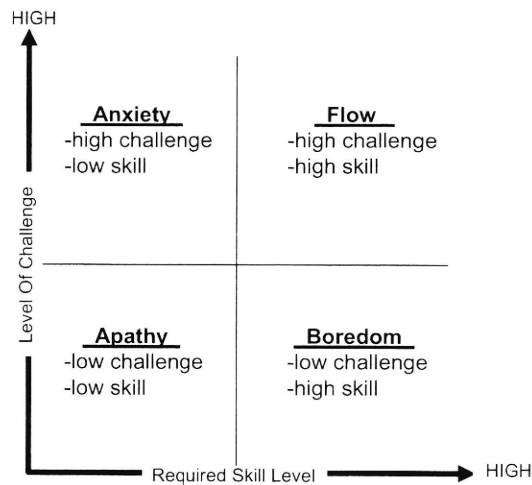
The study did find that high trait EI participants were faster at identifying the expressions than their low trait EI counterparts. High trait EI individuals seem to be adept at decoding other people's facial expressions. The authors conclude that this ability may provide high trait EI participants a substantial advantage in a group's social interactions while also implying a higher sensitivity to emotion-laden stimuli in general. This implies that individuals with higher EI traits, are likely better able to handle significant ambiguity and "mixed signals" within processes they participate in.

### *Flow Theory*

Alkin (1992) defines a *flow* experience as one in which people temporarily lose awareness of themselves, becoming so involved in what they are doing that they do not see themselves as separate from what they are doing. Intellectual ability develops to the fullest when a person is in flow. Such experiences occur when environmental challenges match competencies and skills (p.276). Csikszentmihalyi's (1990) flow theory is a significant contribution and sheds light on how certain factors relate to participant motivation. The theory describes highly motivated employees as more likely to fully engaged in the actions required to form self-adapting processes. These employees tend to move with purposeful intent, which in turn, helps sustain better results. Csikszentmihalyi describes flow as an experience in which attention is freely invested in the accomplishment of goals, which affords order to consciousness and allows the self to develop increasing levels of complexity (p. 74-75). He further describes flow as dependent on achieving the right balance between how challenging the goals are and how effective a person's skills are in meeting those challenges (2003, p. 67). Much of Csikszentmihalyi's early studies were of world-class athletes, chess players, and artists.

He formed a two-by-two matrix of high and low levels of challenge and skills resulting in the four distinct conditions as illustrated in figure 1.1:

*Figure 1.1 – Csikszentmihalyi's matrix of high and low levels of challenge and skill*



Csikszentmihalyi's matrix indicates that as participant skill level increases, he or she is motivated to seek out increasingly challenging activities. The person is likely to become bored with the activity, if it becomes too easy. Conversely, if a person given a task perceived as being too challenging for his or her current skill level, she or he will experience anxiety and frustration. According to Csikszentmihalyi, individuals must perceive they are in control of their actions and working toward a self-determined goal to achieve a flow state. During this process, they must be receiving informative feedback on whether they are reaching these goals. Additionally, individuals must be able to make decisions on how to modify the environment such that the challenge balances with the skill level (2003, p. 42-43).

Applying this matrix to participants of a people-driven process provides an interesting frame of reference for analyzing behavior. For example, anecdotally it might

be said that a particular group is “in a groove” and “high-performing” whereas another group doing the same process is perceived as being “in a rut” and “low-performing”. On the surface, this anecdotal labeling presents a significant leadership challenge. The leader needs to select corrective action to improve performance without actually making it worse in the end. The dynamics driving the high – low performance groups would be better quantified by applying Csikszentmihalyi’s model rather than the anecdotal labels.

Csikszentmihalyi and Figurski (1982) investigated the relationship of self-awareness and voluntariness to the quality of experience. The research question was to determine whether the relationship between self-awareness and affect is conditional on one’s sense of personal control. Personal control was assumed to be present in everyday activities, which respondents rated as being voluntary and absent in activities considered obligatory. The interrelationships among self-awareness, voluntariness, and emotional tone were the focus of the study. The participants were 170 employees of five large companies in the Chicago metropolitan area. All had volunteered to participate, without pay, in a study of work experience. Occupational status ranged from assembly line and clerical workers to managers and engineers. Participant ages varied from 19 to 63 years, with a mean age of 37 years; 62% were male and 38% were female.

Participants reported their activities, thoughts, and feelings at randomly designated intervals over seven days, resulting in more than 4,800 self-reports. The first day was considered a practice day. Participants carried an electronic pager for eight days. The experimenters followed a randomized schedule to beep the participants seven to nine times a day between 7:30AM to 10:30PM for an approximate total of 56 times a week. Participants were to fill out a self-evaluation sheet after each page. The evaluation sheets

requested participants to describe their main activity at the time paged and why they were doing it. The authors found that perceived voluntariness associated with positive experience, while self-awareness to be associated with the lower affects of negative experience, activation, and personal involvement, but only when the activity is voluntary and not obligatory.

The authors concluded from these results that the relationship between self-awareness and aversive experience is conditional and supports past research that self-awareness is associated with negative experience. They also acknowledged that the averseness relevant to self-awareness is not universal. Csikszentmihalyi and Figurski summarized that the empirical evidence shows that aversiveness emerges only in activities perceived to be voluntary. They argued that these findings support the theory that within the instances of personal choice, an individual's quality of experience changes with self-awareness. No such correspondence emerges under conditions of obligation. In conclusion, the authors state that evidence indicates that the ideal [flow] experience is one in which the person is voluntarily engaged in an activity that does not focus attention on the self. In flow, self-awareness clearly interferes with the experience by drawing attention away from the immediate activity itself; thus, depleting its intensity.

#### *Corporate Information Dispersal via Intranets*

As communication technologies continue to evolve, new tools become available to aid in information dispersal within an organization. Murgolo-Poore, Pitt, Berthon, & Prendegast (2003) research showed a significant positive effect on participants when access is provided to an Intranet with easy portals to the information they consider useful.

Murgolo-Poore's, et al.(2003) completed an empirical study focused on the following question: "Do managers, who perceive their organizations' intranets to be effective, also perceive them to enhance the dissemination of information" (p.14)? The authors used a large commercial database to identify 1800 firms as viable survey candidates. The mailing list included both small and large firms. The questionnaire consisted of items requiring the respondent to evaluate the overall success of the organization's intranet on a four-point scale (*very unsuccessful, unsuccessful, successful, very successful*) and intelligence dissemination using a Likert-type scales with 1 = *I strongly disagree* through 7 = *I strongly agree*.

263 completed responses were received, of which 70 respondents indicated that their organizations did not have intranets, reducing the number to 193 usable questionnaires used in the analysis (10.72% overall response rate). The study showed evidence of increased organizational value resulting from the implementation of an effective intranet. The authors of this study concluded that an effective intranet significantly enhances information dissemination within organizations. They suggest that the potential for organizations with an effective Intranet is to make their collective knowledge available to employees when and where they need it in order to bring innovative and timely solutions to their customers faster than competitors. This implies that an effective intranet enhances the organizational potential to act sooner, when it learns what it knows (and doesn't know), thus minimizing delay and reducing rework. It follows that an effective intranet can enable organizations to quickly create access to relevant process-related information and at a relatively low cost as compared to other methods of information dispersion.



## Literature Summary

The research described in this literature review provides encouragement and support for a shift to simpler and less human energy absorbing processes. Improving the flow of information to and from processes is a fundamental catalyst to sustaining simpler process dynamics. Relevant process information better serves the participant perspective of working smarter within the process.

These paradoxical attributes may likely be close to the intrinsic center of creating leaner and more empowering people-driven processes. This implies that the leader who can create, enable, and sustain a free-flow of meaningful information find the reward of having a more adaptable, productive, and efficient people-driven organization.

The literature described supports the hypothesis proposed within this current study. Specifically stated as, the more ways you find to inform processes, rather than increase restrictive control, the greater your yield of desired results. *TiVo'ng*<sup>1</sup> the information is a metaphorical way to describe this free-flow accessibility to process-relevant information. TiVo'ng techniques focus on the relevance and usefulness of information as viewed by those receiving it. This perception of what is useful information may often be different from what the transmitter (in the role of manager, administrator, or leader) believes to be most relevant.

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<sup>1</sup> TiVo is a consumer video device, which allows users to capture television programming to internal non-volatile storage for later viewing (sometimes called "time shifting"). TiVo systems contain sophisticated software to record programs - not only those the user specifically requests, but also other material the user is likely to be interested in. The name TiVo is formed from a combination of the abbreviations TV and io: Television Input/Output. This is essentially the concept of the product (Wikipedia, 2004).

## Research Purpose and Questions

This research investigates if measurable performance effects are present within two perception-based assumptions of people-driven process dynamics. The first research question is stated as follows: On average, do higher-performing process participants hold a more favorable perception of access to useful information as compared to their lower performing colleagues? The hypothesis is that without access to reliable information, people cannot readily identify what needs to change, and therefore, what they need to do differently to sustain better performance. This infers that accessing meaningful information flow will lead to better result-orientated process decisions and thus induce a performance effect.

The second research question examines whether a positive performance effect is present when process participants hold a more favorable perception of what the organization values. The primary organizational factors felt to induce performance-effects are: 1) customer orientation, 2) sense of purpose, 3) adaptability for learning & change, 4) sense of collaboration, 5) consistency of action, 6) information flow, and 7) sense of involvement. Koestenbaum describes company culture as: *“the intangible that defines what people feel and how they behave. Culture means loyalty and commitment to the organization –how much of themselves people are willing to give”* (1997, p.57).

Significant correlations found between participant perceptions and performance level would generally indicate a performance effect. In turn, this would infer that the chaotic structures described in the people-driven process model create at least some influence on participant behavior. This model is illustrated and detailed in appendix A.

## Method

This research compared participant perception of a set of organizational attributes to their high/low performance groupings with respect to four repetitive business processes. The selected processes met the requirement of established metrics and deemed applicable by the participating organization of this study. A survey instrument collected participant-held views of the organizational attributes.

### *Sample*

This research examines performance effects attributed to organizational perceptions held by the active participants of people-driven processes. Two fundamental requirements were essential in selecting an appropriate organization to participate in this study: 1) The participating organization must have processes that meet the definition as being people-driven; processes where the participants have the autonomy to make decisions and take action based on the complexity of a dynamic situation. 2) An available set of repetitive processes with a mix of operational and financial-based metrics used to measure process performance over an 18-month minimum.

*Participants.* A field service organization within a mid-size corporation agreed to participate in this study. This service organization had members geographically dispersed and operating in locations throughout North America with corporate headquarters located in the upper Midwest. The customer-facing nature of a field-based service organization provided a good fit for both study requirements. Field engineers often find themselves on the leading edge of an organization's internal and external decision-making situations. Intuitively, the action-orientated decisions made by the field

engineer do affect a customer's overall experience in a reactive service event. Sound choices and actions are required of these process participants based on the complexity of a given dynamic customer situation. Reactive customer influences and the organization's internal expectations of the field staff accentuate the essential need for active decision-making and flexibility by members of a service organization.

*Recruitment.* Seventy-nine members affiliated with this field-based North American service organization received information about this research before receiving the survey. The introductory information articulated that completing the survey was voluntary with individual responses held confidential. Participants were encouraged to contribute their responses as a means to share feedback about their experiences with general process dynamics and related information flow used in their daily work.

Recipients were told that the survey was part of a larger research project in completion of the author's graduate studies. Twenty to thirty minutes was the expressed time estimate to complete the survey. A duplicate of this information was included in the first paragraph of the two survey reminders sent to non-respondents. Email reminders followed one-week intervals from the survey's original distribution date.

*Responses.* Seventy-two responses were received out of a total of seventy-nine surveys sent. This yielded a total return rate of 91.1%. One survey response uploaded only 20% complete and was discarded. Of the 72 respondents, seventy-one were male and one female. Age ranged from the mid twenties to late fifties. Average work experience of the respondents was 12.3 years with a low of three years and a high of over thirty years.

### *Measurement*

*Questionnaire.* Perception-based factors of the organization were collected by asking field engineers to rate several attributes of their organization on a 1-to-5 scale. An 88-item questionnaire collected this perception data. A 5-point Likert scale was used with response options that ranged as follows: (1) Strongly disagree, (2) Disagree, (3) Neutral, (4) Agree, (5) Strongly Agree.

Past research questionnaires and survey instruments have collected various types of organizational data such as corporate culture, information dispersion, and organizational effectiveness. This questionnaire followed the pattern of Cho's (2000) rigorous statistical work on the Denison organizational cultural survey. Several survey questions were added and a few replaced to delve more into perceived attributes of information flow structures and its content within people-driven process dynamics. Glaser, Zamanou, & Hacker's (1987) 36-item Organizational Cultural Survey was also instructive and supported by a reliability and validity review published by Rubin, Palmgreen, & Sypher (1994). Separate from these cultural-based instruments, Murgolo-Poore's et al. (2003) constructed a survey to investigate corporate information dispersal using intranets.

The construction of the 88-item questionnaire used in this study drew from portions of these past survey instruments. Since the survey was not identical to one used previously, data were submitted to a factor analysis to determine the dimensions used in this study.

Table 1 lists the measures incorporated within the questionnaire and used to derive the organizational factors. The structural elements contained within the chaotic

people-driven process model are included in the right-hand column. Perceptions related to the cultural, behavioral, and structural attributes reveal a degree of commingling in this overview of both lists. The questionnaire, as distributed, is presented in appendix B.

Table 1

*Comparing the Questionnaire's Measures of Scale to the Structural Elements of the Chaotic Model.*

Measures of Scale Incorporated Within the Questionnaire.	Organizational Structures Contained Within the Chaotic People-Driven Process Model.
<u>Customer orientation</u>	<u>Management vortex</u>
- customer focus	The management challenge is within its smaller sphere of influence. Alignment is critical to the centerline of process dynamics.
<u>Sense of purpose</u>	Who does the organization serve via this process? Does it align with a customer focus?
- strategic direction & Intent	
- goals & objectives	
<u>Adaptability for learning &amp; change</u>	<u>Goals that compete or support</u>
- creating change	What is my interest in supporting these Goals?
- organizational learning	Do they conflict with my desires or values?
<u>Sense of collaboration</u>	<u>Participating roles</u>
- team orientation	What is my Role and how is my participation rated? Am I a small cog in a larger machine or something more? Am I improving my role and skills or narrowly focused on proving my functional worth?
- coordination and integration	
<u>Consistency of action</u>	
- core values	
- agreement	
<u>Information flow structures &amp; content</u>	<u>People-driven process</u>
- relates to systems for information storage, retrieval, accessibility, and content	How do I fulfill my role in a given Process?
	How can I contribute?
<u>Sense of involvement</u>	<u>Relationships that coalesce or disengage</u>
- empowerment	What are the team dynamics I participate in?
- capability development	How will these dynamics affect me?
	What is the emotional IQ within this work group?

*Assessing Process Performance.* The process performance variables are normalized metrics of repetitive processes used by the field-based service organization participating in this study. Combinations of financial and operational metrics are used to determine overall participant performance in a given process. This study uses four process-related performance outcomes categorized as follows: labor utilizations, service contract delivery, rate of task completion, and revenue to margin production. The first three are operational processes where field engineers have similar degrees of autonomy to actively but not exclusively influence the end result. If it were exclusive, it would be person-driven processes, not people-driven. The revenue to margin production leans heavily toward the financial considerations of bottom-line process results.

Labor utilization processes are dynamic and can be both fast-paced and sometimes latent. The allegory of *Burt's WIP* illustrates well some of the dynamics inherent to this process category. The labor utilization processes tend to routinely require quality of decision-making to arbitrate and sustain higher performance without getting lost in the situational complexity of reactive events.

Service contract delivery focuses on the fulfillment of an agreed bundle of services a customer has purchased in advance for a preferred price. A successful delivery fosters subsequent success in contract renewals. The complexity of content and the elapsed time inherent between scheduled deliveries can periodically generate contract-related confusion for customers, fellow field engineers, sales, and others who may have some relative involvement with a specific contract

Rate of task completion processes are unique in their high degree of stability over time. This is with regard to the operational role the field engineer. A long-standing information flow structure tailored to this field staff has consistently supported this process. The field engineer has the controlling influence in the submission of the task service reports, but does not control the subsequent closure process after submission.

The revenue to margin production category is a reflection of collective business processes that accumulate service revenues and costs from work centers. Work centers are virtual configurations within a business system that group a customer base with sectors of the field staff. Metrics here are primarily financial with secondary indication of the mix of different revenue sources. Many members of the organization drive this metric by the wider degree of interaction involved in the overall revenue generation. These interactions can be in addition or separate from the field engineer responsible for the work center.

The complexities of most processes yield measures of both primary and secondary attributes. It is important to consider an appropriate mix of these attributes when assessing the complexity of trended performance over time. Isolating process performance to one dimension will typically ignore other participant acts that either add to or limit organizational success of a given process. The application of appropriate weighting to variable terms within a process metric can provide a more holistic consideration of the wider range of participant process contributions.

Statisticians of baseball (e.g. sabremetricians) often use this form of calculation to arrive at a more relevant composite performance indicator. Hakes and Sauer state that:



“it is well known among sabremetricians that batting average, while popular, is a flawed measure of productivity because it ignores many acts that contribute to team success” (2004). This is analogous to many bottom-line measures used solely with people-driven processes. The ‘On Base Percentage’ (OBP) statistic is a good example of a composite calculation. The *Baseball Almanac* (2005) describes OBP as a method used to measure the percentage of times a player reaches any base. They distinguish it as one of the more important statistics, specifically written with the team’s manager in mind.

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$$\text{On Base Percentage [OBP]} = (\text{Hits} + \text{Walks} + \text{Hit By Pitch}) / (\text{At Bats} + \text{Walks} + \text{Hit By Pitch} + \text{Sac Flies})$$


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Kaplan and Norton state that: “Performance measurement systems typically are aggregations of stand-alone measures, such as return on capital, customer satisfaction, and defect rates” (P.99, 2001). This is a constructive description of the composite metrics used in this study. Normalizing and weighting trended metric data helps account for performance variances resulting from different geographical dichotomies and customer dynamics. The technique of rank ordering was used to normalize performance results. Combining weighted metric rank orders generated a composite performance result for a given process. This composite result determined the quartile performance groupings. Calculations used to compute composite rank orders for each process-related performance outcome are listed in appendix C.

The senior field service management of the participating organization was consulted on the construction of these normalized and weighted metrics. This helped ensure that the normalized metrics would represent the organization’s process objectives

across its geographic sectors. This provided a check of the face and external validity that the metrics were congruent with the organization's rationale for the use of such measures.

### *Statistical Procedures and Analysis*

The perception data received from the questionnaire were submitted to a factor analysis to determine the dimensions used in this study. Pearson correlations checked the selected items and Cronbach alphas measured the statistical reliability of items grouped to form the index variables. Each of the four sets of process metrics required independent treatment with a factor analysis performed on each set. An ANOVA analysis then compared the differences in average perception values held by the first to fourth quartile performance groups for each of the seven organizational attributes (index values).

*Organizational factors.* Exploratory factor analysis using principle components extraction and varimax rotation was used to examine the component structure of the questionnaire. More specifically, the measures of scale incorporated within the questionnaire response data. Factor analysis provided a significant data reduction technique to smaller sets of related survey items per scale. Each selected set of related items accounted for the majority of survey response variance per scale. Factor loading helped eliminate items that loaded heavily on more than one component. Combining the seven selected item groupings produced the seven index variables. These index variables represented the perception measures used for each organizational factor. See appendix D for a comprehensive listing of the seven-factor analysis statistics.

Cronbach coefficient alphas for selected grouping of scale items were determined to investigate reliability of each index variable. Inter-item deletion analysis helped identify any items that, by their inclusion, diminished the overall alpha value of the index variable. Alphas ranged from .874 to .685 for the seven index variables used in this study. This reached the level of generally acceptable reliability in the obtained measurements (Nunnally, 1978). See appendix E for a comprehensive listing of the reliability statistics of the index variables.

Relationships among the index variables were examined by calculating their Pearson product moment correlations. The intercorrelations among the index variables were moderately positive and significant at the  $p < .01$  level. This suggests that while the index variables are related to each other, each index measures different things. All correlations were low enough to indicate data reduction via factor analysis was successful in minimizing problems with multicollinearity. Appendix F lists the means, standard deviations, and Pearson correlation matrix of the index variables. The values on the diagonal represent the coefficient alphas of reliability for the index variables used to access perception levels of the organizational factors used in this study.

Table 2 reports statistical information used to determine each index variable. The number of items, factor components, mean levels, standard deviations, and reliability coefficients for all indexes are listed.

Table 2.

Factor information, means, SD, and alphas for index variables

INDEX	No. Items	No. Factors	% Variance Accounted For	<i>M</i>	<i>SD</i>	<i>Alpha</i>
Customer orientation	3	1	65.6%	2.98	.774	.744
Sense of purpose	6	1	62.3%	3.22	.723	.874
Adaptability for learning & change	3	1	68.6%	3.37	.593	.774
Sense of collaboration	4	1	54.1%	2.91	.642	.715
Consistency of action	2	1	76.7%	3.29	.747	.719
Information flow structures & content	3	1	67.3%	3.35	.729	.752
Sense of involvement	3	1	60.6%	3.38	.696	.685

*Process Metrics.* The descriptive statistics for each process metric are instructive of the minimum to maximum range of each measured term. See appendix G for a comprehensive listing of descriptive statistics for each process metric used in this study. Composite rank ordering of this metric data determined the quartile performance grouping for each of the four processes. Appendix C lists the calculations used to compute composite rank orders for each process-related performance outcome.

*Comparing participant perception to performance.* The construction of this research culminates in the comparison of differences in average perception values held by the first to fourth quartile performance groups with regard to the five organizational attributes (index values). An ANOVA analysis of [process] x [quartile] x [organizational factor] was performed to determine the significance of mean-level correlations.

Appendix H lists the detailed summaries of the ANOVA analysis for each of the four processes.

The high rate of survey response (91.1%) provided adequate pairings of survey responses to the quartile performance groups. Numbers (N) in the first and fourth quartile groupings varied due to the occasion when a survey response was not available for the particular quartile. 12.3 years of average participant work experience is represented across the combined categories of the first and fourth quartile groups.

## Results

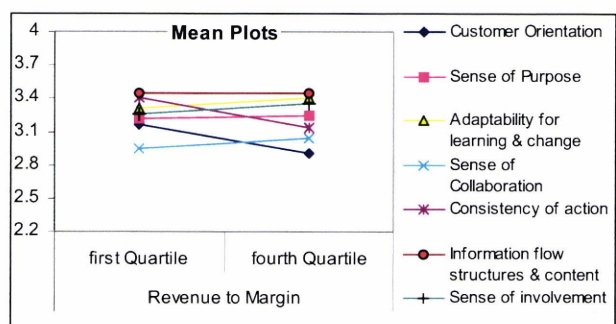
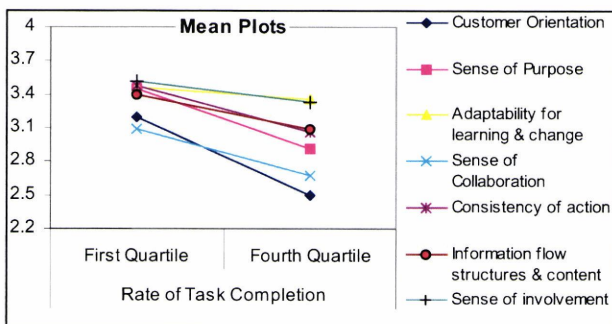
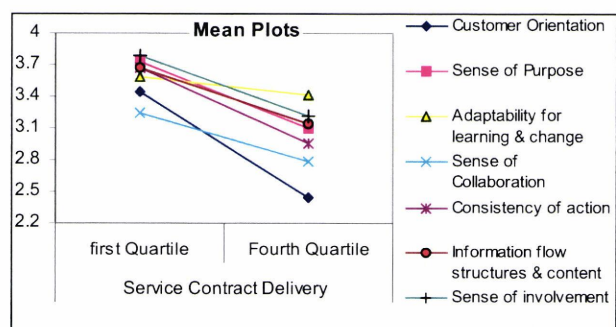
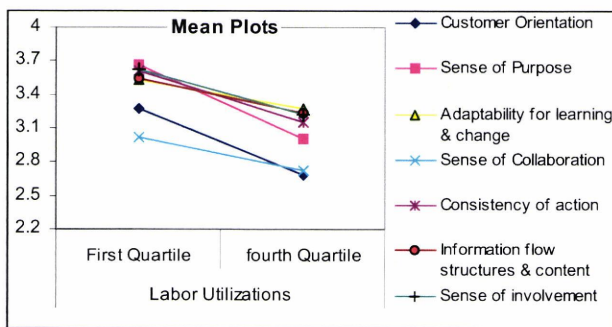
The results of this research are based on how they relate to the participants of this study. With this in mind, the findings may offer some general and broad perspective with regard to how perceptions interact and effect organizational process dynamics.

### *Quartile Comparisons*

The mean-level and standard deviations for survey responses are shown in table 3 using first and fourth performance quartiles derived for each composite process. The mean plots of factors for each process category are also included.

Table 3  
Mean levels and plots by first versus fourth quartile performance results

Organization Factors	Mean Levels and (Standard Deviations)								Average of Mean Values	
	Labor Utilizations		Service Contract Delivery		Rate of Task Completion		Revenue to Margin			
	First Quartile	Fourth Quartile	First Quartile	Fourth Quartile	First Quartile	Fourth Quartile	First Quartile	Fourth Quartile		
	n = 17	N = 18	n = 14	N = 12	n = 18	N = 16	n = 17	n = 14		
	Avg. Work Experience		Avg. Work Experience		Avg. Work Experience		Avg. Work Experience			
	11.6 years	10.4 years	12.2 years	9.5 years	11.7 years	13.3 years	10.2 years	12.7 years	First Quartile	Fourth Quartile
Customer orientation	3.27 (.66)	2.68 (.78)	3.45 (.71)	2.44 (.43)	3.20 (.72)	2.50 (.86)	3.16 (.61)	2.91 (.65)	3.27	2.63
Sense of purpose	3.67 (.64)	3.01 (.73)	3.73 (.56)	3.10 (.39)	3.45 (.66)	2.91 (.67)	3.21 (.64)	3.24 (.68)	3.52	3.07
Adaptability for learning & change	3.53 (.47)	3.27 (.62)	3.58 (.66)	3.42 (.66)	3.46 (.51)	3.36 (.61)	3.31 (.63)	3.40 (.63)	3.47	3.36
Sense of collaboration	3.02 (.73)	2.72 (.69)	3.24 (.50)	2.79 (.54)	3.09 (.65)	2.67 (.72)	2.94 (.61)	3.04 (.54)	3.07	2.81
Consistency of action	3.61 (.73)	3.15 (.69)	3.67 (.55)	2.96 (.77)	3.48 (.79)	3.06 (.81)	3.41 (.67)	3.14 (.66)	3.54	3.08
Information flow structures & content	3.55 (.54)	3.23 (.75)	3.67 (.57)	3.14 (.77)	3.40 (.66)	3.09 (.86)	3.45 (.56)	3.45 (.56)	3.52	3.23
Sense of involvement	3.62 (.64)	3.22 (.68)	3.78 (.58)	3.21 (.58)	3.52 (.74)	3.33 (.54)	3.25 (.81)	3.35 (.71)	3.54	3.28



*Labor utilizations.* The first quartile group within this process was shown to express a stronger customer orientation present within the organization ( $\bar{x} = 3.27$ ), than the fourth quartile group ( $\bar{x} = 2.68$ ,  $F(1,33) = 5.896$ ,  $p = .021$ ) and a stronger perception of the organization's sense of purpose. (First quartile  $\bar{x} = 3.67$  versus fourth quartile  $\bar{x} = 3.01$ ,  $F(1, 33) = 8.111$ ,  $p = .008$ ). Differences in mean-level did not reach a compelling degree of significance in group perception for adaptability for learning and change (first quartile  $\bar{x} = 3.53$  versus fourth quartile  $\bar{x} = 3.27$ ,  $F(1,33) = 1.903$ ,  $p = .177$ ), collaboration (first quartile  $\bar{x} = 3.02$  versus fourth quartile  $\bar{x} = 2.72$ ,  $F(1,33) = 1.544$ ,  $p = .223$ ), nor in information flow structures and content for this process (first quartile  $\bar{x} = 3.55$  versus fourth quartile  $\bar{x} = 3.23$ ,  $F(1,33) = 2.010$ ,  $p = .166$ ). A moderate degree of significance was seen in for consistency of action (first quartile  $\bar{x} = 3.61$  versus fourth quartile  $\bar{x} = 3.15$ ,  $F(1,33) = 3.439$ ,  $p = .073$ ) and sense of involvement (first quartile  $\bar{x} = 3.62$  versus fourth quartile  $\bar{x} = 3.22$ ,  $F(1,33) = 3.079$ ,  $p = .089$ ).

*Service contract delivery.* The first quartile group was shown to express a significantly stronger positive perception for six organizational factors. A strong perception of the organization's customer orientation was indicated (first quartile  $\bar{x} = 3.45$  versus fourth quartile  $\bar{x} = 2.44$ ,  $F(1,24) = 18.46$ ,  $p = .000$ ) followed closely by a sense of purpose (first quartile  $\bar{x} = 3.73$  versus fourth quartile  $\bar{x} = 3.10$ ,  $F(1,24) = 11.66$ ,  $p = .002$ ). No significant difference was shown for adaptability for learning and change between the first and fourth quartile groups (first quartile  $\bar{x} = 3.58$  versus fourth quartile  $\bar{x} = 3.42$ ,  $F(1,24) = .376$ ,  $p = .546$ ). Strong significance was again found for the remaining four index variables. Sense of collaboration (first quartile  $\bar{x} = 3.24$  versus fourth quartile  $\bar{x} = 2.79$ ,  $F(1,24) = 4.893$ ,  $p = .037$ ), Consistency of action (first quartile

$\bar{x} = 3.67$  versus fourth quartile  $\bar{x} = 2.96$ ,  $F(1,24) = 7.526$ ,  $p = .011$ ), and sense of involvement (first quartile  $\bar{x} = 3.78$  versus fourth quartile  $\bar{x} = 3.21$ ,  $F(1,24) = 6.253$ ,  $p = .020$ ). Group perception differences with regard to information flow (first quartile  $\bar{x} = 3.67$  versus fourth quartile  $\bar{x} = 3.14$ ,  $F(1,24) = 5.648$ ,  $p = .026$ ) and a were also shown to be significant.

*Rate of task completion.* This process category, when compared to the previous two processes, showed similar slopes connecting the total mean levels for each factor within each group. Group perception differences for three of the organizational factors were found statistically significant for this process: customer orientation (first quartile  $\bar{x} = 3.20$  versus fourth quartile  $\bar{x} = 2.50$ ,  $F(1,32) = 6.592$ ,  $p = .015$ ), sense of purpose (first quartile  $\bar{x} = 3.45$  versus fourth quartile  $\bar{x} = 2.91$ ,  $F(1,32) = 5.619$ ,  $p = .024$ ), and to a lesser degree, their sense of collaboration within the organization (first quartile  $\bar{x} = 3.09$  versus fourth quartile  $\bar{x} = 2.67$ ,  $F(1,32) = 3.241$ ,  $p = .081$ ). The results held no significance in detecting group perception differences for the organization's ability to adapt for learning and change (first quartile  $\bar{x} = 3.46$  versus fourth quartile  $\bar{x} = 3.36$ ,  $F(1,32) = .276$ ,  $p = .603$ ), consistency of action (first quartile  $\bar{x} = 3.48$  versus fourth quartile  $\bar{x} = 3.06$ ,  $F(1,32) = 2.346$ ,  $p = .135$ ), or with regard to perceptions of information flow (first quartile  $\bar{x} = 3.40$  versus fourth quartile  $\bar{x} = 3.09$ ,  $F(1,32) = 1.466$ ,  $p = .235$ ). Same was true for their sense of involvement (first quartile  $\bar{x} = 3.52$  versus fourth quartile  $\bar{x} = 3.33$ ,  $F(1,32) = 766$ ,  $p = .388$ ).

*Total revenue to margin.* This category of process results was an outlier when compared to all aspects of correlation between the first and fourth quartile with respect to the perceptions measured by the organizational factors. No statistical group differences



were seen given comparable means levels and higher standard deviations across the factors. A slope reversal in mean values occurred for four of the factors where the fourth quartile rates negligibly higher for this factor than does the first quartile: customer orientation (first quartile  $\bar{x} = 3.16$  versus fourth quartile  $\bar{x} = 2.91$ ,  $F(1,29) = 1.235$ ,  $p = .276$ ), sense of purpose (first quartile  $\bar{x} = 3.21$  versus fourth quartile  $\bar{x} = 3.24$ ,  $F(1,29) = .018$ ,  $p = .893$ ), adaptability for learning and change (first quartile  $\bar{x} = 3.31$  versus fourth quartile  $\bar{x} = 3.40$ ,  $F(1,29) = .161$ ,  $p = .691$ ), and their sense of collaboration (first quartile  $\bar{x} = 2.94$  versus fourth quartile  $\bar{x} = 3.04$ ,  $F(1,29) = .232$ ,  $p = .633$ ). Perception values for consistency of action for first quartile ( $\bar{x} = 3.41$ ) were also negligibly different from the fourth quartile ( $\bar{x} = 3.14$ ,  $F(1, 29) = 1.255$ ,  $p = .272$ ). In similar fashion, no statistically significant differences were seen in perceptions of information flow (first quartile  $\bar{x} = 3.45$  versus fourth quartile  $\bar{x} = 3.45$ ,  $F(1,29) = 0.000$ ,  $p = .995$ ) or in sense of involvement (first quartile  $\bar{x} = 3.25$  versus fourth quartile  $\bar{x} = 3.35$ ,  $F(1,29) = .132$ ,  $p = .719$ ).

### Discussion

The assessment tool collected participant self-reported views of seven organizational attributes and compared them between the high and low participant performance groups of four unique processes. Each process had established ways to measure long term performance trends. The tool found consistent patterns of perception differences between the high and low performance groups. These patterns provide insight and help answer the two research questions of this study.

*First Research Question*

The first research question examined if higher-performing process participants held a more favorable perception of their access to information as compared to their lower performing colleagues. Information flow structures & content explored participant familiarity with information channels. Prior to this research, a strong correlation was anticipated between performance levels and channel familiarity. The results only showed partial correlation in this area. Positive perceptions of information channels only showed high significance in the service contract delivery process ( $p < .03$ ). It was much less significant ( $p < .16$ ) for labor utilization and task completion ( $p < .27$ ) processes. This indicates that for participants of this study, the relationship between performance and varying perceptions of information flow structures & content was process dependent.

The repetitive nature of these people-driven processes may be one possible reason for this partial-effect. Repetition and long-term stability within information structures are likely to foster habitual human tendencies. At the individual level, participants in both groups may just be confident in what they know and how they utilize available information structures. Some participants likely have a deeper understanding of the available resources. Others may be less aware or have not been able to relate the same information as being applicable or useful to them.

Participants may simply be comfortable about what they know even though large gaps exist in what they each perceive as common knowledge regarding information structure and its content. The differentiator between average experience and expert experience may lay more in who better applies their curiosity to continually improve what they know rather than just striving to reach comfort in what they presently know.

The latter may represent a derivative of Boulding's disutility of work definition (as described on p. 4).

This may be most evident in the task completion process. Over time, the information channel feeding this process had been tailored to the field engineer. This is generally desirable. Yet, its channel consistency may have reached a near institutional state. It then becomes easier to overlook or neglect creating participant dialogue around the information's more subtle indicators.

The inference here is that a process can develop too much stability. Complacency may be the companion to unwavering stability. Channel consistency is intuitively important. Less obvious is the need for instability triggered by new or different information flowing through the channel. Too much stability may be the unintended consequence of managing the channel too tightly rather than its content. Effective process information behaves much like a vibration coursing through a plucked guitar string. Participant complacency of the information structure may lead toward a lack of discussion of the actual information and its process-related meaning. This could foster false assumptions of what is common knowledge shared by all participants.

Larson's (1996, 1998, 2002) and Wittenbaum (1999) studies of group discussion of shared versus unshared information are instructive in this regard. Common knowledge (what Larson refers to a "shared" information) is most often brought into group discussion first followed by information not common to everyone ("unshared" information). Periodic triggering of formal and informal discussions helps promote uncommon information sharing within the group.

It is noteworthy that the service contract delivery process did show high significance between the means in this area. This process has experienced more recent tinkering with the information structure and its content more so than the other processes. This may have increased instability and fostered more informal small group discussions. This, in itself, would tend to precipitate broader awareness of what was previously uncommon knowledge across groups.

Even though an information flow correlation was highly significant for one process, it was more often the case that participants shared similar perceptions of information flow regardless of the resultant process performance level. A conclusion can be drawn with respect the first research question. Simply stated, the lack of broader correlation across the information flow dynamics of multiple processes and the respective performance indicators makes each, by themselves, a poor predictor of the other.

### *Second Research Question*

The second research question looked at whether a positive performance effect is present when process participants hold a more favorable perception of what the organization values. This question focused on participant perspectives related to customer orientation, sense of involvement, consistency of action, sense of collaboration, adaptability for learning & change, and a sense of purpose. Mean-level plots for the first three processes are all in the expected direction. This represented eighteen plotted relationships. The majority of these plots (ten) represent high degrees of significance ( $p < .06$ ). Three additional mean plots registered a moderate level of significance at  $p < .09$ .

The aggregate of these findings suggest a measurable relationship does exist between the collective perceptions of these organizational factors and process

performance. Different organizational factors varied in order of significance across the first three processes. This would seem reasonable given that no two people-driven processes are ever completely identical for the same reason people are not. The strong showing of significant differences in how each group perceived their organization's customer orientation across the first three processes is noteworthy. This shows support for the model's management vortex need to be customer-focused.

It is reasonable that the first quartile group within the labor utilization processes would show the most significant differences in the sense of purpose followed next by a higher sense of customer orientation and involvement. Confidence in knowing the larger goal and one's role in contributing to that goal would seem to go hand in hand with these organizational factors and within this process category. Csikszentmihalyi's (1982, 1990, 2003) seminal work in flow theory describes how higher levels of complexity are more easily handled when an individual's attention more freely focuses in the accomplishment of a goal rather than in completing an obligation. The high sense of involvement, purpose, and customer orientation for the first quartile group supports this dynamic.

The service contract delivery results are very instructive because of the tangible nature of executing deliverables and its relative high autonomy in operationally managing a unique contract. This process scored the highest degrees of significance to mean-level differences across six of the seven organizational factors as compared to all other processes. Participant perception in these areas showed strong correlation with delivery success. The ability to ask the more in-depth question based on a better understanding of the contract's intent may be a key factor in the difference between a high and low performing contract delivery. Persistence in finding usable answers to these questions is

another consideration. These intangibles often shape a contract and influence whether it sustains higher levels of success through its renewal cycle.

The results from the rate of task completion category are somewhat surprising. Even though the mean-level slopes are as anticipated, the low level of significance found for sense of involvement and information flow was unexpected ( $p \leq .38$ ). Not surprising was that a sense of purpose and customer orientation were quite significant ( $p < .024$ ) between the first and fourth quartile followed closely by a sense of collaboration ( $p = .08$ ). This has intuitive support given that this process relies primarily on attention to detail and follow through for its success in serving the customer.

As previously stated, field engineers in this study had a controlling influence in the submission of the task service reports but not in opening and closing tasks. Instabilities in the opening and closure process, coupled with an almost institutional stability in these field process, may have un-assessed influence on these results. Although not included in this research, it is curious to consider if field engineers may choose to symptomatically compensate for the instabilities in the opening and closure processes. Holding their submissions longer and using them more creatively than what the organization prefers, would produce this effect. Continual degradation of the submission process increases the financial burden carried within the “work in process” balances. This has a strong tendency to induce some organizational anxiety. The anxiety may often trigger a symptomatic fix in the submission process rather than fundamental improvement in the inflicting process.

The subtle nature of such a shift over time is often difficult to perceive. The repetitive and habitual human nature of this process can also dull the awareness of

degrading performance. This observation creates possibilities for additional research. It does highlight a tangible scenario where changes in one process could have latently dysfunctional effects on another process.

The three preceding processes have more operational-based metrics as compared to the revenue to margin production category. The complete lack of differences between the first and fourth quartile on any of the organizational factors is significant in itself. Bottom-line financial metrics generally blend the complexity of several top-line operational and financial metrics into a simplified set of terms. These terms are important to gauge organizational success, just not well suited as an indicator of participant contribution. This may likely be due to the ubiquitous and ambiguous nature of bottom-line measures as viewed by participants with regard to their work.

Incentive and bonus plans are often based on bottom-line financial performance because measurements of profit and loss are generally very well established. The empirical evidence of this study indicates a total lack of correlation between financial results and a higher sense of involvement or purpose held by process participants. This infers that while financial success is one outcome of collectively doing good work, it is not a good indicator of what that good work is. These results suggest that an effective incentive program needs to have a tangible operational measure as a primary component within the overall metrics used to promote and assess a successful incentive plan. Well-defined operational metrics appear to better correlate to participant contribution, which in turn may lead to better financial results.

*Study Limitations and Suggestions for Future Research*

Empirical results of this study show general support for the model's usefulness in examining dynamic processes for the organization participating in this study. The generic nature of this model increases its potential as a tool to assess a wide range of processes but it lacks broader empirical evidence of applied benefit. Replicating this study several times in diverse organizational settings would significantly strengthen the validity of this research. The research could be further improved by integrating some of the previous observations. In particular, adding survey questions to assess what effects a change in ancillary processes can have on perceptions and subsequent performance outcomes. Adding questions that delve into the level of status quo and stability in a process would also help identify if a causal relationship exists between increased complacency and a reduction in performance.

Another improvement would be to document the primary top-line metrics used to forecast bottom-line results. The added link to top-line variables could be used to construct weightings to calculate a new independent composite variable. This may lead to better secondary correlation of performance with regard to bottom-line results without direct use of the financial metric. Appendix I contains a framework for possible future study. It is a compilation of knowledge gained by the author in pursuit of this study and transformed into a possible methodology for constructing a generic formula for assessing or creating dynamic people-driven processes.



### *Conclusions*

This research produced some interesting findings. Significant differences, where present, support the hypothesis that participant perception does have a performance impact within people-driven processes. These correlations were evident only in the more operationally based metrics. Bottom-line metrics showed no correlation to process performance. This helps show that while bottom-line metrics are important; they themselves are not good predictors for gauging process performance. The results also reflect that each process studied had its own unique histories and dynamics. This implies that, while processes may be similar, organizational factors can influence each process in different ways.

This supports some of the chaotic dynamics illustrated in the model and driven by perceptions participants hold in response to the model's questions. The degree to which participants of this study arrived at their answers for these questions may indeed have had some performance effect when gauged by operational metrics. The research also brings forward a concept of a negative performance effect resulting over time and induced by complacency when too much process stability accumulates. The organization's desire to learn more about a particular process and its performance becomes stale. It is curious to wonder if too much stability and status quo, rather than leadership instability caused Petronius his perpetual distress and discord.

This study identified some of the effects participant perception can have on performance within a people-driven process. The information available in ones working environment most often forms the basis of how we view our organization. Teamwork dynamics may enable or impede success in producing desired results. It is realistic to

assume that without information, people cannot identify what needs to change and thus what they need to do better. Faulty or misdirected information can also have an adverse performance effect beyond just the lack of information. Misinformation induces false perceptions just as information dulled by a lack of energy can lead to a false sense of stability.

The ability to sense the relationship between current dynamics and anticipated changes in the business climate become increasingly more important in a competitive market. Tapping into the information flow coursing within people-driven processes is a rich area to sense dynamics for change and adaptation. –Ideally, this discovered information is modulated to flow useful portions to those who can best use it. In turn, this can propel both continuous improvement and positive participant perception.

Images we hold of both the present realities and the future possibilities influence our decisions. Much can be drawn from Plato's use of imagery to teach a similar lesson. Plato's allegory of the cave delves into the human tendencies for uncertainties and probabilities to illustrate how perception shapes one's reality. The person who ascends from the cave of false perceptions and learns the true realities is changed forever. The intriguing dimension of this allegory is Plato's foresight to advocate how authentic leaders of the State must be made to continually ascend to gain the greater knowledge and then descend to participate in the work of the less informed. Plato describes this as the preferred means to spread the cultural values and newly acquired knowledge amongst the people of the State. Plato concludes this allegory with a telling description of what he sees as the manifest political effects of two highly contrasted leadership styles: "Whereas the truth is that the State in which the rulers are most reluctant to govern is

always the best and most quietly governed, and the State in which they are most eager, the worst". (Plato)

A leader's pursuit with regard to building and sustaining dynamic people-driven processes might be comparable to the labors of Sisyphus in Greek mythology (Eiermann, 1996). Sisyphus, for less virtuous reasons than we have here, is destined to continually roll a stone up a hill only to have his traction give way as he nears the top. Maintaining highly adaptable people-driven processes may be similar. You can however, eventually roll the process over this mythological hill. It then takes off on its own momentum. Open conduits that flow compelling information shape participant perceptions and build momentum. This should be reflected in an organization that learns fast and acts quicker because members work smarter and continually shape and polish the process as they go. Over the process continuum, these behaviors should induce the potential for surprisingly better cost advantage results.

## References

- Alkin, M.C., (Ed.). (1992). *Encyclopedia of educational research* (6th edition Volume I). New York: Macmillan.
- Baseball Almanac, Inc. (2005, May 12). *Offensive stats 101: Formulas / definitions / examples*. Retrieved May, 12, 2005, from <http://www.baseball-almanac.com/stats.shtml>
- Block, P (1996). *Stewardship: Choosing service over self-interest*. San Francisco, CA: Berret-Koehler Publishers.
- Boulding, K.E. (1985). *Human betterment*. Beverly Hills, CA: Sage.
- Cho, H.J. (2000). *The validity and reliability of the organizational culture questionnaire*. Retrieved November 9, 2003, from [http://www.denisonculture.com/Validity Of Denison Questionnaire.pdf/](http://www.denisonculture.com/Validity%20Of%20Denison%20Questionnaire.pdf/)
- Csikszentmihalyi, M., & Figurski, T.J. (1982). Self-awareness and aversive experience in everyday life. *Journal of Personality*, 50, 15-28.
- Csikszentmihalyi, M. (1990). *Flow: The psychology of optimal experience*. New York: Harper & Row.
- Csikszentmihalyi, M. (2003). *Good business: Leadership, flow, and the making of meaning*. New York: Viking.
- Denison, D. R. (1990). *Corporate culture and organizational effectiveness*. New York: Wiley.
- Eiermann, K. (Ed.). (1996). *The Myth of Sisyphus*. Retrieved June 15, 2005, from <http://stripe.colorado.edu/~morrsto/sisyphus.html>
- Festinger, L. (1957). *A theory of cognitive dissonance*. Stanford, CA: Stanford University Press.
- Forrester, R. (1995). Implications of lean manufacturing for human resource strategy. *Work Study*, 44(3), 20-24.
- George, B. (2003). *Authentic leadership: Rediscovering the secrets to creating lasting value*. San Francisco, CA: Jossey-Bass

- Glaser, S.R., Zamanou, S., & Hacker, K. (1987). Measuring and interpreting organizational culture. *Management Communication Quarterly*, 1, 173-198.
- Goleman, D. (1995). *Emotional intelligence: Why it can matter more than IQ*. New York: Bantam Books.
- Greenaway, D., Bleaney, M.F., & Stewart, I. (Eds.). (1991). *Companion to contemporary economic thought*. London: Routledge
- Hakes, K. & Sauer, D. (2004) *A probability based measure of productivity in major league baseball with application to the questions of clutch performance & the value of pitching*. John E. Walker Dept. of Economics, Clemson University. Retrieved June 4, 2005 from: <http://hubcap.clemson.edu/~sauerr/papers.html>
- Harmon-Jones, E., & Mills, J., (Ed.). (1999). *Cognitive dissonance: Progress on a pivotal theory in social psychology*. Washington, D. C.: American Psychological Association.
- Kaplan, R.S. & Norton, D.P. (2001). *The strategy-focused organization: How balanced companies thrive in the new business environment*. Boston, MA: Harvard Business School Press.
- Koestenbaum, P. (1997) *Leadership: The inner side of greatness*. San Francisco, CA: Jossey-Bass.
- Larson, J. R., Jr., Christensen, C., Abbott, A. S., & Franz, T. M. (1996). Diagnosing groups: Charting the flow of information in medical decision making teams. *Journal of Personality and Social Psychology*, 71, 315–330.
- Larson, J. R., Jr., Foster-Fishman, P. G., & Franz, T. M. (1998). Leadership style and the discussion of shared and unshared information in decision-making groups. *Personality and Social Psychology Bulletin*, 24, 482–495.
- Larson, J. R., Jr., Sargis, E.G., Elstein, A.S., & Schwartz, A. (2002). Holding shared versus unshared information: Its impact on perceived member influence in decision-making groups. *Basic and Applied Social Psychology*, 24, 145–155
- Madzar, S. (2001). Subordinates' information inquiry: Exploring the effect of perceived leadership style and individual differences. *Journal of Occupational and Organizational Psychology*, 74, 221-235
- May, R. (1965). Intentionality, the heart of human will [electronic version]. *The Journal of Humanistic Psychology*, 2, 202-209.

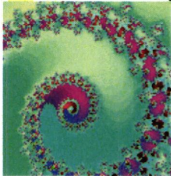
- Monte, C. (1999) *Beneath the mask: An introduction to theories of personality* (6<sup>th</sup> ed.). New York: Harcourt Brace College.
- Murgolo-Poore, M.E., Pitt, L.F., Berthon, P.R., & Prendegast, G. (2003) Corporate intelligence dissemination as a consequence of intranet effectiveness. *Public Relations Review*, 29, p171-184.
- Nunnally, J. C. (1978). *Psychometric theory* (2nd ed.). New York: McGraw-Hill
- Petrides, K. V., & Furnham, A. (2003). Trait emotional intelligence: Behavioural validation in two studies of emotion recognition and reactivity to mood induction. *European Journal of Personality*, 17, 39-57.
- Plato, *The Allegory of the Cave, Book VII of Plato's Republic*. Retrieved January 11, 2004, from [Augsburg College Blackboard for course ML-531]  
[http://courseinfo.augsburg.edu/bin/common/course.pl?course\\_id=\\_531](http://courseinfo.augsburg.edu/bin/common/course.pl?course_id=_531)
- Poppendieck, M. (2003). Lean development and the predictability paradox. Retrieved March 22, 2004, from [www.poppendieck.com/pdfs/Predictability\\_Paradox.pdf](http://www.poppendieck.com/pdfs/Predictability_Paradox.pdf)
- Rubin, R.B., Palmgreen, P., & Sypher, H.E. (Ed.). (1994). Organizational culture survey. *Communication Research Measures: A Sourcebook*. 263-267. New York: The Guilford Press.
- Safire, W. (2003, December 29). Aesop's fabled fox. [Editorial Column] (Democrats who criticize secretive energy task force should call on Howard Dean to release Vermont papers) *The New York Times*, p. A17.
- Sandelands, L., Glynn, M.A., & Larson, J.R. Jr. (1991). Control theory and social behavior in the workplace. *Human Relations*, 44, 1107-1131.
- Sefton, D. (2003, September 29). Creatures of habit. *Pioneer Press*. Retrieved May 16, 2004, from [www.twincities.com/mld/pioneerpress/6869941.htm](http://www.twincities.com/mld/pioneerpress/6869941.htm)
- Senge, P. M. (1994). *The fifth discipline: The art and practice of the learning organization*. New York: Doubleday.
- Sewell, G. (1994). What goes around comes around: Inventing a mythology of empowerment. Retrieved April 15, 2005, from <http://www.management.unimelb.edu.au/Research/papers/wph7.pdf>
- Szenberg, M., (Ed.). (1992). *Eminent Economists – Their life philosophies*. New York: Cambridge University Press.

- Townsend, G.F. (ed.). (2005). *The Fox and the Grapes*. Retrieved December 9, 2005, from <http://www.literature.org/authors/aesop/fables/chapter-209.html>
- Underwood, M. (Ed.). (2003). Consistency theory: Cognitive dissonance. Communication, cultural, and media studies. Retrieved Sept 14, 2005, <http://www.cultsock.ndirect.co.uk/MUHome/cshtml/index.html>
- Wheatley, M.J. (1999). *Leadership and the new science: Discovering order in a chaotic world*. San Francisco, CA: Berrett-Koehler.
- Wikipedia. (2004, May 2). Free-content encyclopedia. Retrieved September 14, 2005, from <http://en.wikipedia.org/w/index.php?title=TiVo&oldid=3465293>
- Wikipedia. (2004, October 24). Free-content encyclopedia. Retrieved September 20, 2005, from [http://en.wikipedia.org/wiki/Group\\_think](http://en.wikipedia.org/wiki/Group_think)
- Wittenbaum, G.M., Hubbell, A.P., & Zuckerman, C. (1999). Mutual enhancement: Toward an understanding of the collective preference for shared information. *Journal of Personality and Social Psychology*, 77, 967-978.
- Womack, J.P., & Jones, D.T.;(1996). *Lean thinking – Banish waste and create wealth in your corporation*. London: Simon & Schuster.
- Yolles, M., & Guo, K. (2003). Paradigmatic metamorphosis and organizational development (Research Paper): A discussion of a cybernetic theory of organizational patterning. *Systems Research and Behavioral Science*, 20, 177-199.

Appendix A:

Model of a Chaotic People-Driven Process

Information flow conduits carry **transmitted** information **downstream** to the **receivers** and take in bits and pieces of upstream realities of how processes truly perform with regard to efficiency and effectiveness



**Management Vortex**

The management challenge is within its smaller sphere of influence. Alignment is critical to the centerline of process dynamics  
Is it aligned with a customer focus?  
Who does the organization serve via this process?

**Goals that Compete or Support**

What is my self-fulfilling interest in supporting these goals?  
Do they conflict with my desires or values?

**Participating Roles**

What is my Role and how will my participation be rated?  
Am I more than my Position or am I mainly a small cog in a larger machine?

**People-Driven Process**

How do I fulfill my roll in a given Process?  
How can I contribute?

**Relationships that coalesce or disengage**

What are the Team dynamics in the work I do as a process participant?  
How will these actions affect me?

Figure 1. The model describes a set of questions that influence of participant perception based on the answers participants hold in reference to these questions. Positive self-adaptation is anticipated when participants seek and find information that provides them with new ways of thinking about the causal relationships their actions, and those of fellow participants, have on process fulfillment.



Appendix B: Questionnaire (*As sent to participants*)

Subject: The Study of Information flow in Dynamic Processes

{####1.PROGRAMMATIC PROCESS SURVEY EFORM ~ REV B1  
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This questionnaire is part of an Augsburg College graduate study by Jim Hennen. The study examines participant perception of quality, relevance, and accessibility of information felt to have an impact on work processes. In other words, how meaningful and useful is the information to those doing fieldwork within a variety of dynamic customer situations?

You are part of a sample of worldwide field-based service personnel asked to share feedback about your experiences with the dynamics and related information flow we use in our daily work processes. Your responses will give your leadership team insights about the aspects of our processes that are important to you as well as how satisfied you are with them. Individual responses are automatically compiled into generic composite with no individual responses reported. Participation is completely voluntary and much appreciated.

Your service organization is interested in systematically listening to its team members. Therefore, your thoughtful and candid responses to this survey are very important.

Sincerely,  
Jim Hennen  
952-937-4615  
[hennenjl@augsborg.edu](mailto:hennenjl@augsborg.edu)

\*\* Please note: You will need approximately 25-35 minutes to complete the survey. \*\*

**1. Most employees are highly involved in their work.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

**2. Decisions are usually made at the level where the best information is available.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

**3. Information is widely shared so that everyone can get the information he or she needs when it's needed.**

- Strongly disagree
- Disagree

- Neutral
- Agree
- Strongly Agree

4. **Everyone believes that he or she can have a positive impact.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

5. **People actively seek information that improves the work we do in the field and our remote offices.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

6. **We are encouraged and expected to participate in decision-making in significant and dynamic ways.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

7. **This company encourages people to contribute ideas for improving work processes and the work environment.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

8. **I have appropriate freedom in deciding how to do my work.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

9. **Cooperation across different parts of the organization is actively encouraged.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

10. **People work like they are part of a team.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

11. **Teamwork is the preferred approach in work completion.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
12. **Work is organized so that each person can see the relationship between his or her job and the goals of the organization.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
13. **Teams receive training in how to work and learn in groups.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
14. **Local team members tend to be competitive towards each other.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
15. **Authority is delegated so that people can act on their own.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
16. **The "bench strength" (capability of people) is constantly improving.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
17. **There is continuous investment in the skills of employees.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
18. **The capabilities of people are viewed as an important source of competitive advantage.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree

Strongly Agree

19. **Problems often arise because we do not have the skills necessary to do the job.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

20. **People are trained in the skills of creative thinking and experimentation.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

21. **The leaders and managers "practice what they preach."**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

22. **There is a characteristic management style and a distinct set of management practices.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

23. **There is a clear and consistent set of values that governs the way we do business.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

24. **Ignoring core values will get you in trouble.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

25. **There is an ethical code that guides our behavior and tells us right from wrong.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

26. **Employees are allowed to express their ideas without fear of negative consequences.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
27. **Management believes that sharing of power is key to sustaining our success.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
28. **When disagreements occur, we work hard to achieve win-win solutions.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
29. **There is a "strong" culture.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
30. **It is easy to reach consensus, even on difficult issues.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
31. **There is a clear agreement about the right way and the wrong way to do things.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
32. **We often have trouble reaching agreement on key issues.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
33. **Our approach to doing business is very consistent and predictable.**  
 Strongly disagree  
 Disagree  
 Neutral

- Agree
- Strongly Agree

34. People from different parts of the organization share a common perspective.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

35. It is easy to coordinate activities across different parts of the organization.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

36. Working with someone from another part of this organization is like working with someone from a different organization.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

37. Our intranet is an effective solution for bringing people within the organization together.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

38. The way things are done is very flexible and easy to change.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

39. We respond well to competitors and other changes in the business environment.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

40. New and improved ways to do work are continually adopted.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

41. **Attempts to create change usually meet with resistance.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
42. **Different parts of the organization often cooperate to create change.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
43. **There has been an adequate flow of information about changes in our internal processes and external customer environments to help guide our decision-making.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
44. **Customer comments and recommendations often lead to changes.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
45. **Customer input directly influences our decisions.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
46. **All members have a deep understanding of customer wants and needs.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
47. **The interests of the customer often get ignored in our decisions.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
48. **We encourage direct contact with customers by our people at various levels of our organization.**  
 Strongly disagree  
 Disagree  
 Neutral

- Agree
- Strongly Agree

49. **We actively seek learning partners among customers and our vendor / suppliers.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

50. **We actively share information with our customers, to obtain their ideas and inputs in order to learn and improve services/products.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

51. **There are sufficient and effective means to continuously acquire and analyze the environmental information (e.g. customer trends and external competitors).**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

52. **Our Intranet provides access to a wider technical understanding of products and services we market and provide support to our Customers.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

53. **We learn from failures as well as successes.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

54. **Innovation and risk taking are encouraged and rewarded.**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

55. **Lots of things "fall between the cracks".**

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree



56. **Learning is an important objective in our day-to-day work.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
57. **We make certain that the "right hand knows what the left hand is doing."**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
58. **We see continuous learning by all employees as a high priority.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
59. **We are encouraged and expected to manage our own learning and development.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
60. **Individuals are trained and coached in learning how to learn.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
61. **We use an action-learning process. (that is, learning from careful reflection on the problem or situation, and applying it to future actions.)**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
62. **We are committed to continuous learning for improvement.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
63. **We reward people and teams for learning and helping others learn.**  
 Strongly disagree  
 Disagree

- Neutral
- Agree
- Strongly Agree

64. **People are aware of the need to retain important organizational learning and share such knowledge with others.**
- Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree
65. **The intranet in our organization is very helpful as a general learning tool.**
- Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree
66. **I often use our intranet as a research tool to find the information I need.**
- Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree
67. **The function of refining, integrating, analyzing, and distributing external and internal process-related information are apparent and useful.**
- Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree
68. **People avoid distortion of information and blocking of communication channels through skills such as active listening and effective feedback.**
- Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree
69. **People have full access to the data they need to do their jobs effectively.**
- Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree
70. **We can adapt software systems to collect, code, store, create, and transfer information in ways bes**
- Strongly disagree

- Disagree
- Neutral
- Agree
- Strongly Agree

71. Our electronic support performance systems enable us to learn and to do our work better.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

72. People have ready access to the information highway (local area networks, internet, on-line, etc.)

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

73. We have accessible business systems, which are used for collecting internal and external information.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

74. Members within our local group have adopted an effective and accurate lateral information flow for themselves.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

75. A very efficient structure information flow has been established and shared between the work groups.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

76. There is a long-term purpose and direction in our organization.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

77. Leaders have a long-term viewpoint.

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly Agree

78. **Our strategy leads other organizations to change the way they compete in the industry.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
79. **There is a clear mission in our local group that gives meaning and direction to our work.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
80. **There is a clear strategy for the future.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
81. **Our strategic direction is unclear to me.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
82. **Our intranet helps me stay current with our implementation of business strategy.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
83. **There is widespread agreement about goals.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree
84. **Leaders set goals that are ambitious, but realistic.**  
 Strongly disagree  
 Disagree  
 Neutral  
 Agree  
 Strongly Agree

85. **We continuously track our progress against our stated goals.**
- Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree
86. **People understand what needs to be done for us to succeed in the long run.**
- Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree
87. **Short-term thinking often compromises reaching our long-term Goals.**
- Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree
88. **The leadership has "gone on record" about the objectives we are trying to meet.**
- Strongly disagree
  - Disagree
  - Neutral
  - Agree
  - Strongly Agree

Thank you for your time and thoughtful responses to this survey!

{###1.PROGRAMMATIC PROCESS SURVEY EFORM ~ REV B1  
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## Appendix C: Computations of Composite Rank Orders for each Process Metric

Trended Labor Utilization Metrics - Data trended over 19 monthly fiscal periods			
Variable Name	X	Weight	Description of Variable
1. Rank of service diversity	x	1	Activity measure of service work volume and variety
2. Rank of direct labor %	x	0.9	Average direct labor based on available time to work
3. Rank of direct labor hours	x	0.2	Total direct labor hours reported
4. Inverse rank weekend indirect labor	x	0.2	Total weekend indirect labor hrs reported
5. Inverse rank SD of direct labor %	x	5	Std. Dev. of direct labor% over 19 periods

Sum of weighted rank ordering is then Rank ordered with lowest total score given a rank of 1

AMP Service Contract Metrics – Data trended over 24 month period (minimum 3 contracts)			
Variable Name	X	Weight	Description of Variable
1. Rank contract margin %	x	1	Margin % =[(revenue\$ - cost\$) / (revenue\$)]
2. Rank margin \$ per contract	x	0.5	Margin dollars = revenues - delivery costs
3. Rank of total contracts	x	0.5	Total number of contracts.
4. Inverse rank margin % variance	x	2	Margin fluctuation across pre-planned contracts

Sum of weighted rank ordering is then Rank ordered with lowest total score given a rank of 1

Rate of Task Completion Metrics – Data trended over 30 month period			
Variable Name	X	Weight	Description of Variable
1. Rank of combined service reports	x	1	Service Reports registered as received from the field
2. Rank average elapsed time	x	1	Average days between work done and registered dates
5. Inverse rank of Std. Dev.	x	2	Standard deviations in days of elapsed interval

Sum of weighted rank ordering is then Rank ordered with lowest total score given a rank of 1

Revenue to Margin Production Metrics – Data trended over 12 monthly fiscal Period			
Variable Name	X	Weight	Description of Variable
1. Rank of margin %	x	1	Margin% = [(Revenue\$ - Cost\$) / (Revenue\$)]
2. Rank of margin dollars	x	4	Margin\$ = (Revenue\$ - Cost\$)

Sum of weighted rank ordering is then Rank ordered with lowest total score given a rank of 1

## Appendix D: Factor Analysis\* of Questionnaire Items

ITEM	Components						
	Customer orientation	Sense of purpose	Adaptability for learning & change	Sense of collaboration	Consistency of action	Information flow	Sense of involvement
	1	2	3	4	5	6	7
47	<b>0.693</b>	0.264	-0.086	0.341	0.085	-0.161	0.215
48	<b>0.682</b>	-0.174	0.268	0.230	0.260	0.154	0.138
46	<b>0.659</b>	0.209	-0.035	0.166	0.028	-0.117	0.039
53	<b>0.580</b>	0.196	0.105	0.234	0.452	-0.065	0.114
7	<b>0.541</b>	0.144	0.221	0.073	0.282	0.101	0.115
49	<b>0.525</b>	0.160	0.153	0.101	0.139	0.354	0.286
54	<b>0.503</b>	0.479	0.158	0.043	0.239	-0.004	0.115
6	0.497	0.197	0.132	-0.058	0.296	0.192	0.094
41	<b>0.495</b>	0.168	0.146	0.137	-0.035	0.155	0.146
50	0.489	0.218	0.196	0.337	-0.183	0.291	0.058
59	0.484	0.084	0.326	-0.347	0.261	-0.133	-0.134
45	0.484	-0.084	0.221	0.428	0.042	0.302	0.101
58	0.477	0.202	0.468	0.132	0.155	0.169	0.145
9	0.428	0.064	0.298	0.244	0.258	0.080	0.143
44	0.417	0.198	0.309	0.253	-0.039	0.089	-0.020
28	0.383	0.209	0.110	0.227	0.355	0.004	-0.076
14	0.378	0.241	0.057	-0.243	-0.117	0.051	-0.068
38	0.372	0.125	0.227	0.340	-0.026	0.035	0.042
77	0.256	<b>0.757</b>	0.066	0.119	0.142	0.159	-0.179
80	0.222	<b>0.748</b>	0.302	0.081	0.026	-0.038	0.002
79	0.075	<b>0.682</b>	0.249	0.093	0.169	-0.098	0.077
18	-0.012	<b>0.635</b>	0.052	0.209	0.275	-0.011	0.348
76	0.056	<b>0.627</b>	0.230	0.177	0.319	0.091	-0.107
81	0.256	<b>0.586</b>	0.240	0.138	0.068	0.068	0.013
85	0.192	<b>0.502</b>	0.013	0.164	0.032	0.146	0.042
16	0.169	0.487	0.212	0.153	0.118	-0.018	0.188
12	0.349	0.474	0.216	0.049	0.280	-0.105	0.107
52	0.065	0.422	0.113	0.372	0.074	0.297	0.239
43	0.008	0.378	0.120	0.195	0.230	0.340	0.226
60	0.163	0.126	<b>0.756</b>	0.146	-0.073	0.018	0.091
56	0.267	-0.007	<b>0.606</b>	0.024	0.170	-0.099	0.130
62	0.325	0.244	<b>0.578</b>	0.265	0.102	-0.182	0.122
64	0.060	0.370	<b>0.542</b>	-0.082	-0.076	0.146	0.199
42	-0.051	0.016	<b>0.538</b>	0.157	0.238	-0.035	0.166
63	0.459	0.257	<b>0.511</b>	0.000	0.089	0.334	0.007
13	0.168	0.040	<b>0.506</b>	0.311	0.210	-0.112	0.104
71	-0.029	0.242	0.494	0.103	-0.041	0.105	0.207
75	0.223	0.053	0.464	0.437	0.204	-0.096	-0.112
86	0.241	0.335	0.443	0.008	0.204	0.197	-0.236
67	0.181	0.175	0.443	0.184	0.303	0.053	-0.026
88	0.194	0.273	0.432	0.085	0.076	-0.003	0.023
68	0.361	-0.032	0.431	0.301	0.240	0.186	0.054
73	-0.061	0.282	0.401	0.133	0.359	0.034	-0.089
40	0.189	0.363	0.400	0.285	0.084	0.048	0.095
61	0.174	0.218	0.368	0.258	0.317	-0.042	-0.225

15	0.015	0.312	0.360	-0.061	0.348	0.139	0.173
74	-0.036	0.223	0.266	0.007	0.247	-0.007	-0.231
<b>69</b>	-0.092	-0.093	0.118	<b>0.756</b>	0.048	0.099	0.132
<b>35</b>	0.123	0.126	0.227	<b>0.705</b>	0.196	0.056	-0.117
57	0.381	0.254	0.317	<b>0.524</b>	0.048	0.053	0.237
<b>36</b>	0.107	0.274	0.160	<b>0.517</b>	0.042	0.052	-0.123
<b>34</b>	0.197	0.218	-0.009	<b>0.510</b>	0.019	-0.075	-0.067
51	0.082	0.202	0.103	0.495	0.098	0.331	0.184
10	0.095	0.312	-0.104	0.492	0.072	-0.208	0.298
2	0.315	0.062	0.156	0.444	0.268	0.025	0.267
17	0.053	0.151	0.414	0.443	0.183	-0.039	0.186
21	0.194	0.341	0.066	0.431	0.183	-0.010	0.225
55	0.385	0.026	0.291	0.415	0.006	-0.361	-0.073
32	0.120	0.156	0.052	0.389	0.334	-0.097	0.130
39	0.304	0.196	0.362	0.373	-0.007	0.254	-0.092
<b>25</b>	0.121	0.072	0.049	-0.057	<b>0.610</b>	0.020	0.015
<b>33</b>	-0.088	0.219	0.111	0.191	<b>0.600</b>	0.189	0.196
<b>31</b>	0.003	-0.042	0.057	0.046	<b>0.577</b>	0.106	-0.030
27	0.414	0.242	0.183	0.052	<b>0.526</b>	0.198	0.005
30	0.060	0.117	0.089	0.405	<b>0.508</b>	-0.088	0.064
26	0.233	0.347	-0.074	0.243	0.492	0.013	0.257
72	0.161	0.011	-0.083	0.290	0.469	-0.047	-0.158
78	0.160	0.172	0.350	-0.039	0.463	-0.082	0.048
29	0.142	0.211	0.272	-0.112	0.460	-0.115	-0.223
23	0.118	0.270	0.056	0.185	0.427	0.140	0.104
8	0.047	0.332	0.107	0.156	0.349	0.074	0.209
11	0.104	0.139	0.177	0.027	0.328	-0.044	0.170
22	-0.322	0.075	0.251	0.134	0.323	0.070	0.130
<b>82</b>	0.315	0.288	0.038	0.098	-0.033	<b>0.665</b>	0.047
<b>19</b>	-0.120	0.052	0.155	0.129	-0.069	<b>-0.601</b>	0.112
<b>66</b>	0.137	0.283	0.157	0.214	0.109	<b>0.568</b>	-0.280
<b>65</b>	0.258	0.263	0.200	0.200	0.034	<b>0.541</b>	-0.043
87	0.255	0.430	0.133	-0.001	0.208	-0.483	-0.080
37	0.249	0.199	0.236	0.094	0.206	0.481	0.086
24	-0.094	-0.097	0.035	-0.044	0.362	0.432	0.152
20	0.046	0.266	0.115	0.303	0.165	-0.364	0.013
<b>5</b>	0.205	0.171	0.271	0.003	0.096	-0.119	<b>0.615</b>
<b>4</b>	0.187	0.090	0.113	0.143	0.152	0.078	<b>0.598</b>
1	0.028	-0.167	-0.111	0.174	0.440	-0.174	<b>0.560</b>
<b>3</b>	0.161	0.030	0.235	0.221	0.043	-0.027	<b>0.558</b>
83	0.069	0.092	0.202	-0.075	-0.227	0.163	<b>0.453</b>
84	0.182	0.262	0.256	0.021	0.047	0.184	0.338
Initial Eigenvalues	21.66	4.10	3.82	3.27	3.13	2.96	2.66
% of Variance	24.90	4.72	4.37	3.76	3.60	3.40	3.06

\* Extraction Method: Principal Component Analysis.

Rotation Method: Varimax with Kaiser Normalization. Rotation converged in 15 iterations.



## Appendix E: Reliability Statistics of Index Variables

## Customer orientation

Cronbach's Alpha		Cronbach's Alpha Based on Standardized Items			N of Items
.744		.742			3
Questionnaire ITEM Number	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
46	6.35	2.652	.572	.370	.628
47	6.01	2.408	.625	.413	.559
48	5.50	2.535	.478	.233	.741

## Sense of purpose

Cronbach's Alpha		Cronbach's Alpha Based on Standardized Items			N of Items
.874		.878			6
Questionnaire ITEM Number	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
18	19.10	15.570	.600	.447	.852
76	19.64	14.668	.669	.462	.843
77	20.03	14.666	.696	.547	.839
79	19.44	15.902	.668	.491	.844
80	19.87	14.722	.794	.729	.826
81	20.14	14.472	.661	.596	.845
85	19.17	17.767	.396	.267	0.874**

## Adaptability for learning and change

Cronbach's Alpha		Cronbach's Alpha Based on Standardized Items			N of Items
.774		.772			3
Questionnaire ITEM Number	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
42	10.07	3.181	.439	.224	.774**
56	9.23	3.148	.522	.300	.727
60	10.55	2.851	.611	.430	.678
62	9.75	2.935	.697	.498	.638

## Sense of collaboration

Cronbach's Alpha		Cronbach's Alpha Based on Standardized Items			N of Items
.715		.715			4
Questionnaire ITEM Number	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
34	8.97	3.882	.458	.215	.682
35	8.90	3.534	.641	.435	.564
36	8.68	3.985	.496	.326	.656
69	8.36	4.323	.424	.204	.696

## Consistency of action

Cronbach's Alpha		Cronbach's Alpha Based on Standardized Items			N of Items
.719		.719			2
Questionnaire ITEM Number	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
25	6.60	2.157	.335	.112	.719**
31	7.50	1.442	.553	.333	.445
33	7.44	1.294	.558	.339	.437

## Information flow structures &amp; content

Cronbach's Alpha		Cronbach's Alpha Based on Standardized Items			N of Items
.752		.752			3
Questionnaire ITEM Number	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
19	10.03	-.238	4.599	.235	0.752**
65	6.83	.619	2.169	.398	.629
66	6.33	.528	2.310	.279	.737
82	6.94	.609	2.391	.386	.647

## Sense of involvement

Cronbach's Alpha		Cronbach's Alpha Based on Standardized Items			N of Items
.685		.688			3
Questionnaire ITEM Number	Scale Mean if Item Deleted	Scale Variance if Item Deleted	Corrected Item-Total Correlation	Squared Multiple Correlation	Cronbach's Alpha if Item Deleted
3	6.99	2.194	.444	.205	.669
4	6.69	2.157	.567	.329	.503
5	6.62	2.389	.493	.272	.599

\*\* These items were deleted to improve reliability

Appendix F: Descriptive Statistics, Coefficient Alphas, and Pearson Correlations for Index Variables

Correlations of seven indexes with listwise deletions	Numbers inside the parenthesis are coefficient alpha. (Listwise N = 72)								
	Mean	Std. Dev.	Index #1	Index #2	Index #3	Index #4	Index #5	Index #6	Index #7
INDEX #1 – Customer orientation	2.98	.774	<b>(.744)</b>						
INDEX #2 – Sense of purpose	3.22	.723	.427*	<b>(.874)</b>					
INDEX #3 – Adaptability for learning & change	3.37	.593	.436*	.426*	<b>(.774)</b>				
INDEX #4 – Sense of collaboration	2.91	.642	.439*	.402*	.343*	<b>(.715)</b>			
INDEX #5 – Consistency of action	3.29	.747	0.221	.347*	0.144	0.216	<b>(.719)</b>		
INDEX #6 – Information flow	3.35	.729	.370*	.472*	.350*	.391*	0.215	<b>(.752)</b>	
INDEX #7 – Sense of involvement	3.38	.696	.424*	.335*	.464*	.326*	0.199	0.21	<b>(.685)</b>

\* Correlations are significant at the 0.01 level (2-tailed).

## Appendix G: Descriptive Statistics of Process Metrics

## Labor Utilization Data

Descriptive Statistics	N	M	SD	Min	Max	Percentiles		
						25th	50th (Median)	75th
Total Direct Labor Hours	74	1959.8	556.5	150	3119	1612	1910	2374
Average Direct Labor %	74	61.53%	15.87%	6%	98%	53.9%	59.65%	72.6%
Std Dev Direct Labor %	74	14.60%	4.29%	5%	25%	11.6%	14.1%	17.1%
Diversity of Service Work	74	80.28	40.58	1.00	173.0	53.25	78.0	108.25
Weekend Indirect Labor	74	5.80	9.34	00	62.0	.00	2.5	8.5

## AMP Service Contract Data

Descriptive Statistics	N	M	SD	Min	Max	Percentiles		
						25 <sup>th</sup>	50 <sup>th</sup> (Median)	75 <sup>th</sup>
Contract Margin %	54	45.59%	14.45%	.0363	.7548	38.5%	46.6%	54.9%
Margin \$ per Contract	54	\$5,200	\$3,811	\$158	\$18,967	\$2,446	\$4,290	\$6,776
Total # contracts >3	54	13.33	8.1	4	35	8.00	11.0	16.50
Variance of Margin %	54	4.97%	7.61%	.0002	41.76%	0.67%	1.83%	6.44%

## Factor Analysis – Rate of Task Completion Data

Descriptive Statistics	N	M	SD	Min	Max	Percentiles		
						25th	50th (Median)	75 <sup>th</sup>
Total Combined Service Reports	74	109.8	46.5	5.0	312.0	82.8	111.0	133.2
Average Elapsed time to closure	74	27.4	13.9	9.2	72.80	16.8	25.4	32.9
Std Dev in Elapsed time to Closure	74	30.1	17.2	4.1	72.07	14.6	27.4	41.4

## Revenue to margin production by work center over 12 fiscal periods

Descriptive Statistics	N	M	SD	Min	Max	Percentiles		
						25th	50th (Median)	75 <sup>th</sup>
MARGIN %	64	48.3%	9.07%	12.9%	61.9%	44.2%	51.3%	53.9%
MARGIN dollars	64	\$123,689	\$79,068	\$12,310	\$464,307	\$73,898	\$110,398	\$138,861

## Appendix H: ANOVA Tests of Index Variables per Process Metrics

Labor Utilization: first versus fourth quartile performance groups						
ANOVA Group Comparison of Means		Sum of Squares	df	Mean Square	F	Sig.
Customer orientation	Between Groups	3.093	1	3.093	5.896	.021
	Within Groups	17.309	33	.525		
	Total	20.402	34			
Sense of purpose	Between Groups	3.848	1	3.848	8.111	.008
	Within Groups	15.655	33	.474		
	Total	19.502	34			
Adaptability for learning & change	Between Groups	.578	1	.578	1.903	.177
	Within Groups	10.018	33	.304		
	Total	10.596	34			
Sense of collaboration	Between Groups	.779	1	.779	1.544	.223
	Within Groups	16.652	33	.505		
	Total	17.431	34			
Consistency of action	Between Groups	1.817	1	1.817	3.439	.073
	Within Groups	17.434	33	.528		
	Total	19.251	34			
Information flow & content	Between Groups	.861	1	.861	2.010	.166
	Within Groups	14.129	33	.428		
	Total	14.990	34			
Sense of involvement	Between Groups	1.341	1	1.341	3.079	.089
	Within Groups	14.371	33	.435		
	Total	15.712	34			

## Service Contract Delivery: first versus fourth quartile performance groups

ANOVA Group Comparison of Means		Sum of Squares	df	Mean Square	F	Sig.
Customer orientation	Between Groups	6.627	1	6.627	18.46	.000
	Within Groups	8.608	24	.359		
	Total	15.235	25			
Sense of purpose	Between Groups	2.828	1	2.828	11.66	.002
	Within Groups	5.822	24	.243		
	Total	8.650	25			
Adaptability for learning & change	Between Groups	.164	1	.164	.376	.546
	Within Groups	10.507	24	.438		
	Total	10.671	25			
Sense of collaboration	Between Groups	1.315	1	1.315	4.893	.037
	Within Groups	6.452	24	.269		
	Total	7.768	25			
Consistency of action	Between Groups	3.286	1	3.286	7.526	.011
	Within Groups	10.478	24	.437		
	Total	13.763	25			
Information flow & content	Between Groups	2.547	1	2.547	5.648	.026
	Within Groups	10.822	24	.451		
	Total	13.368	25			
Sense of involvement	Between Groups	2.101	1	2.101	6.253	.020
	Within Groups	8.064	24	.336		
	Total	10.165	25			



## Rate of Task Completion: first versus fourth quartile performance groups

ANOVA Group Comparison of Means		Sum of Squares	df	Mean Square	F	Sig.
Customer orientation	Between Groups	4.101	1	4.101	6.592	.015
	Within Groups	19.909	32	.622		
	Total	24.010	33			
Sense of purpose	Between Groups	2.466	1	2.466	5.619	.024
	Within Groups	14.044	32	.439		
	Total	16.511	33			
Adaptability for learning & change	Between Groups	.086	1	.086	.276	.603
	Within Groups	10.000	32	.313		
	Total	10.086	33			
Sense of collaboration	Between Groups	1.518	1	1.518	3.241	.081
	Within Groups	14.985	32	.468		
	Total	16.503	33			
Consistency of action	Between Groups	1.505	1	1.505	2.346	.135
	Within Groups	20.530	32	.642		
	Total	22.036	33			
Information flow & content	Between Groups	.847	1	.847	1.466	.235
	Within Groups	18.484	32	.578		
	Total	19.331	33			
Sense of involvement	Between Groups	.329	1	.329	.766	.388
	Within Groups	13.740	32	.429		
	Total	14.069	33			





## Revenue to Margin Production: first versus fourth quartile performance groups

ANOVA Group Comparison of Means		Sum of Squares	df	Mean Square	F	Sig.
Customer orientation	Between Groups	.488	1	.488	1.235	.276
	Within Groups	11.455	29	.395		
	Total	11.943	30			
Sense of purpose	Between Groups	.008	1	.008	.018	.893
	Within Groups	12.625	29	.435		
	Total	12.633	30			
Adaptability for learning & change	Between Groups	.064	1	.064	.161	.691
	Within Groups	11.478	29	.396		
	Total	11.541	30			
Sense of collaboration	Between Groups	.078	1	.078	.232	.633
	Within Groups	9.674	29	.334		
	Total	9.751	30			
Consistency of action	Between Groups	.555	1	.555	1.255	.272
	Within Groups	12.832	29	.442		
	Total	13.387	30			
Information flow & content	Between Groups	.000	1	.000	.000	.995
	Within Groups	9.233	29	.318		
	Total	9.233	30			
Sense of involvement	Between Groups	.077	1	.077	.132	.719
	Within Groups	16.921	29	.583		
	Total	16.998	30			



## Appendix I: Constructing a Generic Formula for Process Creation

A methodology can be formed as a recipe to either create or modify a dynamic people-driven process. This method is the result of combining the findings of this research, the literature review, and the chaotic model of a people-driven process. This design is suggested as simple starting or entry point on a dynamic process continuum. The method is an iterative design that only ends iterating when the process is retired. It starts with a five-step analytical approach to fully study the attributes and dwells here until you can reasonably articulate the causality of the process. This is followed by measurement and iterative loop-backs.

- 1) Define the *proper* path of *least* resistance to yield the result with the least energy and *without* impeding another group or process.
- 2) Examine other processes that either add or subtract from the one being created.
- 3) Learn from processes with self-similarity to the one being developed or modified.
- 4) Define how *wide* the proper path is. This defines the acceptable variations between individuals following the path.
- 5) Consider TiVo'ng techniques to focus on the receiver's perceived relevance and access to useful information in regards to the work the process requires. The perception of 'usefulness' may often be different from what the transmitter, (in the role of manager, administrator, or leader), believes is the most relevant information.



- 6) Establish operational metrics to be used to gage overall process performance. These metrics should have similar attributes to the information flow considered in step 5.

Steps 5 and 6 should continually loop back and forth adapting, modifying, and refreshing the relevance of the information flowing bidirectional in the process. It is this continual loop back, where the “too much stability” effect may best be minimized.

- 7) Proceed down the wide path. Begin to look for the “value-subtractors” that impede the path, either by making the path sharply curve or via potholes in the path. These are easier to find than true value-adders often espoused for their “good looks” but seldom of true impact. Reconciling the “value-subtractors” is a kin to reducing the friction to building the desired process momentum.
- 8) Start over at step 1. Forming a periodic schedule to repetiviely review the process helps test assumptions and identify training needs as well as simple re-affirmation of the width and direction of the path.

This generic method of process management is inherently simple and constructed around just a few do’s and don’ts. Focus is placed on continuous and organic process evolution over time rather than reaching a static end goal.

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