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PROCESS IMPROVEMENT ON A SHOESTRING:

USING THE PONZIO ADS MATURITY MODEL (AMM) AS A KICK-START

A WHITE PAPER

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WHITE PAPER
PROCESS IMPROVEMENT ON A SHOESTRING:
THE PONZIO ADS MATURITY MODEL

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"Don't use a lot where a little will do."
- American Proverb

"Garbage-In, Garbage-Out."
- George Fuechsel *(IBM 305 RAMAC Technician/Instructor)*

"By three methods we may learn wisdom: first, by reflection, which is noblest; second, by imitation, which is easiest; and third, by experience, which is the most bitter.
- Confucius

1. INTRODUCTION

Broadly defined, process improvement is, "…a series of actions taken by a process owner to identify, analyze and improve existing processes within an organization to meet new goals and objectives. These actions often follow a specific methodology or strategy to create successful results (Bratić, 2011, p. 2)." Continuous process improvement (CPI) is the institutionalization of these improvement efforts as a viable cultural norm within the organization's mores and commonly held group values.

While little empirical data is generally available to the public on the full extent of "process improvement" activity—either nationally or internationally—extrapolating the results of Datamonitor's 2010 estimates of the Operations Management market segment gives a rough confirmation of the overall global importance of process improvement activity. Excluding corporate strategy services, human resource management services, and outsourcing services, the remaining Operations Management services and Information Technology services are together a convenient approximation of global "process improvement" service activity.

In 2009, the global Operations Management segment revenue totaled $71.5 billion; the global Information Technology segment revenue totaled $61.6 billion. This equals about 26.3 % and 22.6 %—together 48.9 %—of the $272.3 billion generated by the entire global management & marketing consultancy industry. This generated a combined amount of approximately $133 billion for these two segments. Despite a downturn in demand during the 2008-2009 recession, Datamonitor analysts forcast accelorated growth in this market, with an anticipated Compound Annual Growth Rate (CAGR) of 7.1% for the five-year period 2009-2014. Based upon these projections, the global Process Improvement market is expected to be $187.6 billion by the end of 2014.

Clearly, process improvement—under its many guises—is a hot topic of discussion, and an activity into which businesses and governments are investing heavily. However, process improvement—even on a massive cumulative scale—does not necessarily imply the adoption of CPI as a business cultural norm. The efficiency and effectiveness of current process improvement efforts are at the very least uneven, and at worst abysmal (Lefcowitz, 2006b, 2007a & 2007d).

Why then do process improvement efforts—an activity that is so current in our collective imagination—fall well short of our needs and expectations? When everything is said-and-done, the answer appears to be simply: bad data. We collect, or—inversely—fail to collect, the right data necessary to frame our questions, which inevitably lead us to collect yet more bad data. Ross and Perry (1999, p. 368) report a 1996 survey by the Institute of Management Accountants [1] whose results indicated that 82 % of its respondents said their companies were involved in a quality program of some type, but of those only 33 % of them actually calculated the Cost of Quality (COQ). [2] It was estimated—of those that did calculate the COQ—that quality costs averaged from about six to ten percent of revenue.

Even the most concerted, well-intentioned efforts to produce process improvements are doomed to failure when decision-makers make bad decisions on how to manage information, or make bad decisions based on data that lacks validation by a set of governance entities that support the business environment; i.e., *authoritative data*. Rather than arguing about what is the best data software application to use, businesses and organizations need to focus on the real issue, "What is the quality of data stored in my database, and how can I efficiently and effectively validate that only authoritative data is being stored and used?"

Bad decisions are costly. One company (Abrams, 2010) estimates that each spreadsheet used in business has a burdened cost of $3,000/year. A 2008 industry study (SirusDecisons, 2008) reports that the failure to follow data management best practices results in costs summarized by the "1-10-100" rule: "It takes $1 to verify a record as it is entered, $10 to cleanse and de-dupe it, and $100 if nothing is done, as the ramifications of the mistakes are felt over and over again." In a paper presenting the outcomes of 113 field audits conducted since 1995, 15 spreadsheet studies, and four code inspection experiments, Panko (2008) reports:

> "*Every study that has attempted to measure errors, without exception, has found them at rates that would be unacceptable in any organization. These error rates, furthermore, are completely consistent with error rates found in other human activities. With such high cell error rates, most large spreadsheets will have multiple errors, and even relatively small 'scratch pad' spreadsheets will have a significant probability of error."*

In the end, the general field of business management—and specifically the more narrowly defined field of process improvement—is concerned with trying to maximize the efficiency and effectiveness of business operations. Accurate information (i.e., accurate and efficient data collection, storage, and retrieval) is the single most important component to that goal. Without it, decision-makers—not necessarily executives, managers, or even human beings—will not have the right information, at the right time, to help them make the right decision that will lead to a correct, efficient, and effective response.

This paper asserts—regardless of methodology or approach—that the first step in any process improvement effort is to begin the process of instituting a standard of accurate and validated data collection, storage, and retrieval—"authoritative data"—for data customers, both internally and externally. Without a fundamental change in the way data is collected and validated to be "authoritative", no other significant institutionalization of CPI practices and values can occur.

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[1] IIE (1996).

[2] "*Costs associated with providing poor quality products or service. There are four categories of costs: internal failure costs, costs associated with defects found before the customer receives the product or service, external failure costs – costs associated with defects found after the customer receives the product or service, appraisal costs (costs incurred to determine the degree of conformance to quality requirements), and prevention costs) costs incurred to keep failure and appraisal costs to a minimum* (Elsmar Cove Mission)".

Towards this end, the Ponzio Authoritative Data Source (ADS) Maturity Model (Ponzio, 2003) is presented as a simple, straightforward, scalable, and too long overlooked tool to initiate with all process improvement efforts, regardless of existing business size or existing organizational maturity.

2. DATA & DATA ERRORS

A recent study conducted by Dynamic Markets on behalf of Oracle (Oracle, May 2011, p. 1) reveals senior business and IT managers practice "Decision Making 'in the dark'" The study report highlighted six findings:

- Profit Myopia: 82% of businesses admit to not having complete visibility into profits by line of business. Furthermore, 46% believe this creates potentially erroneous business decisions, 40% feel this can impair financial performance and 38% believe it results in flawed business planning that will hamper business success

- Spreadsheet Spaghetti: Managers typically spend over a third (36%) of their week number crunching in spreadsheets. This figure rises with seniority, with C-level executives spending 40% of their time managing the company through simple spreadsheets.

- Vintage Data: Handling data this way means it becomes outdated quickly: on average, data used to make decisions is more than four months old; worse still is that 28% of managers do not even know the age of the data they use

- Outdated Planning: Scenario planning fares little better, with data being typically six months old, with almost a third (30%) again not knowing the age of critical data; it is no surprise that 95% of respondents involved in this process encounter problems

- Poor Agility Creates Consequences: It can take nearly a year and a half to identify and amend a failing business process or initiative and 83% of companies admit to suffering consequences of this. One third (33%) see plans become obsolete, 55% incur unnecessary cost and 43% witness a negative impact on employee morale

- Silo Mentality: 87% of businesses criticize inter-departmental data sharing and communication with 71% describing the links between strategic goals, operational plans and budgets as "fragmented

Anyone with hands-on experience with the problems associated with the collecting and storing of data can probably give more than a few horror stories about their experiences with "scrubbing data." Errors on spreadsheets are bad enough, but inaccuracies compound when there are multiple versions of the same data used by different individuals. Enterprise Data Management (EDM), Data Warehousing (DW), and Service Oriented Architecture (SOA)—while sold as panaceas to solve this problem—have in fact not. If anything, due to the tremendous complexity and resource outlays associated with EDM/DW/SOA, the problem has only exacerbated.

An early personal professional experience may help to clarify:

A well-known regional Health Care provider (herein, referred to as We-Have-You-Covered Health (WHYCH), was erroneously paying out health coverage benefit to individuals for procedures for which they were not actually covered. A previous analysis of this issue revealed that not all benefit information resided within WHYCH's systems as data; detailed benefit information resided as text, and were therefore not retrievable through normal dataset queries.

Interviews, conducted almost exclusively from the PAR[3]/PPO [4] side of the business, with business and technical subject matter experts and functional line-workers produced some unexpected unanimity among representatives of diverse business units on some general functional issues:

- The methodology for indexing and organizing benefits were outmoded.
- The universe of index numbers was too small; a 5-digit numbering system, with the first digit being reserved for a "1", a "2" or a "3", signifying specific product lines, allowed only 1,000 possible individual categories of benefits to be listed for each of the three product lines, 3,000 categories of benefits in all. Over time, as lines of business grew in complexity, it periodically became necessary to reuse old, out-of-date benefit index numbers for new benefits, resulting in a loss of important historical business data to the company.
- The indexing system became difficult to navigate - similar benefits within each of the three lines of business, generally, did not have the same last 4-digit identifier, and similar types of benefits were not always categorized uniformly together.
- The approach to benefit categorization did not accurately reflect how WHYCH marketed or administered benefit packages.
- There was also a serious lack of consistency in the WHYCH enterprise product line naming convention. This resulted in similar benefit packages often having the same name, and other benefit packages marketed under completely different name to the customer than the in-house name prescribed by WHYCH. This often led customer service representatives (CSRs) to spend a great deal of time finding the correct answer to a member's benefit question, but often lead to incorrect information being given to the member.

A Six Sigma study on CSR documentation time—for all lines of business, except for the company's federal program—revealed that 68% of all after call time was spent documenting the call, costing WHYCH $2.7 million annually.

Changes in specific group benefit information could take up to two weeks to be data entered into WHYCH central data repository. General benefit and rider information, for a specific group, was often difficult to find, unless the CSR already knew the answer. Without specific group number, diagnosis codes and procedure codes, more detailed benefit information was impossible to identify. Often, both providers and members, alike, were missing key pieces of information, preventing a simple, straightforward answer to the member's question.

WHYCH's policy of honoring out-of-benefit misinformation given by CSRs, led to the general business practice of avoiding giving misinformation. CSRs tended to respond to member benefit questions with either very general benefit information, or an over-abundance of detailed information that covered all eventualities.

When circumstances forced CSRs to calculate out-of-pocket accumulation information by hand, for a variety of benefit service types, the process was frequently complex, requiring time-intensive research, leading inevitably to multiple re-calculations.

At the time, WHYCH had embarked upon an aggressive plan to adopt industry best practices throughout the company. Program managers were encouraged to obtain PMI (Project Management Institute) certification. Six Sigma training and certification was established internally. Substantial resources were committed to the creation of

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[3] PAR (Prior Approval Review): Certain covered health care services – identified by select criteria – require approval by the insurance carrier prior to the actual rendering of the service; typically, this includes transplants, high-dollar durable medical equipment, certain surgical procedures, and certain specified drugs and injections.

[4] PPO (Preferred Provider Organizations): A managed care classification that is a variation of the HMOs, uniting physicians, hospitals, and other health care providers who have contracted with an insurance carrier, and who provide health services to their customers at reduced rates.

an EDM and DW infrastructure. Yet, these considerable investments had not resulted in more efficiency and effectiveness, i.e. WHYCH giving its customers timely and accurate information.

While most IT professionals can doubtlessly relate similar anecdotal narratives, quantitative studies on data errors —not surprisingly—are hard to come by. However, a few studies have been reported whose results will not surprise those familiar with the business landscape, today.

Panko (2008, p. 3) cites the following studies:

- Financial intelligence firm CODA reports that 95% of U.S. firms use spreadsheets for financial reporting according to its experience.
- In 2004, RevenueRecognition.com (now Softtrax.com), had the International Data Corporation interview 118 business leaders. IDC found that 85% were using spreadsheets in reporting and forecasting and that 85% were using spreadsheets for budgeting and forecasting.
- In 2003, the Hacket Group surveyed mid-size companies. It found that 47% of companies use stand-alone spreadsheets for planning and budgeting.
- CFO.com interviewed 168 finance executives in 2004. The interviews asked about information technology use within the finance department. Out of 14 technologies discussed, only two were widely used—spreadsheets and basic budgeting and planning system. Every subject said that their department use spreadsheets.
- In Europe, A.R.C. Morgan interviewed 376 individuals responsible for overseeing SOX compliance in multinationals that do business in the United States. More than 80% of the respondents said that their firms use spreadsheets for both managing the control environment and financial reporting.

In a paper prepared by LCP Consulting for joint publication with Zetes (Braithwaite & Wilding, 2010) Alan Braithwaite and Richard Wilding report on the GS1 UK and Cranfield School of Management Study (GSI UK, 2009), the "*Data Crunch Report*". The report investigated data inaccuracies among the top five UK retailers and their suppliers. With no preamble to lighten the impact of the executive summary of their analysis, Braithwaite and Wilding deliver what can only be described as a definitive attention grabber in the opening sentences of their paper:

> "The…report…identified an 80% level of data inconsistency between UK retailers and their suppliers. Put the other way it means that there is only a 20% chance of the data at a supplier being exactly the same as that data across the top 4 retailers. This appears to be a remarkable scale of inaccuracy for two reasons. The first is the scale of investments that have been made in identification and data capture with Zetes, among others; the second is the context of an increasing culture of 'Lean' management and Six sigma quality."

The paper sets out eight key steps toward securing higher levels of data accuracy:

- Measure actual performance – continuously.
- On physical dimensions, use equipment like CubiScan to capture missing data on goods receipt.
- Monitor and analyse data adjustments.
- Set up a perpetual audit process.
- Apply the framework to identify value potential and focus on the big opportunities.
- Systematically improve Processes to manage input.
- Build six sigma accuracy into cross-functional KPIs and make data quality everyone's responsibility.
- Automate data alignment where possible.

While Braithwaite & Wilding guidance is spot-on—unfortunately—it lacks a suggested roadmap for implementation.

3. BETWEEN A ROCK & A HARD PLACE

The concept of business maturity and standardization of practices can hardly be said to new to the business world. Standards of measurement and quality stretch all the way back into antiquity. First established for convenience and then out of necessity, these standards evolved so that individuals and localities could have common references for the pursuit of commerce and business. *"How do I know that the weight you are stating for my wool is accurate?" "How do I know that the coin with which you offer payment is of pure gold?"* Initially, standards of measurement were applied solely as a means of deterring fraud in commerce; i.e., quality of exchange.

In contrast, the modern quality movement—manifestly the product of engineers and business managers—concerned itself with the problems of increasing efficiency and effectiveness of manual operations, particularly manufacturing operations. By the turn of the 19th Century, it had became clear that considerations of fraud aside, there were also important issues of conservation of resources and national efficiency that needed deliberation (Lefcowitz, 2007a, p2). Recognition emerged that errors in quality were not just the result of premeditated malfeasance, but also of benign neglect, management inefficiency, as well as task complexity and the limits of human productivity.

In 1911, Frederick W. Taylor published, *The Principles of Scientific Management.* In that same year, the founding fathers of "scientific management" gathered at Dartmouth College for the first Conference on Scientific Management. In addition to Taylor, participants included Frank B. Gilbreth, Dr. Lillian M. Gilbreth, Henry L. Gantt, and Harrington Emerson. In parallel, the already well-establish principles of mass production were applied to the emerging principles of assembly line production. By the end of the 20th Century, through the work of individuals like Joseph M. Juran, W. Edwards Deming, and Taiichi Ohno, the quality movement was recognized as a field in its own right.

Process improvement efforts are justified based on Poor Quality Costs (PQC), a phrase coined by H. James Harrington (1987) but derived from the concept of "quality costs" first described by Armand V. Feigenbaum (1945 & 1961). These concepts—and others—were subsequently adopted by the Total Quality Management (TQM) movement, and later also adopted by both Six Sigma and Lean thinkers and practitioners in the "hidden plant" model. Today, COQ has supplanted PQC as the phrase used to describe the "costs associated with providing poor quality products or service".

Thinkers also began to grapple with the possibility that the methodologies applied to mechanical quality could also be applied to semi-mechanical and non-mechanical processes with equal effect. It is during this time-frame that Deming's (1989) Plan, Do, Check, Act (PDCA) cycle—based upon the work of W. A. Schewhart (1939) and later renamed "Plan, Do, Study, Act" (PDSA)— begin to come to the fore as a viable solution to a altogether new class of business poor quality issues.

As early as the mid-1970s, many individual were discussing the impact of computing power on the business community's ability to deliver successful large, complex software projects. Richard Nolan (July 1973 & March-April 1979) proposed a "stages for growth model" [5] for organizations using information technology (IT). By the end of the decade, Philip Crosby had published his Quality Management Maturity Grid (QMMG) in, *Quality is Free* (Crosby, 1979, p. 38 - 39). [6] In 1986, Watts Humphrey joined the Software Engineering Institute (SEI), and began a concerted effort to develop a "capability maturity model" for software engineering. With a research grant from the U.S. Air Force, Humphrey and his associates began formalizing a process maturity framework to aid the U.S. Department of Defense (DoD) in evaluating the capability of software contractors' ability to deliver successfully

[5] Specifically: Initiation, Contagion, Control, Integration, Data Administration, and Maturity.

[6] Specifically: Uncertainty, Awakening, Enlightenment, Wisdom, and Certainty.

software projects as part of the contract award process. Seven years later, Humphrey (1993) formally reported on the SEI effort, the Capability Maturity Model (CMM).

The maturity model approach is based upon the proverbial truism: you must learn to walk before you can run. Even the most basic of human skill need be learned; the human race's relatively long period of childhood, in relation to that of other species, gives testament to the fact that we are comparatively slow learners. Any individual or group's ability to perform any particular skill—at any given moment in time—on a consistent basis is a problem in statistical probability, rather than a statement of an absolute certainty. Groups—and the individuals members of whom they are made—must learn to be efficient and effective over time. Mastery of any complex skill set rarely occurs immediately, but rather incrementally over time with a great deal of repetition.

Maturity—the attribute of judicious decision-making acquired over time and based upon experience –denotes a level of sophistication and understanding lacking in those less fully developed. While some of us beyond the age of 25 may, undoubtedly, obey traffic regulations out of fear or blind obedience to authority, most of us obey because we understand that to do so decreases the likelihood of danger to both ourselves and to the entire group as a whole. By contrast, as a group, drivers under the age of 25 years, are generally less reliable drivers than their parents are because they tend to lack the experience, familiarity, and knowledge that generally result in good judgment and decision-making in the operation of a motor vehicle. Organizational maturity—either explicitly or implicitly—forms the basis of every process improvement and quality improvement effort devised. [7]

Even before the establishment of CMM (now CMMI, Capability Maturity Model Integrated) there were already a plethora of international, national, business, and governmental organizations whose goal were the establishment of some standard and best practice, generally requiring some sort of certification or appraisal process; referred, herein, as *certification.* [8] Many of these certifying organizations—e.g., the Software Engineering Institute (SEI), the International Organization for Standardization (ISO) , and the United Kingdom's Office of Government Commerce (OGC)]—aggressively claim significant increases in a Return on Investment (ROI).[9]

Certifying institutions are often rather reticent when it comes to providing guidance on the expected costs associated with their certification process. To be sure, some reticence is justifiable; no two organizations are the same. Costs associated with certification will certainly vary with the business size, its industry type, and its organizational

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[7] In a private email, Brett Champlin, relates that he gave a keynote presentation and paper in April 2002 for the "16th Midwest Computer Conference" held at Roosevelt University. At the time he had "collected" and analyzed 120 maturity models. Over the next several years, he occasionally updated the presentation for one group or another and continued to "collect" maturity models and then analyze and assess them. Within a year or two, he finally stopped adding them when he hit the 300 mark.

[8] For example, an organization is appraised to the CMMI using the Standard CMMI Appraisal Method for Process Improvement (SCAMPI). The result of this appraisal determines either the organization's Maturity Level or the Capability Level of the organization's processes. The SCAMPI process is not a certification, but simply a rating of the current Maturity Level or Capability Level.

[9] The calculated monetary benefit of an investment, less its total direct and indirect costs (*Cost*), divided by Cost, times 100; i.e.:

$$\frac{Benefit - Cost}{Cost} \times 100$$

maturity. [10] Data on individual company certification costs—of course—are privileged information whose disclosure is understandably restricted.

However, it appears fair to say that this reticence—widely reported and commented upon on the worldwide web—gives the strong impression that something may be going on that has more to do with organizational protective non-disclosure rather than concerns over misinformation. Regardless, the ROI value of these quality certification standards aside (e.g., Ask Process, 2005), the need for organizations to integrate traditionally separate organizational functions has become more apparent with each passing year. Organizations need to be able to set process improvement goals and priorities, as well as need to provide guidance for quality processes. Organizations must establish a point of reference for appraising their institutional ability to address complex tasks successfully.

Unfortunately, the lack of organizational maturity that results in poor quality, inefficiency, and ineffectiveness is often less painful than its cure. Businesses and organizations continue to struggle with establishing quality programs based upon these standards. Quality certifications represent a significant investment of time, effort, and capital. It is not something any business or organization attempts to initiate without extreme motivation. In the United States, usually Federal or State dollars—either directly or indirectly—are somehow involved in the ROI calculus. [11]

Economies of scale are a primary differentiator in this regard. Larger organizations typically have more resources - both more people and more money; smaller organizations have less. With "more" comes greater buying power and the ability to decrease costs, a portion of which—in turn—can be passed on to customers through decreased costs and value added. However, these economies of scale have a limit; very quickly, the diseconomies of scale kick in. Some notable causes of diseconomies of scale are:

- Cost of communication
- Duplication of effort
- Top-heavy companies
- "Office politics"
- Isolation of decision makers from results of their decisions
- Slow response time
- Inertia (unwillingness to change)
- Cannibalization
- Large market share / portfolio
- Public and government opposition
- Other effects related to size

These diseconomies of scale are only the symptom, not the cause. They result from cognitive and mechanical frailties—of both individuals and groups—of every stripe. Notably among these are: perceived self-interest, insufficient information, poor judgment, perceptions of competition for limited resources, and pressures of time. They may also be based upon custom, culture, and belief system. Often, they are based upon, "social tensions and needs not met in the work situation" (Hield, 1955, p. 6), and complex shifts in market forces due to changes in needs, wants, and technology. More often than not, to the outside observer they may appear to be completely irrational.

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[10] The extent to which an organization has explicitly and consistently deployed processes that are documented, managed, measured, controlled, and continually improved (CMMI Product Team, 2007, p. 412).

[11] SEI (2002, p. 7) lists 24 early adopters of CMMI; 22 of the listed entities were companies with significant Federal contract revenue. Of the remaining two listed entities, one was NASA, a government agency, and the other was Process Assessment, Consulting & Training, a company specializing in CMMI appraisals.

In short, complexity invariably offsets economies of scale. Larger organizations tend to be more complex and more dynamic than smaller organizations. What may appear to be monolithic and rather static from the outside, is in fact often a cauldron of boiling human interaction.

According to the U.S. Census Bureau's 2007 Survey of Business Owners, there are 5,739,890 employer firms [12] in the United States. In 2007, the Central Contractor Registry (CCR)—a required point of registration for all businesses desiring to bid on Federal contracts—had 43,7901 [13] active companies, approximately 0.76 % of the total employer firms.

Inexorably, we are led to the conclusion that only a miniscule portion of businesses actually need to consider the rather painful process of attaining formal quality certification. Moreover—according to a study conducted by American Express (VIP, 2010, p. 7)—most active small businesses contractors seeking Federal contracts invested an average of $86,124—including outlays and staff time—pursuing these opportunities. The study reported that, "active contractors report that it took nearly two years of trying (an average of 1.7 years or 20 months) to win their first Federal contract (VIP, p. 3). The study further noted, "The old adage 'it takes money to make money' would appear to be never truer than in this case" (VIP, p. 5).

Few small to medium sized businesses can afford such a long payoff cycle time on an investment, much less the actual direct and indirect out-of-pocket costs themselves. It begs the question, "If the vast number of companies doing business collects and store data, but only a small fraction would benefit from "industrial strength" quality certification, is there a viable alternative?"

4. MATURITY MODELS IN DYNAMIC ENVIRONMENTS

As already alluded to above, maturity is an attribute of judicious decision-making acquired over time and based upon experience, i.e. learning based upon active memory. However, organizational maturity is different from individual maturity.

As noted in Starkey, Tempest & McKinlay (2005, p. 41):

> "Organizational memory, broadly defined, includes everything that is contained in an organization that is somehow retrievable. Thus, storage files of old invoices are part of that memory. So are copies of letters, spreadsheet data stored in computers, and the latest strategic plan, as well as what is in the minds of all organizational members. However, as with individual learning, such a static definition of memory is not very useful in the context of organizational learning.
>
> The parts of an organization's memory that are relevant for organizational learning are those that constitute active memory — those that define what an organization pays attention to, how it chooses to act, and what it chooses to remember from its experience — that is, individual and shared mental models. They may be

[12] An employer firm is a business organization or entity consisting of one domestic establishment (location) or more under common ownership or control, with paid employees excluding sole proprietors and partners, subject to federal income taxes. A nonemployer business is one that has no paid employees, has annual business receipts of $1,000 or more ($1 or more in the construction industries), and is subject to federal income taxes. Most nonemployers are self-employed individuals operating very small unincorporated businesses, which may or may not be the owner's principal source of income.

[13] This figure was provided by the US General Services Administration (GSA), and represents the "average number of active CCR registrants in FY 2007 …The number changes daily (some become active and others become inactive), so they provide an average rather than a discrete total number".

> explicit or implicit, tacit or widely recognized, but they have the capacity to affect the way an individual or organization views the world and takes action. Organizational learning is dependent on individuals improving their mental models; making those mental models explicit is crucial to developing new, shared mental models. This process allows organizational learning to be independent of any specific individual".

This brings us directly to how a maturity model differs from organizational memory, and consequently leads us to a maturity model working definition. Like individual maturity, organizational maturity depends upon the critical element of choice. K*nowing is not the same as acting*. Taking considered action based upon active learning is l*earned behavior* in an individual. Within the organization, learned behavior manifests itself through *process*. It is through business processes—what business analysts refer to as "AS-IS" processes—i.e., how organizations actually respond to inputs that result in some sort of tangible output—by which organizations make evident their institutional maturity. Thus, a maturity model can be defined as, *the formal documentation of a process methodology expressly used for guiding and improving future organizational action in response to some specific class of input(s) that will produce specific, tangible output(s).*[14]

Subsequent process methodologies have adopted CMMI as the basic maturity model template and starting point. For example, Kleppe & Warmer's (2010) six Modeling Maturity Levels (MMLs) [15] is very similar to the five CMM maturity levels (Paulk, et al, 1993, p. A-11). [16] Both mirror the essential Nolan "stages for growth model" and the Crosby QMMG stepped approach.

Aside from the criticism that many of the maturity models are too complex for a favorable return-on-investment for any but the largest of organizations, the most distressing aspect of the maturity model approach is that it has resulted in a plethora of hopeful "Cash Cows" whose authors appear eager to emulate SEI's marketing success of its guru-oriented approach.

We live in a dynamic technical, political, cultural, and economic environment. Changes surround us, and with us our institutions. There is nothing in the maturity model approach, per se, that guarantees that any given organization will be able to maintain the same static maturity level—once attained—indefinitely, or without further challenges, or without discomfort. While organizational process improvement does appear to be strongly connected to organizational maturity, organizational maturity cannot be obtained through a cookbook, cookie-cutter approach. Complex maturity models—particularly complex maturity models based upon the CMMI template and marketing approach—represent a significant risk to the vast majority of businesses because it may constrain their ability to focus on issues that affect their core ability to remain in business. Assuring the quality of one's data is one of those core issues.

Maturity is a reflective process requiring time. In our present circumstance, where shall we find the time to reflect before the window of opportunity for action has passed us by?

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[14] Paulk, et al (1993, p. A-11) defines maturity level as, "A well-defined evolutionary plateau toward achieving a mature software process". In addition to being obviously software-oriented, this definition seems to be circular, and therefore not useful as a generic working definition.

[15] Specifically: No Specification, Textual Specification, Text With Models, Models With Text, and Precise Models.

[16] Specifically: Initial, Repeatable, Defined, Managed, and Optimizing.

5. THE PONZIO ADS MATURITY MODEL

As previously noted, multiple data sources containing potentially inaccurate and outdated copies of data, are not only confusing, time-consuming, and expensive to maintain, they can also directly lead to a host of COQ issues and constraints.

An Authoritative Data Source is a recognized or official data production source with a designated mission statement or source/product to publish reliable and accurate data for subsequent use by customers.

> "An authoritative data source may be the functional combination of multiple, separate data sources…Developing a registry that identifies the single trusted — or authoritative — data source will save time as well as the costs associated with maintaining and verifying the accuracy of multiple sources" (United States' Army Data Transformation Office).

Working with his customer, the United States' Army, Frank Ponzio discovered that:

> "Organizations and individual data providers (some using mission funds, some as a derivative work product, some using out of pocket funds) were considered by consumers of their data to be a data source. In order to produce their own work products, those consumers had established processes that were dependent upon the providers' data.
>
> The data providers were not fully aware of their consumer population and were not privy to the intended use of their data; the consumers lacked any in sight to the providers' processes. The result was that 'good enough' situations were probably achieved—'good enough' for consumers and therefore 'good enough' for the providers. The attitude was: 'If it's not broken don't fix it.' A working level version of 'trust' and 'suitability for intended use' was individually achieved.
>
> Neither the consumer nor the providers wanted to use the term 'authoritative' for a variety of reasons (e.g., not in their mission set), although in some cases it was implied. This is why I termed this 'a cottage industry.' My intent was to position it for a call to action that had to become an enterprise solution if it were to be an enabler for NCES to become a reality.[17]

In response, Ponzio developed a maturity model framework, "a standard data quality improvement process for any government or commercial organization that relies on external source data for…to others" (Ponzio, 2004, p.347). When compared to other maturity models, Ponzio's is elegant in its bevity and simplicity—a sure sign that he is on the right track.

According to Ponzio, "CMMI was still focusing on software development; it was focusing on achieving repeatability of results. Because of the assumed 'cottage industry' starting point, I felt that the framework part of this as a baseline 'how to starter kit process' would be helpful and would lead to repeatable results without having to define them as repeatable results. This turned out to be true, and we have used and are continuing to use [the Ponzio ADS Maturity Model] successfully in mission critical military applications.

The feedback within the process is important overall. We actually added, in some cases, a data review board in which the SMEs and consumers participate before release of data."

[17] Private email from Frank Ponzio dated , May 17, 2011.

Using the familiar stages of growth model, Ponzio outlines a simple high-level framework model:

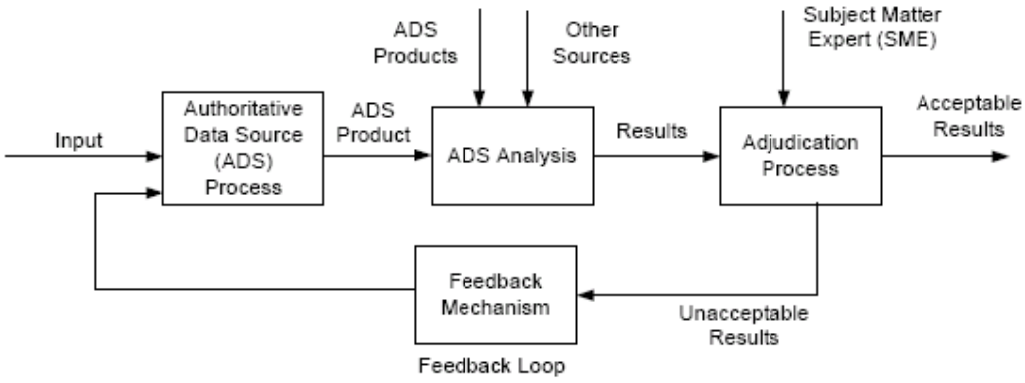

Figure 1: Ponzio ADS Framework [18]

We see only four major process area:

1. The receipt of additions, changes, or deletions to ADS product data or metadata;
2. An analysis of the submitted ADS product data and its prior version;
3. An adjudication of the product data; and
4. A feedback mechanism to improve the ADS input process results in the future.

While each of the four process areas are important, it is within the ADS Analysis and Adjudication Process that the real work of the maturity model is accomplished. The five levels of maturity—each described in terms of risk mitigation—is presented in terms of the necessary action on the new information received within the Analysis and Adjudication processes.

Maturity Level	Risk Management Steps Taken	Information Source
0	No ADS analysis is provided.	
1	The adds, changes, and deletion between successive versions are provided and approved by the provider.	Provided in the ADS analysis
2	Duplication, consistency, and uniformity checks were performed.	Provided in the ADS analysis
3	The ADS results have been scrubbed by at least one SME.	Provided in the adjudication process
4	Multiple SMEs and multiple users have accepted the ADS analysis results	Provided in the adjudication process

Figure 2: Ponzio ADS Maturity Model [19]

[18] Ponzio, 2003, p. 3.

[19] Ponzio, 2003, p. 4.

Obviously, depending upon the size of the organization, as well as the number and complexity of its business processes, what lies within each of the four process boxes may differ, wildly. Ponzio provides guidance in a subsequent presentation (Ponzio, 2004, p. 348) on how the ADS Maturity Model may be scaled to accommodate multiple data sources.

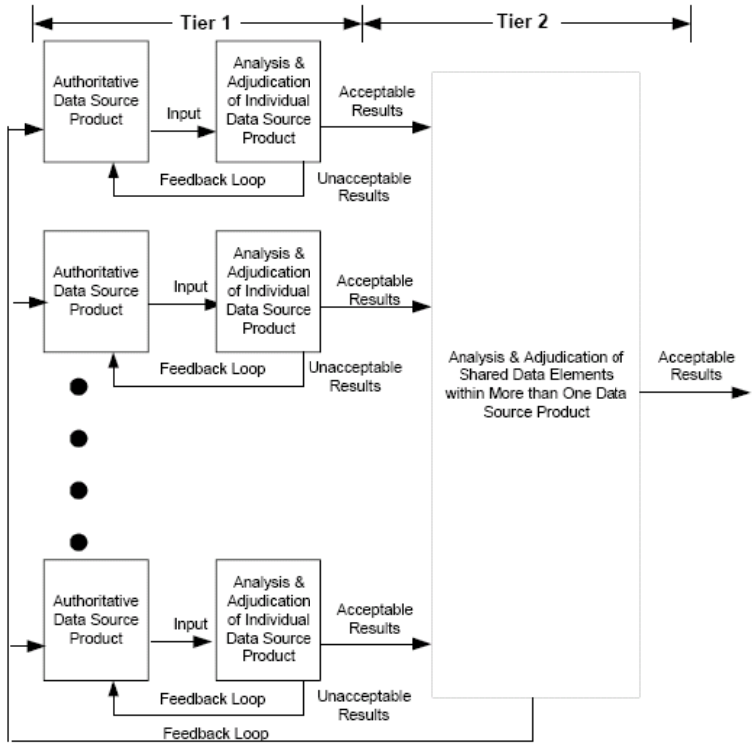

Figure 3: ADS Framework Scaled to address multiple data sources

Ponzio's solution does not require outside appraisals, nor does it require extensive model training, or implementation of a complex matrix of associated components. Organizations wishing to implement it who already have a data governance policy in place can simply add an Authoritative Data Source (ADS) section to their existing policy and data governance procedures. Those lacking a data governance policy—but perceiving a critical business need to implement one—can simply implement include Authoritative Data Source (ADS) as part of that new governance process for their organization.

The ADS Framework and Maturity Model represents a significant, straightforward, and relatively low cost methodology for kick starting any Continuous Process Improvement effort.

6. CONCLUSION:

Accurate and timely information is everything. Without it, we are all adrift in a sea of possibilities governed by blind chance, speculation, false premises, and undiscovered risk.

Despite the interest and acknowledged need for Continued Process Improvement, many of the maturity models developed over the past two decades—as well as the related tools developed to support them—are too expensive and too complex to provide a realistic return on investment-to-risk ratio acceptable to all but the largest and well heeled of organizations and businesses.

The Ponzio Maturity Model is presented as an elegant solution to a clear and present problem. It reminds us—despite the current trend of elitism and complexity—keeping it simple is often more efficient and effective. It provides us with a model of minimalism in design and implementation that should be an example of the Just-In-Time tool that—when judiciously applied—is appropriate for any organization or business of any size. It is an approach to maturity model construction that all should emulate.

From my first exposure, it has quickly become a key component of my professional tool kit. I strongly urge you to consider making the Ponzio Maturity Model an integral element of your own professional tool kit, as well.

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