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# IMPROVING THE BUSINESS PROCESS MODEL:

# A HUMAN CONSTRAIN T APPROACH

# A WHITE PAPER


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Version 2.0

**WHITE PAPER**
**Improving the Business Process Model: A Human Constraint Approach**

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*"For want of a Nail the Shoe was lost; for want of a Shoe the Horse was lost; and for want of a Horse the Rider was lost; being overtaken and slain by the Enemy, all for want of Care about a Horse-shoe Nail."*

- **Benjamin Franklin, Poor Richard's Almanack, June 1758**

*"Remember that all models are wrong; the practical question is how wrong do they have to be to not be useful"*[1]

*"Essentially, all models are wrong, but some are useful"*[2]

**- George Box**

## INTRODUCTION:

In May 1908, President Theodore Roosevelt sponsored a three-day meeting of governors in the White House.[3]

In the very first sentences of his classic treatise, The Principles of Scientific Management, Frederick W. Taylor cites a brief portion of the President's remarks, quoting: "The conservation of our national resources is only preliminary to the larger question of national efficiency."[4]

Taylor continues:

> "The whole country at once recognized the importance of conserving our material resources and a large movement has been started which will be effective in accomplishing this object. As yet, however, we have but vaguely appreciated the importance of 'the larger question of increasing our national efficiency.'
>
> We can see our forests vanishing, our water-powers going to waste, our soil being carried by floods into the sea; and the end of our coal and our iron is in sight. But our larger wastes of human effort, which go on every day through such of our acts as are blundering, ill-directed, or inefficient, and which Mr. Roosevelt refers to as a, lack of 'national efficiency,' are less visible, less tangible, and are but vaguely appreciated."[5]

Almost 100 years later, we still do not fully appreciate either issue. We have witnessed two World Wars, separated by a global Great Depression. We have been tested by the triumphs and turbulence of an ideological rivalry that spanned half a century beyond. We have seen more than our fair share of corporate greed and self-aggrandizement, based upon a popular culture of self-indulgence and the wholesale rejection of personal responsibility. We have

[1] Box, George E. P. and Draper, Norman R. (1987). Empirical Model-Building and Response Surfaces. John Wiley & Sons, Inc.: Hoboken, p. 74.
[2] Box and Draper (1987), p. 424.
[3] The White House Historical Association (2003). The President and the Power to Conserve the American Frontier, Primary Document Activities, The American Antiquities Act - 1906, p. 4. Retrieved 9/26/2007 from http://www.whitehousehistory.org/04/subs/images_subs/primary_1906.pdf
[4] Taylor, Frederick W. (1911). The Principles of Scientific Management. Harper & Brothers Press: New York, p. 5.
[5] Taylor, Frederick W. (1911).

nurtured a system of unimaginative governmental administration that has produced a wasteland of mind-numbing bureaucratic incompetence. We have witnessed a pace of technological and cultural change beyond the wildest abilities of most of us to either imagine or adequately cope, as well as the emergence of deadly forms of feudalism and gangsterism, on a global scale.

Never has national efficiency been more important. What the author has previously referred to as, "avoiding the bear-trap".[6]

As noted by Ben Graham[7] in the same year that Taylor's seminal work was published, 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, Harrington Emerson, and others.

Graham goes on to explain:

> Gilbreth, in his search for the 'one best way,' developed a collection of tools for studying work that later became the foundation of the industrial engineering discipline. One of these tools was the flow process chart-a lined, columnar form with sets of five symbols running down the page and a space adjacent to each set of symbols for a brief description. It was this tool that did so much for manufacturing during the first half of the twentieth century…"[8]

Today we call these tools modeling, "a simplified abstract view of the complex reality. It may focus on particular views, enforcing the 'divide and conquer' principle for a compound problem."[9] From this early pioneer work has flowed a variety of graphical methodologies used to summarize the steps by which we accomplish work:

> "The Process Chart is a device for visualizing a process as a means of improving it. Every detail of a process is more or less affected by every other detail; therefore the entire process must be presented in such form that it can be visualized all at once before any changes are made in any of its subdivisions.
>
> 1 In any subdivision of the process under examination, any changes made without due consideration of all the decisions and all the motions that precede and follow that subdivision will often be found unsuited to the ultimate plan of operation.
>
> 2 The process chart is a record of present conditions. It presents, in simple, easily understood, compact form, data that must be collected and examined before any improvement in existing conditions and methods is undertaken. Even if existing conditions are apparently satisfactory, the chart is useful as presenting much information in condensed form.
>
> 3 The process chart serves as an indicator of profitable changes. It assists in preventing 'inventing downward,' and stimulates invention that is cumulative and of permanent value. It is not only the first step in visualizing the one best way to do work, but is useful in every stage of deriving."[10]

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[6] Lefcowitz, Mark (2002). Homeland Defense: avoiding the "bear-trap". Journal of Homeland Security (June 2002). Retrieved from http://www.homelandsecurity.org/journal/articles/beartrap.htm

[7] Graham, Ben B. (2004). Detail Process Charting: speaking the language of process. John Wiley & Sons: Hoboken, NJ, p. 7.

[8] Graham, Ben B. (2004), p. 1.

[9] Noran, Ovidiu S. (2003). Business Modeling: UML vs IDEF. Griffith University, School of Computing and Information Technology, p. 2. Retrieved 9/23/2007 from http://www.cit.gu.edu.au/~noran/Docs/UMLvsIDEF.pdf

[10] Gilbreth, Frank B. and Lillian M. (1921). Process Charts: first steps in finding the one best way to do work. Presented at the Annual Meeting of The American Society of Mechanical Engineers, 29 West 39th Street, New York. December 5 to 9, 1921. Retrieved 9/27/2007 from: http://ie.www.ecn.purdue.edu/IE/GilbrethLibrary/gilbrethproject/Label1.pdf

What can be said about how we graphically model how work is done, can certainly also be said for how we conceptualize the various elements by which we define what work is. How we view these elements affects what we choose to include in the process we chart. We have come to recognize that the activities by which we accomplish work are much more than just the physical movement and delay of workers and materials. It is about how we go about solving a specific problem, what has come to be termed a "business process".

This white paper will examine one of the many mapping methods to emerge since Gilbreth: the business process model, and will attempt to add to it.

## 1.0 PREVIOUS BUSINESS PROCESS MODELS

A business process is, "a collection of activities designed to produce a specific output for a particular customer or market".[11] These activities are often too complex for the human mind to comprehend fully in a single gulp, and so we build models - representations of reality - to symbolize the intricate relationships that take place as people and things interact. As discovered by the Gilbreth's, graphically representing these interactions - these process models - are a convenient way to do this. The goal of all process models - ultimately - is improvement, to enhance the internal and external actions (processes) by which organizations operate on a day-to-day basis.

There is no perfect process model; their utility is dictated by what aspect of the process flow is being looked at, and for what purpose it is used. Currently, there are two approaches to process modeling: 1). the information system approach,[12] and 2) the business improvement approach.[13] The family of coding languages that have been invented to develop the software used to produce the graphical representations of these two approaches typifies these two approaches: IDEF and UML.

The IDEF (ICAM DEFinition) is a family of computer language that became the early standard for modeling and analysis in management and business improvement efforts. It was produced for the United States Air Force Integrated Computer-Aided Manufacturing (ICAM) initiative, by Dennis E. Wisnosky and Dan L. Shunk. It owes a considerable debt to the Structured Analysis and Design Technique (SADT) method developed by Douglas Ross from SofTech during the 1970s.

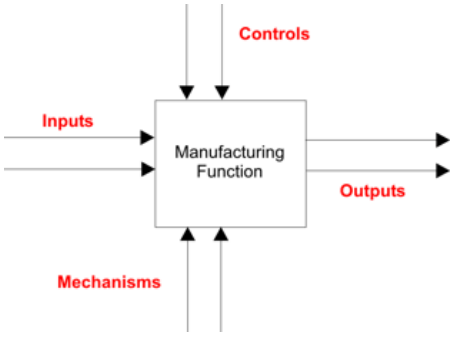


**Figure 1: The IDEF0 Process Model** [14]

The IDEF0 (Figure 1) method specifies a functional view of a business process, depicting the constraints upon the process by its inputs, its outputs, its controls, and its mechanisms (ICOMs).

[11] Sparx Systems (2007). The Business Process Model, p. 8. Retrieved 9/20/2007 from http://www.sparx systems.com/resources /whitepapers.
[12] Noran (2003), p. 3.
[13] Noran (2003), p. 2.
[14] Copied from: http://www.idef.com/IDEF0.html

From a business requirements gathering perspective, the IDEF0 model gives limited specificity on the business rules that drive the process. Inputs are the resources consumed or transformed (refined) by the process. Outputs are the things created through the consumption / transformation of the inputs by the process. Controls are the things guiding the process: policies, guidelines, standards, laws. Mechanisms are defined as the agents that accomplish the actions (activities) contained by the process (i.e., people or manual and automated tools).

As noted by Noran (2003):

> "A very important concept in the IDEF0 method is the abstraction from time. The IDEF0 diagrams show activation of activities, not flow (sequences). ICOMs are able to show the activity activation constraints, but neither what signals the process completion, nor the conditions for the process to actually start."[15]

From a software development point-of-view, the IDEF0 model approach had limited utility, because it is a mechanical view of the universe. Software development is an attempt to automate a particular mechanical activity by mimicking human judgment. To build software it is necessary to track information, where it comes from, where to store it, and what to do with it. Consequently, to produce the computer code that instructs the computer how to act, the developers working on theses instructions - the application - need to know the when, where, what, why and how that are required: its "business rule" requirements.

A solution to this problem was suggested by Grady Booch – one of three founding members of the Rational Software Corporation - in his paper, "Object-Oriented Design."[16] In 1994, Rational wooed James Rumbaugh from General Electric. The company became the source for the two most popular object-oriented modeling approaches of that time: Rumbaugh's Object-modeling technique (OMT) and Booch's object-oriented design (OOD) method. Rumbaugh's method had greater utility for analysis and Booch's method had greater utility for design. Together, they began to reconcile the two approaches.

Rumbaugh and Booch attempted to reconcile their two approaches and started work on a Unified Method. In 1995, a third collaborator, Ivar Jacobson, the creator of the Object-oriented software engineering (OOSE) method, soon joined them when he sold his company, Objectory, to Rational. In 1996, Rational concluded that the abundance of modeling languages was slowing the adoption of object technology. Booch, Rumbaugh, and Jacobson (collectively referred to as the "Three Amigos") began development of a non-proprietary Unified Modeling Language (UML).

UML is now used in modeling a wide range of systems, and combined systems:

- *"Information systems:* Store, retrieve, transform, and present information to users. Handle large amounts of data with complex relationships, which are stored in relational or object databases.
- *Technical systems:* Handle and control technical equipment such as telecommunications, military systems, or industrial processes. They must handle the special interfaces of the equipment and have less standard software than information systems. Technical systems are often real-time systems.
- *Embedded real-time systems:* Execute on simple hardware embedded in some other equipment such as a mobile phone, car, household appliance, etc. This is accomplished through low-level programming that requires real-time support. These systems often lack devices such as a display, hard disk, etc.
- *Distributed systems:* Distributed on a number of machines where data is transferred easily from one machine to another. They require synchronized communication mechanisms to ensure data integrity and are often built upon object mechanisms such as COREA, COM/DCOM, or Java Beans/RMI.
- *System software:* Defines the technical infrastructure that other software uses. Operating systems, databases, and user interfaces perform low-level operations on the hardware, while presenting generic interfaces for other software to use.

[15] Noran (2003), p. 17.
[16] Grady Booch, Object-oriented design, ACM SIGAda Ada Letters, v.I n.3, p.64-76, March/April 1982. Retrieved 9/30/2007 from http://doi.acm.org.ezproxy.umw.edu:2048/10.1145/989791.989795

- *Business systems:* Describe the goals, the resources (humans, computers etc.), the rules, laws, business strategies, policies, etc.), and the actual work in the business (business processes)."[17]

Hans-Erik Eriksson and Magnus Penker built upon the popular use of UML in software system design and proposed business extensions to enable business process modeling.[18]

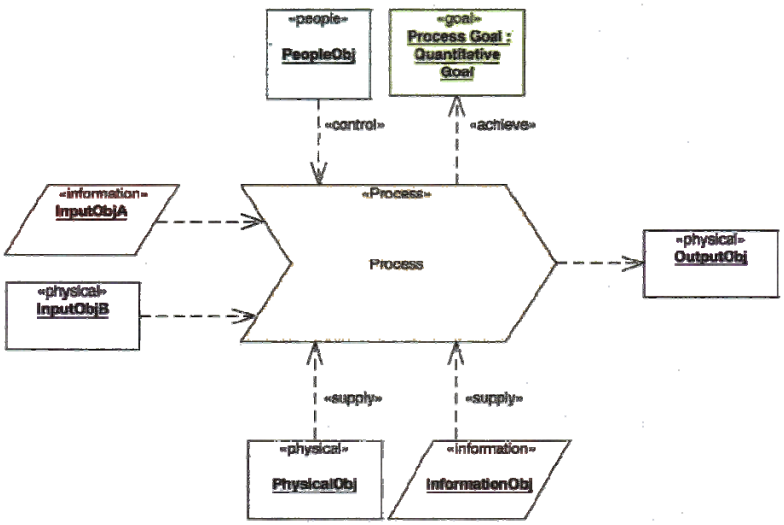


**Figure 2: Eriksson-Penker Business Process Model [19]**

Objects depicting various classes of "things" support the process: physical things, information things, and people things. The process results in the achievement of a physical output "thing", whose goal is to achieve some quantitative goal thing. The process has a physical output of some sort.

- The Goal Object is attached with a dependency to achieve something;
- Input objects are depicted as incoming resources (physical, people, information, etc.);
- Output objects are depicted as outgoing physical products of the process;
- Supplying objects are depicted as incoming resources (physical and information);
- Controlling objects are depicted as resources that control or run the process.[20]

The UML extension proposed by Eriksson and Penker has been generally adopted throughout the UML community as useful constructs for mapping business processes, for example the family of products produced by Sparx Systems.[21]

It soon became apparent, however, that while UML was very useful in modeling systems, it was not optimal when applied to business systems. The reason is straightforward: UML - as with all other management tools - assumes the

[17] Eriksson, Hans-Erik and Penker, Magnus (2000), Business Modeling with UML: business patterns at work. John Wiley & Sons, Inc., New York, NY.
[18] Eriksson and Penker (2000), pp. 419 - 427.
[19] Noran, Ovidiu S. (2003), p. 13.
[20] Eriksson and Penker (2000), p. 108.
[21] Sparx Systems (2007). The Business Process Model. Retrieved 9/20/2007 from http://www.sparxsystems.com/resources/whitepapers

existence of internal and external stability.[22] "Actors" - something external that interacts with the system, either a human being or another system[23] - are ubiquous entities whom interface with the system both predictably and uniformly. This assumption is necessary to make modeling work, *despite the fact that we know the assumption, in reality, to be false*. Where IDEF0 views systems mechanically, UML views humans mechanically.

The issue is one of conflicting definitions of ***constraints***:

UML defines constraint as, "a semantic condition or restriction", where they may be pre-defined by UML, but others may be user-defined.[24] The semantic condition is based upon the relationship that exists between the UML classes. For example, a part-time student class represents a set of part-time student objects.[25] This is an issue concerning set theory; a full-time student is constrained from being a member of the part-time student class that represents the set of part-time student objects. UML makes the working assumption that constraints can be identified and that they behave in a predictable manner, and therefore that they can be modeled. Indeed, from what we know of human behavior in complex and dynamic conditions, this assumption is manifestly not the case. Modeling may tell us how a system should operate, but it rarely tells us how - in reality - it does operate.

Project management makes no such assumptions. To the contrary, it presumes uncertainty; i.e., constraints are unknown until they are discovered. Oddly enough, the Project Management Institute (PMI) PMBOK[26] does not make this distinction clear. The working definition of constraint should be, an ***unidentified*** "applicable restriction or limitation, either internal or external to the project, that will affect the performance of the project or a process."[27]

A constraint that becomes known, is a risk, an ***identified*** "uncertain event or condition that, if it occurs, has a positive or negative effect on a project's objectives."[28] For project management, time, cost, and quality are of paramount importance; any change in one risk variable - negatively or positively – affect the others two. The object of project management is the optimization of short-term goals by balancing time, cost, and quality through the mitigation of risk. This mitigation process is a human interaction that is diagnosed, but whose specific implementation is left to discretion of the project manager to devise.

Theory of Constraints (TOC) defines constraints as being a "problem", "anything that prevents the system from reaching its objective."[29]

> "The dominant root cause in organizations performing multiple projects with shared resources is the unavoidable conflict about when to begin new project work. In almost every organization, there are continual internal and external pressures to address important new opportunities. At the same time, managers recognize that beginning new work too soon may divert needed resources from ongoing project work, compromising their ability to meet existing commitments. Unfortunately, with imperfect knowledge of the true status of current project work, ongoing pressures to increase the organization's output, and a belief that de-

[22] Lefcowitz, Mark (2007a). TigerTeam: high-speed, low-drag process improvement. White Paper. MCL & Associates: Fredericksburg.
[23] Eriksson and Penker (2000), p 369.
[24] Eriksson and Penker (2000), p. 372.
[25] Evans, Andy S. (1998). Reasoning with UML class diagrams , Workshop on Industrial Strength Formal Methods, WIFT'98, Florida. IEEE Press. Retrieved 10/04/2007 from http://www.cs.york.ac.uk/puml/papers/evanswift.pdf, p. 4 (Sect. 4).
[26] Project Management Institute (2004). A Guide to the Project Management Body of Knowledge (PMBOK® Guide), Third Edition. Project Management Institute: Newtown Square.
[27] Project Management Institute (2004), p. 355.
[28] Project Management Institute (2004), p. 373.
[29] Goldratt, Eliyahu M. (2005). Beyond the Goal: eliyahu goldratt speaks on the theory of constraints. Coach Series.

laying a project's start will only serve to delay it's finish, managers all too frequently make decisions that overload the organization."[30]

H. William Dettmer. (2000)[31], lists seven basic types of constraints:

- Market: Not enough demand for a product or service.
- Resource: Not enough people, equipment, or facilities to satisfy the demand for products or services.
- Material: Inability to obtain required materials in the quantity or quality needed to satisfy the demand for products or services.
- Supplier/vendor: Unreliability (inconsistency) of a supplier or vendor, or excessive lead time in responding to orders.
- Financial: Insufficient cash flow to sustain an operation. For example, a company that can't produce more until payment has been received for work previously completed, because they might need that revenue to purchase materials for a firm order that's waiting.
- Knowledge/Competence: Knowledge: Information or knowledge to improve business performance is not resident within the system or organization. Competence: People don't have the skills (or skill levels) necessary to perform at higher levels required to remain competitive.
- Policy: Any law, regulation, rule, or business practice that inhibits progress toward the system's goal.[32]

Clearly, there is recognition of human dynamics here, but it is limited to an imperfect understanding of the nature of processes and of their constraints. The basic assumption of TOC is that:

> "…resources available for managers and organizations are limited, and should therefore be directed towards a well defined and focused goal. According to the TOC, the goal of a corporation should not be defined using terms such as technology, share of market, automation, quality or human resource development, but as the ability to generate profits in the present and in the future."[33]

This assumption is consistent with standard economic theory that has long assumed that behavior is driven by an internal cost-benefit calculus. In fact, our understanding of human behavior - both individually and collectively - runs counter to that assumption. Goldratt's assertion that the goal of a for-profit organization is to "make more money, now and in the future"[34] is only true if one presumes that the end justifies the means. Such a supposition is patently false on so many levels that it is hard to know where to begin. In fact, the majority of us - including almost certainly Dr. Goldratt, himself - do not subscribe to such a foolish premise. Clearly, we can agree that within the context of the social fabric that entwines us all, there are normative and psychological constraints upon human behavior.

Despite the long-standing impetus to classify business as a science, it can more correctly be viewed as an art. If business could be boiled-down into a known series of mathematical equations, to be followed in cookbook fashion, it is a certainty that almost everyone would be in the successful enterprise of commerce. Since they are not, there must be something - or a set of some things - that resists quantification. These missing variables are the specific wants, needs, and desires of people. Each making their purchase decisions based upon their own circumstance, habits and customs, and their own access to products and product alternatives. Businesses need people to make things for, not the other way around. A paradigm shift is required.

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[30] Jacob, Dee Bradbury and McClelland, William T., Jr. (2001). Theory of Constraints Project Management. The Goldratt Institute: New Haven.
[31] Dettmer, H. William (2000). Constraint Management. Quality America, Inc: Tucson. Retrieved 10/14/2007 from www.goalsys.com/books/documents/ConstraintManagement.pdf.
[32] Dettmer, H. William (2000), pp. 6 - 7.
[33] Motwani, J., Klein, D. and Harowitz, R. (1996). The theory of constraints in services: part 1 - the basics. Managing Service Quality, Volume 6, Number 1, p. 53.
[34] Goldratt, Eliyahu M. (1990a). The Haystack Syndrome: sifting information out of the data ocean. The North River Press: New York, p. 12.

Theodore Levitt (1960)[35] suggests that business executives have taken a myopic approach to defining market potential, resulting in an unnecessary constraint of their activities to a finite number of products and brands. This constrained market view has led companies to focus on product improvement, rather than actively seeking new products that fulfill emerging needs in their customer base.

Agreeing, Michael Porter (1996)[36]points to the eclipsing of strategic positioning through the business trend of maximizing operational effectiveness. He argues that hypercompetition - when companies over-stress the importance of low-cost production over developing a marketing strategy - misses the point of marketing: the discovery and fulfillment of emerging customer needs. A strategic approach to marketing requires that conscious choices be made to attain a competitive advantage that is sustainable.

Similarly, Yankelovich and Meer (2006)[37] argue that the practice of marketing segmentation has lost its way. Rather than using the technique to guide businesses to products and services to the groups most likely to use them, the technique has been used instead to target customers for established brands. In effect, the authors accuse the business community of putting the cart-before-the-horse. They suggest an ongoing marketing segmentation model that takes into account the product's need-payoff importance to the customer.

Leonard Barry and his co-authors (Barry, et al, 2006)[38] point out that service innovation is an underutilized approach to marketing strategy. They point to internal cultural changes within the business to drive market-creating service innovations. Similarly, Kaplan and Norton (2006)[39] argue that a reliance on organizational change to solve strategic problems often lead to solutions that are as bad as the original problem, itself. They suggest the use of balanced scorecards - a management system that aids business translating their corporate vision and strategy into action.

There is also considerable anecdotal and experimental evidence to suggest that humans - and as it also turns out, capuchin monkeys - often reject what is materially in their best interest, based upon their perception that they are being treated unfairly. James Surowiecki[40] summarizes some results of independent "Ultimate Game" experiments conducted by Vernon L. Smith,[41] Roth, Alvin E., et al.,[42] and Brosnan, and de Waal.[43] Of real interest is that these experiments took place without the benefit of any communication between the participants.

Constraints - even mechanical constraints - are largely human made. Sometimes they are based upon immediate perceived self-interest. Sometimes, they are based upon insufficient information or poor judgment. Sometimes they are based upon group dynamics. Sometimes they are based upon competition for limited resources and the pressures of time, both perceived and real. Sometimes they are based upon custom, culture, and belief system. Sometimes they are based upon, "social tensions and needs not met in the work situation."[44] Sometime they are brought about by complex shifts in market forces due to changes in needs, wants, and technology. Sometimes they may appear to

[35] Levitt, Theodore. (1960). Lack Marketing Myopia. *Harvard Business Review, July-August*, p. 24-47.
[36] Porter, Michael E. (1996). What Is Strategy. Harvard Business Review, November-December, 61-78.
[37] Yankelovich, D. & Meer, D. (2006). Rediscovering market segmentation. Harvard Business Review, February, 122-131.
[38] Berry, Leonard L., Shankar, V. Parish, J. T., Cadwallader, S. and Dotzel, T. (2006). Creating new markets through service innovation. MIT Sloan Management Review, Winter, 56-63.
[39] Kaplan, R. S. and Norton, D. P. (2006). How to implement a new strategy without disrupting your organization. Harvard Business Review, March, 100-109.
[40] Surowiecki, James (2004). The Wisdom of the Crowds. Doubleday: New York.
[41] Smith, Vernon L. (2003). Constructive and Ecological Rationality in Economics," American Economic Review 93, pp. 465 - 508.
[42] Roth, Alvin E., et al (Dec., 1991). Bargaining and Market Behavior in Jerusalem, Ljubljana, Pittsburgh, and Tokyo: an experimental study. The American Economic Review, Vol. 81, No. 5, pp. 1068-1095.
[43] Brosnan, Sarah F. and de Waal, Frans B. M. (18 September 2003). Nature 425, 297-299. Retrieved 10/7/2007 from http://www.emory.edu/LIVING_LINKS/pdf_attachments/BrosnanUnequalPay.pdf
[44] Hield, Wayne (1955). The British Journal of Sociology, Vol. 5, No. 1. (March), pp. 1-11. Retrieved 10/8/2007 from http://links.jstor.org/sici?sici=0007-1315%28195403%295%3A1%3C1%3ATSOCIS%3E2.0.CO%3B2-F, p. 6.

be completely irrational. The possible motivations for human action and inaction are boundless, and certainly not exhausted by the listing of the factors just rendered. What does matter - however - from an organizational perspective is the impact of human action and inaction as a constraint upon the system.

As Nonaka and Taakeuchi (1995)[45] have pointed out:

> "Emphasis is put on logical and analytical (i.e., deductive or inductive) thinking as well as on the use of existing explicit knowledge at the top of the organization. Unquantifiable human factors such as values, meanings, and experiences are excluded from formal business planning and deployment of strategic resources."[46]

Can we model something so immense and so difficult to grasp?

## 3.0 A HUMAN CONSTRAINTS APPROACH

If we are to attempt to model business processes from a human behavior perspective, it clearly must be based upon what we know to be true about human beings, regardless of time, place, culture, social status, or circumstance. It must be straightforward, and its must allow us to distinguish between human behavior that is relevant, and that which is not.

Conflict theory distinguishes between functional and dysfunctional conflict.[47] Conflict is not always bad. It provides a beneficial functional purpose, and therefore is not necessarily dysfunctional. For example, business conflicts over scarce resources or tight timelines for deliverables may act as a catalyst for new ideas that result in more efficient, more cost-effective, and less time-consuming methods. Conflict often forces members of a group to think "outside the circle" for new solutions.

Conflict theory, too, distinguishes between conflict that is "rational" and conflict that is "irrational".[48] Rational conflict ceases, "if the actor can find equally satisfying ways to achieve his end."[49] For irrational conflict, however, there are no alternative outcomes, because the actor's conflict objective cannot be satisfied with its successful attainment. An irrational conflict is always dysfunctional, because it invests resources in an outcome that can never resolve the real need motivating action. However, rational conflict is not always functional:

> "Conflict may serve to remove dissociating elements in a relationship and re-establish unity. Insofar as conflict is the resolution of tension between antagonists it has stabilizing functions and becomes an integrating component of the relationship. However, not all conflicts are positively functional for the relationship, but only those which concern goals, values, or interests that do not contradict the basic assumptions upon which the relation is founded."[50]

The outcomes of business processes may lead to conflict, and therefore we can view them, too, as either being functional or dysfunctional, and rational or irrational. For example, the Nazi's exterminated between 9 and 11 million individuals during their reign of terror, by some accounts matched only by the Soviet Union's regime under Joseph Stalin. Both regimes were monstrously efficient in implementing business goals whose "output" would be universally accepted as being both irrational and dysfunctional.

[45] Nonaka, Ikujiro and Takeuchi, Hirotaka (1995). The Knowledge-Creating Company: how Japanese companies create the dynamics of innovation. Oxford University Press: New York, p. 139.
[46] Nonaka and Takeuchi (1995), p. 41.
[47] Coser, Lewis (1956). The Functions of Social Conflict. The Free Press: New York, pp. 72 – 81.
[48] Coser (1956), pp. 48 - 55.
[49] Coser (1956), p. 50.
[50] Coser (1956), p. 80.

Business processes, too, may be viewed similarly. Policies and procedures initiated years ago - perhaps decades - that remain unexamined and unchallenged, result in dysfunctional constraints. Formal and informal corporate policies in pursuit of legitimate profit goals, in fact, may be irrational.

Within the context of business processes, the following definitions are proffered:

- Irrational: Any executive vision, organizational mission, organizational strategy, organizational metrics, process goals, or process outputs that are found to be inconsistent with the standard of maximizing good and minimizing harm to others.
- Rational: Any executive vision, organizational mission, organizational strategy, organizational metrics, process goals, or process outputs that are believed to be consistent with the standard of maximizing good and minimizing harm to others.
- Dysfunctional: Any unwanted constraint upon the standard of maximizing good and minimizing harm to others.
- Functional: Anything that successfully promotes the standard of maximizing good and minimizing harm to others.

## 4.0 EXECUTIVE VISION, GOAL(S) AND OUTPUT(S)

The importance of executive vision has been written and has been discussed to the point of being virtually anecdotal. It is also almost proverb that good people do bad, hurtful, and - yes - monstrous things.[51] Occasionally, we do acknowledge the harm done to others through our actions, but invariably it is accompanied by a healthy list of excuses and justifications to assuage our conscience. This author has previously noted:

> "It is neither new nor surprising that people associate their extended group's welfare with their sub-group's welfare, or that they associate their sub-group's welfare with their own welfare. To be self-interested is to be human."[52]

However, while it is impossible for anyone to completely avoid giving injury, it is possible to pursue a personal and group standard of maximizing good and minimizing harm to others. Virtually every religious, legal, professional and business organization bases its activities upon some sort of affirmation to do the least possible harm.[53] It would seem, at minimum, an ethical approach to both business and government is necessary for judging whether a process and its various components may be considered either to be functional or to be rational. Going back to back to Goldratt's "make more money, now and in the future"[54] assertion, for example, few would disagree that the pursuit of profit, regardless of consequence would be either. We know such a worldview to be destructive at every level of society when pursued without constraint or self-restraint. Therefore, an executive vision must explicitly constrain the activities of the organization or group, not just simply nod a head implicitly in its general direction.

Estimates of the cost of corporate crime range from $300 Billion to $5 Trillion,[55] annually. These estimates are unattributed. That their range is so broad and the dollar amounts - even at its lowest estimated level - are so staggeringly large, is a rough indicator of the massiveness of the problem, and the current parsimony of specific data. In fact, the true cost of corporate fraud is unknown. No one - to-date - has kept consistent or reliable statistics on them. Indeed, the last concerted attempt to describe and quantify the extent and effect of corporate criminal behavior was

[51] Milgram, Stanley (1969). Obedience to Authority: an experimental view. Harper Colophon: New York.
[52] Lefcowitz, M. (2007b). Implementing six sigma: exploring issues of suboptimization. U.S. Army Journal of Installation Management, Volume 2, Winter, p. 21. Retrieved from http://www.mcl-associates.com /downloads/ ImplementingSixSigma.pdf
[53] For a detailed technical discussion and logical proof of the Golden Rule, see: Gensler, Harry J. (2001). Introduction to Logic. Routledge: New York, pp. 229 - 254. Retrieved in electronic format from: http://www.netlibrary.com
[54] Goldratt (1990a).
[55] See: http://www.law.cornell.edu/wex/index.php/White-collar_crime, http://www.hill-assoc.com/web/Portal?xml=news /news&fid=30&cid=612 and www.angelfire.com/ny5/ pinstripepress /MLBTimeline.htm

conducted almost three decades ago by the United States' Department of Justice.[56] Furthermore, no one agrees on the working definition of "corporate fraud.[57]

What is relevant here is that policies, procedures, and processes that make corporate misdeeds possible are both dysfunctional and irrational. Moreover, process improvements that are aimed at the symptoms rather than the cure are no better. Be-that-as-it-may, executive vision must drive organizational mission, goals and strategy, which in turn must drive process strategy and goals, which in turn must drive the expected process output. Without them, we cannot judge whether the process output meets the standards of functionality or rationality, we cannot hope to establish the metrics necessary to measure success or failure, nor can we judge whether processes previously established meet this same criteria.

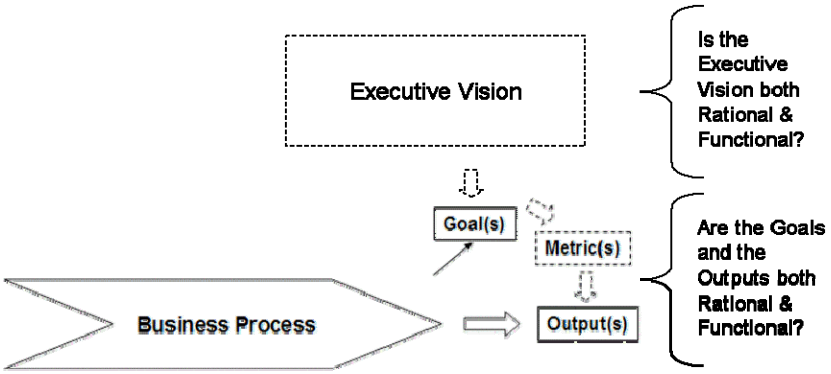


**Figure 3: Vision/Goals/Outputs Rationality and Functionality**

An ethicistic approach to process will not resolve conflicts; functional, dysfunctional, rational, or irrational. It will not stop corporations or the individuals within them from selfish, self-absorbed, or self-aggrandizing actions. It will not unmuddy murky and complex issues. It will not make hard decisions easy. It will not assist us to, "dissect…emotion under the microscope of logic."[58] Nor will it prevent, "defective desires".[59] We have to ask the right questions[60] to get the right answers. What it will do, however, will be to make it easier for all of us to view and discuss process goals through a common language that can verify and validate shared values and base assumptions. If pursued seriously, it should result in processes whose tenants should stand the test of time.

The Rationality-Functionality matrix below (Figure 4) outlines an attempt to apply this model to process goals and outputs, and suggests specific outcomes to the various matrix combinations.

[56] Clinard, Marshall B., Peter C. Yeager, et al. Illegal corporate behavior; U.S. Dept. of Justice, Law Enforcement Assistance Administration, National Institute of Law Enforcement and Criminal Justice: for sale by the Supt. of Docs., U.S. Govt. Printing Office, 1979.
[57] Corporate Crime Reporter. "Crime Without Conviction: The Rise Of Deferred And Non Prosecution Agreements", 2005. Found at: http://www.corporatecrimereporter.com/deferredreport.htm
[58] Prange, Gordon W (1983). "At Dawn We Slept: the untold story of pearl harbor. Penguin Books: New York, p. 642.
[59] Gensler (2001), p. 234.
[60] Gensler (2001), p. 235.

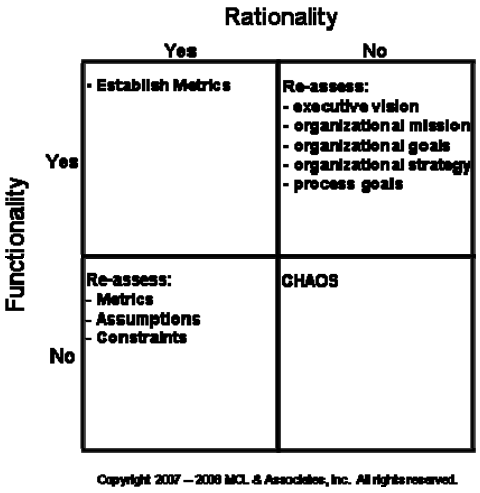


**Figure 4: Goal and Output Rationality/ Functionality Matrix**

Once rationality and functionality have been established at all levels above the process-level, process goals and outputs can be determined. A goal is:

> "The purpose of the business, or the outcome the business as a whole is trying to achieve. Goals can be broken down into subgoals and allocated to individual parts of the business…Goals express the desired state of resources and are achieved by processes. Goals can be expressed as one or more rules…[s]tatements that define or constrain some aspect of the business and…govern how the business should be run.[61]

An output, "represent the accomplishment of the goals and are the primary result of the process".[62] It is something of value to the business or organization, produced either for internal use or to satisfy some external purpose or requirement. In manufacturing processes outputs are typically physical, the physical transformation of some sort of resource. A report process, or the process of sending an invoice are the transformation of collected information into a physical object. Outputs from one business process typically feed into another process, either as a resources or information (See Section 3.2).

Both goals and output need to be SMART (See Figure 5): simple, measurable, agreed to, reasonable, and time-based.[63] There should be no discrepancies between any of the SMART elements in either. In the event that any discrepancies do exist, they must be resolved in such a way as to remain in-line with the executive vision, and the values that cascade from it.

[61] Eriksson and Penker (2000), pp. 62 - 63.
[62] Eriksson and Penker (2000), p. 69.
[63] Breyfogle, Forest W. III (2003). Implementing Six Sigma: smarter solutions using statistical models. John Wiley & Sons, Inc.: Hoboken, p. 57.

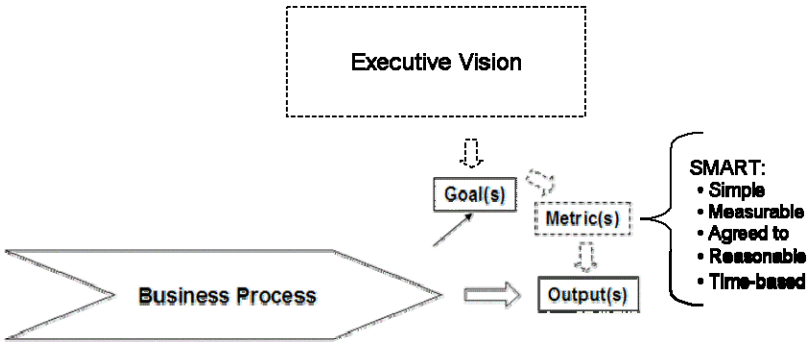


**Figure 5: Establishing Goals - Outputs SMART Metrics**

## 5.0 TRIGGERS, INFORMATION, AND RESOURCES

A brief discussion is appropriate on the three process input elements that are well established and already routinely used in process modeling: triggers, information, and resources. Because they are part of the normal modeling process, it is assumed that the reader is already familiar with these elemental concepts.

A Trigger (also known as an Input or an Event) is, "a significant occurrence in time or space"[64] that sets the business process into motion. There may be a single trigger or a set of triggers that occur singly or together, but without them the process cannot begin. Triggers are a detailed set of business rules that outline the circumstances required by the business rule. Often triggers are the outputs of other business processes and subprocesses that are received by by other, successive processes.

Resources, in UML, are, "objects within the business, such as people, material, information, and products that are used or produced in the business".[65] For our purposes, here, we will distinguish between information resources and all other resources. This is consistent with Erikson-Penker's Business Extension.[66] Unlike information, it is typically expended by the processs activity. A trucking company's process, for example, uses up a portion of its available daily truck fleet during the process of making deliveries. In the event a truck breaks down due to mechanical failure, it is no longer available for the duration of it repair for consumption. The same could be said of a truck driver who goes on vacation for two-weeks, and thus is unavailable.

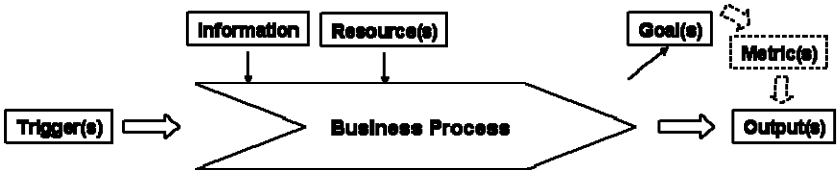


**Figure 6: Triggers, Information, and Resources**

Information, on the other hand, is not consumed but rather used to transform the process in some manner. Information always comes from some external source outside the process, either from the outside world or as the output of some other process or sub-process. For example, customer service data, an output of a variety of sales and

[64] Eriksson and Penker (2000), p. 438.
[65] Eriksson and Penker (2000), p. 442.
[66] Eriksson and Penker (2000), pp. 419 - 427.

accounts receivables processes is stored in a database (a physical system that is also a process with many dependant sub-processes) for a retrieval and sorting process that generates data for a marketing report process.

## 6.0 ROLES

Within the context of a process, "Actors" - again, something external that interacts with the system, either a human being or another system - perform actions that transform resources and information. Role, "describes an action taken by the actor"[67] within the context of a specific process or sub-process. Roles are unique and specific activities. For example, "decision-maker" is not a role even though it is an activity; we are all decision-makers. The Role must describe in some way the kind of decisions that the actor is making.

In the world of UML, human actors often have multiple roles within the context of their functional responsibilities. So too, multiple actors can have the same role. However, no actor can have more than one role at any given instant. That is to say, while it is possible for an actor to have multiple roles in the same process, *they cannot be implemented simultaneously, nor can two or more actors with the same role implement any single role simultaneously in the same process*. Where two or more actors implement the same role simultaneously in a process, the process should be split into appropriate sub-processes. When two or more actors implement similar roles in the same process, their roles must be labeled uniquely to distinguish one from all the others. When a specific role is assigned exclusively to a specific and unique functional title, the functional title should be used as the appropriate role label.

The importance of role is that it defines whom or what will be acting within the process to move that process forward, what dependencies will trigger these actions, in what order these actions will take place, and what further actions the actor takes to move that process forward to the next step.

In an early, unpublished paper, the author has suggested a model where decision-making roles could be viewed as being "functional"; that is, "a collection of general activities which all position-holders must participate in at one time or another, in order to successfully carry out the responsibilities of their position."[68] This functional approach was an attempt to describe what we would now call human constraints. This is a very different view of business process than the mechanical view of UML and Theory of Constraints, where the term "functional" describes operational directions[69] rather than how human action and inaction affects business process. It does not matter if a "left-handed lug wrench setter" is properly trained, bored or highly energized, inexperienced or experienced, or any of the many other competency, psychological, physical, or motivational attributes used to describe and explain human behavior. The expectation is that the individual fulfilling that role will perform efficiently and flawlessly.

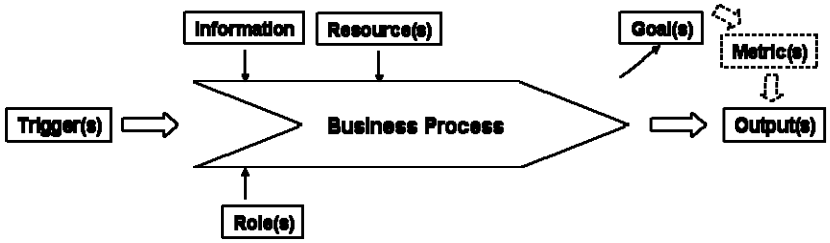


**Figure 7: Roles**

[67] Eriksson and Penker (2000), p. 191.
[68] Lefcowitz, Mark (1975). Functional Roles: a decision-making model. Unpublished (available from the author upon request).
[69] Eriksson and Penker (2000), p. 191.

Again - at the risk of belaboring the point made, previously - we know this expectation to be an unrealistic view of humanity. Moreover, while the author's youthful model of thirty-years ago may not be satisfactory of-and-by-itself, the point it was attempting to make still appears to be a valid one.

## 7.0 SKILL SETS

UML views skill sets as an Actor attribute "that describe competence, knowledge, and experience."[70] Theory of Constraints views skill sets as an element in the physical constraint to throughput[71] that have been identified as affecting required process capabilities. To the contrary, however, skill sets are much more; they define an organization's culture, and therefore are integral to how its members think of themselves, act and interact. Consider the profound change to our culture caused by the adoption of personal computers in virtually every place of business.

Prior to the introduction of the microchip in the mid-1970s, computers were large, costly systems owned by government agencies, universities, and large companies. Programming was done in batches, indirect, using cardpunch reading machines, paper tape, and magnetic tape. The cost to buy and maintain a computer was in the millions of dollars, and beyond the means and capabilities of all but the largest organizations.

This all changed with the advent of the personal computers (PC), at the time called "microcomputers". Initially, limited to home enthusiasts, PCs became viable as a business tool in the early 1980s with the development of VisiCalc by Software Arts, quickly followed by more powerful clones: SuperCalc (1980), MultiPlan (1982), Lotus 1-2-3 (1983), the AppleWorks spreadsheet module in (1984), and Excel (introduced for the Mac OS in 1985 and for Windows 2.0 in 1987), which included graphic capabilities. Simultaneously, word processor software was being developed, notably WordStar (1978), but did not appear as standalone word processor applications until 1985.

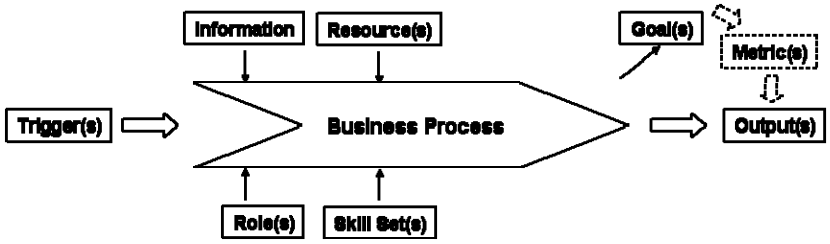


**Figure 8: Skill Sets**

One is hard-pressed to think of a more profound or more far-reaching event in the business world; where documents were once sent manually, they are now exchanged electronically. Where meetings were once conducted face-to-face, requiring considerable travel and expense, now they can be conducted remotely. Where access to data once took days, sometimes weeks to get, today it can be "pushed" to our cell phones. How we do our jobs - how we interact with others and how they interact with us - has dramatically changed the culture of where we work and do business.

Theory of Constraints states that a system is only as fast as its slowest component.[72] However, as the author has pointed out in a previous article[73], this concept has never been applied specifically to skill-set resources. As Cross

[70] Eriksson and Penker (2000), p. 191.
[71] Stein, Robert E. (1997). The Theory of Constraints: applications in Quality and Manufacturing (Second Edition). CRC Press: Boca Raton, p. 271.
[72] Goldratt, Eliyahu M. and Cox, Jeff (2004). The Goal: a process of ongoing improvement (Third Edition). North River Press: New York, pp. 113 - 119.
[73] Lefcowitz, Mark (2006). "How to fix IT skill shortages and misalignments", retrieved at http://articles.tech republic .com.com/ 5100-10878_11-6141245.html

and Baird (2000)[74] reported of their study of organizational learning for 22 projects in professional services, financial services, and manufacturing organizations:

> "While Individual knowledge is an important part of organizational memory, it is always at risk of being lost. Without opportunities to learn from others, employees are in danger of intellectual stagnation. Ironically, the most knowledgeable employees are often in greatest danger of being in positions with fewer learning opportunities. Employee learning can be stunted (at least temporarily) when an organization solely exploits an individual's current expertise in upcoming work rather than helping that person develop new or complementary skills. For example, companies often employ people on projects based on what they already know rather than on what they might be able to learn. As one team member in a law firm remarked, 'You develop an expertise, the organization exploits this expertise in future projects, and your individual development stagnates."[75]

Skill-sets are the mechanism by which cultural change, and therefore process change is triggered.

## 8.0 TOOLS

Closely aligned with skill-sets are Tools. What tools we use, and their appropriateness to the tasks we have before us can clearly tell us important things about the process at which we are looking. A skilled and knowledgeable carpenter asked to hammer nails with a rock, may be able to build the frame of a house, but at what cost? In the case of the carpenter and a rock, it is obvious that a more appropriate tool is required. Rarely, however, are things so obvious: optimum is rarely available and we are forced to do with what we have readily at hand.

None-the-less, what tools we may need for any particular process must be actively and carefully considered.

"Computers in Crisis"[76] conjectured that computer programs could stop working or produce erroneous results due to the early programing practice of using two digits to store years (i.e., "98" for "1998", or "99" for "1999"), causing the year "2000" to be represented by "00". It was feared that this would cause software routines to produce incorrect results because of a program's inability to distinguish the year 2000 from the year 1900. It was also feared that this might cause critical utility and infrastructure systems to fail at midnight, December 31, 1999. Virtually the entire focus of the information technology (IT) world for 1998 and 1999 wqs the possible system failures that might take place at the stroke of the year 2000 (dubbed, Y2K).

On one such project, the author was collecting contingency planning business requirements for agencies of a large municiple government. One of the senarios included the loss of electrical power. How was an agency planning to maintain critical core services in that eventuality? And so, business analysts were assigned specific agencies and assisted each of the agencies assigned to us in building a Y2K contigency plan for each identified core service.

Generally, the agency heads we spoke with were grateful for the assistance. However, one executive was supremely confident that she did not require help in carrying out her Y2K responsibilities. To every question posed she smiled and confidently said, "I have that covered", and then proceeded to tell me the details of her contingency plan. One of her agency's core responsibilities was to produce press releases on the status of critical agency services for release to the outside world. How would she accomplish that if her agency computers went down?

Again the confident executive repeated her mantra, "I have that covered." She pointed to a typewriter sitting on top of a file cabinet in her office, "I have that typewriter over there, in case that happens". It was an IBM Selectric II; an

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[74] Cross, Rob and Baird, Lloyd (2000). Technology Is Not Enough: improving performance by building organizational memory. Sloane Management Review (Spring 2000), Vol. 41, No. 3, pp. 69–78. Retrieved on 7/20/06 from http://sloanreview.mit.edu/smr/issue/2000/spring/5/

[75] Cross and Baird (2000), p. 70.

[76] Murray, Jerome T., and Marilyn J. Murray. 1984. *Computers in Crisis: how to avert the coming worldwide computer systems collapse.* PBI: New York.

electric rather than a manual typewriter. The agency executive had not considered the possibility that her agency's computers might be inoperable due to a lack of electric power to make them run.

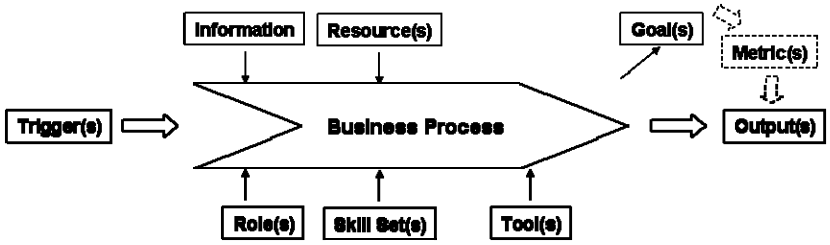


**Figure 9: Tools**

We take the tools we have at our disposal largely for granted. Business processes, particularly critical core business processes, are interdependent. It is a rare event when any single business process is free of any dependencies upon any other business process, or it does not pose, in turn, a potential risk for some other business process.

As the author recounted some years ago:

> "Several years ago the Bureau of Alcohol, Tobacco, and Firearms (ATF) approached the United States Customs Service for access to data stored in its system…To the uninitiated, it would seem that the impetus for teamwork and cooperation would abound. Sadly, this was not the case. After a great deal of onerous and contentious negotiations, Customs finally granted permission to its sister agency. A provision of the inter-agency agreement was that Customs would neither change the structure of its existing database, nor be forced to facilitate in any way the implementation of the necessary data interface by ATF. In effect, Customs told ATF to go pound sand, and wasted precious time and resources in the process of doing so."[77]

At issue was the data interface: a tool. At the heart-of-the-matter was not the agency's uncooperative approach to helping a sister agency, but the fact that they had built a data system without apparently ever considering the possibility that it might be needed by another agency.

## 9.0 ASSUMPTIONS

It is axiomatic that not knowing what you do not know is the greatest risk of all. The examples cited above are just a few brief illustrations of how unexamined assumptions often are the source of our biggest and most damaging problems.

The Project Management Institute's PMBOK[78] goes into considerable detail on the examination of assumptions to avoid project risk. There are four basic risk management strategies: mitigation, avoidance, transfer, and acceptance.[79] Statistical hypothesis testing is all about examining assumptions. Theory of constraints is essentially a methodology for examining assumptions to discover unidentified constraints. Zur Muehlen and Rosemann (2005) have suggested the adoption of a risk-aware process modeling techniques to capture appropriate risk-related information for both UML and Business Process Modeling Notation (BPMN).[80]

[77] Lefcowitz (2002).
[78] Project Management Institute (2004), pp. 237 - 268.
[79] Project Management Institute (2004), pp. 261 - 263.
[80] zur Muehlen, Michael and Rosemann, Michael (2005). Integrating Risks in Business Process Models; paper presented at the 16th Australasian Conference on Information Systems, 29 Nov – 2 Dec 2005, Sydney. Retrieved 10/23/2007 from http://www.workflow-research.de/Publications/PDF/MIZU.MIRO-ACIS(2005).pdf

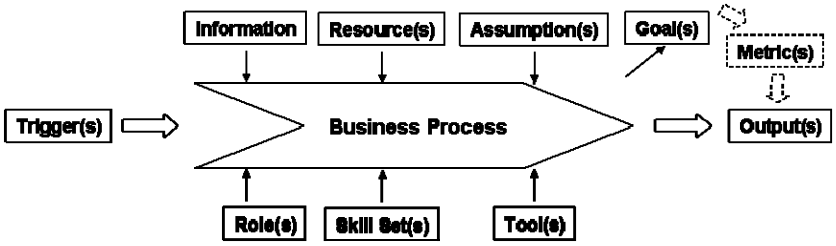


**Figure 10: Assumptions**

One of the most difficult things to do is to accurately distinguish what we know from what we assume, and what we know from what we wish to be true. Peer group pressure and other group dynamics, obedience to authority, our own beliefs and prejudices, and our own perceived self-interest - to name only a few - all contribute to the false assumption that something is a fact. More important they contribute, too, to our reluctance at times to point unexamined assumptions out.

## 10.0 CONSTRAINTS

Only through the process of accurately enumerating our assumptions can we have any hope of identifying the constraints of a business process. As depicted by the **Figure 11**, constraints can come from anywhere, internal or external, to the business process. At issue is the dependency of the process upon its required inputs, as well as other processes that may in turn be dependent upon its own output. Constraints are more than delays caused by missing inputs. As TOC points out constraints may also be caused by the system's inability to sustain itself beyond a certain level of activity. Like the "I Love Lucy" episode in which Lucy and Ethel attempt to pull out faulty chocolates produced by a speeding conveyor belt, our ability to handle inputs adequately are bottlenecks, too.

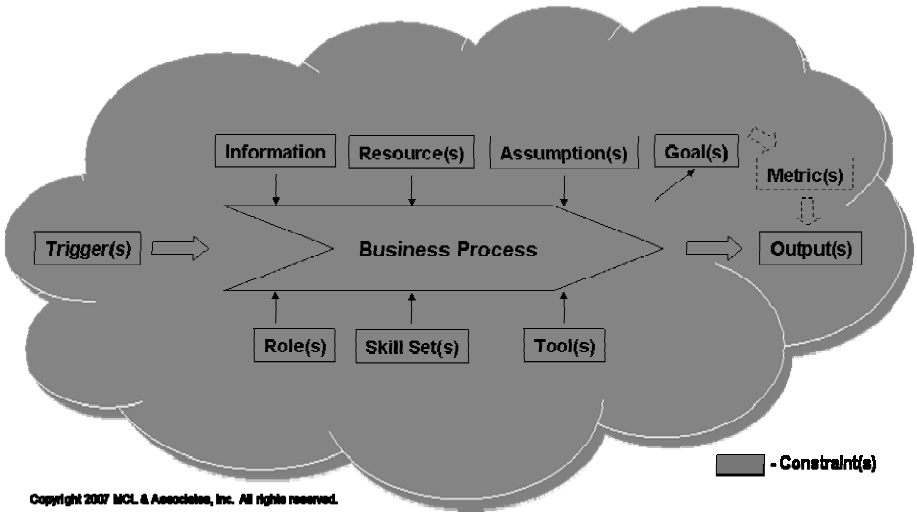


**Figure 11: Constraint Cloud**

We must distinguish between those constraints that we do not want because they impede our attainment of rational process goals - *dysfunctiona*l constraints - and constraints we do want because they help us control the throughput of the process system - functional constraints. We need constraints to keep the system from cycling in and out-of-control. It is not constraints we are trying to eliminate, bur rather *dysfunctional* constraints. Golratt's Drum-Rope-Buffer method[81] is nothing more than a governing mechanism for a functional constraint.

[81] Goldratt, Eliyahu M. (1990b), Theory of Constraints. North River Press: New York.

Theory of Constraints rest on some important principles:

- Every organization is built for a purpose…
- Every organization is comprised of more than one person…
- Organizations require the synchronized efforts of more than one person…
- The contribution of any single person to the organization's purpose is strongly dependant upon the performance of others…
- Organizations, therefore, can be regarded as interdependant chains…
- The more complex the organization…the more interdependencies between the various links[82]

Again, there is a clear recognition of the human element. However, recognition of the human element does not go far enough.

As pointed out by Motwani and Harowitz (1996)[83] and Goldratt and Cox (2004),[84] constraints are often the result of policies and procedures that no longer serve the needs of the organization's goals. This is not a new revelation for the average person who must wait in line for hours to renew a driver's license; or the individual who must wait on the telephone for an eternity to straighten out a billing error with a provider; or the traveler whose business flight is late regardless of the weather. The real issue is, what function do policies and procedures fulfill?

The answer appears to be obvious: we have policies and procedures to standardize the way work is done, to ensure that a process consistently produces a reliable output. Nevertheless, we need to dig deeper to find the real answer. What drives policies and procedures? Is it really goal attainment? The answer is, no. We have policies and procedures to ensure the *uniform consumption* of information, resources and tools in the pursuit of attaining goals.

This is not a small point. Once again, we return to Goldratt's definition, noted above, of a "problem": anything that prevents the system from reaching its objective. During the Apollo 13 space mission accident, hundreds of people comprised the "White Team" led by Eugene F. "Gene" Kranz and the "Black Team" led by Glynn Lunney. Their objective was not to get the three astronauts back to Earth alive, it was to get them back to Earth alive within the limits of the life support systems aboard Apollo 13. The problem all organizations have - and for that matter, all individuals within them - is not the reaching of the objective, but rather reaching the objective with what we *believe* we *in fact* have at hand. Constraints are just as much a function of perception as they are a matter of process mechanics and bottlenecks. Procedures and policies are based upon assumptions of available information, resources and tools.

Invariably, it is our assumptions that unintentionally constrain us.

## 11.0 METRICS

The widely quoted maxim, "If you can't measure it, you can't manage it"[85], has been a mainstay of business for decades. It is countered by the equally popular quote attributed to Albert Einstein, "Not everything that can be counted counts and not everything that counts can be counted". Measuring is important. However, it is not the only thing that is important The trick is knowing what to measure, when to measure it, and how to do it correctly so as not to end up with the wrong answer - or worse, with the right answer to the wrong question. The equally popular adage, "There are three kinds of lies: lies, damned lies, and statistics"[86] reminds us, too, that the process of measuring things can be misused.

[82] Goldratt and Cox, Jeff (2004), pp. 331 - 335.
[83] Motwani, J., Klein, D. and Harowitz, R. (1996), p. 53.
[84] Goldratt and Cox (2004), pp. 331 - 335.
[85] This quote has been attributed to Peter Drucker, W. Edwards Deming, Robert Kaplan, T. Travers Waltrip, and a host of others.
[86] For a brief essay on the interesting attribution of this quote, see: Lies, Damned Lies and Statistics, University of York, Department of Mathematics at: http://www.york.ac.uk/depts/maths/histstat/lies.htm.

We have a love-hate relationship with statistics. Collecting data is tedious. Most particularly, the science - as well as the art - of statistical analysis it is not generally well-taught. Prior to the widespread use of sophisticated portable devices, statistical calculations were performed by hand, leaving whole generations of students with mathematical cognition challenges - the author included - behind in the dust. So like the unwanted offering of food, we have a tendancy to push it to the side of our plate in the hope that someone will eventually take it away. When used against us, it harkens back to Mark Twains', "I like criticism, but it must be my way".[87] On the other hand, we like it just fine when it supports our most closely held beliefs. Thus proving for all that a hungry man will eat almost anything.

If there is one thing that can be said about the Information Age: there is an abundance of information to be had. With increased information has come increased volume of communications, this further dilutes effectiveness. In an effort to segregate pertinent information from that which is not, departments and business units become stove-piped. Enterprise Resource Planning (ERP) is in vogue, and statistical process control - once the exclusive purview of academicians and other eggheads has now attained "flavor-of-the-month" status in both the private and public sectors.

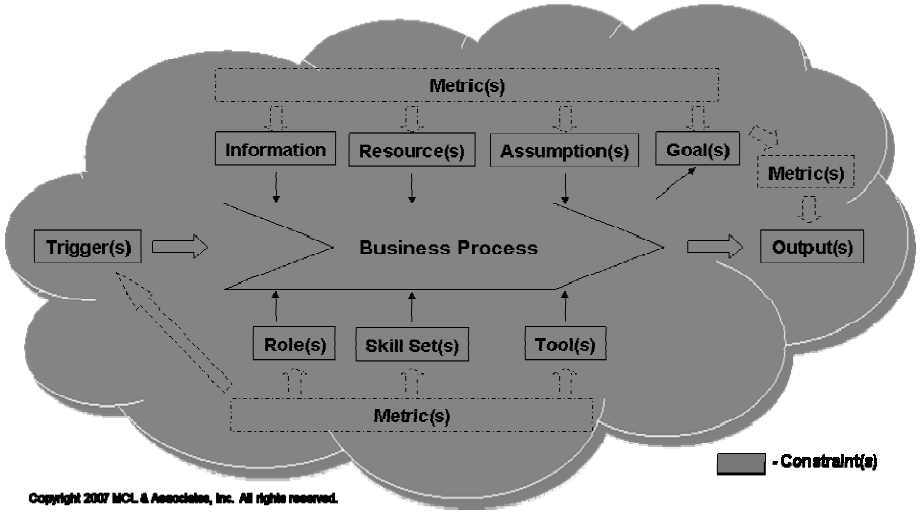


**Figure 12: Lefcowitz' Process Model**

Again, Cross and Baird (2000) have noted:

> "At best, however, databases only complement the personal networks of those seeking answers to problems. No matter how robust the search functionality or how customized the database, a person's network of human relationships often determines which knowledge they access. People usually take advantage of databases only when colleagues direct them to a specific point in the database. For example, it is common for people to ask other people for information and to be directed to a specific point in a database for lessons or tools. Alternatively, people might point out work products such as legal documents developed for other cases or sales presentation materials, that could be reused with some modification in the current situation. Rather than engaging in an extensive search through an organization's repository of knowledge, employees turn first to friends and peers lo learn where to find relevant knowledge."[88]

Often, the employees with the most institutional knowledge, and thus the best source of which metrics should be considered and which should not, are the functional workers who have the least status within the organization.

[87] Mark Train (Samuel Clemens), Chapters from My Autobiography. North American Review, No. DXCVIII, September 7, 1906. Retrieved 10/27/2007 from http://www.gutenberg.org/files/19987/19987.txt
[88] Cross and Baird (2000), pp 71.

## 12.0 ENTELECHY

A model is only as useful as its effectiveness in helping us understand, and thus solve, practical problems. A business process model that fails to take into account what we know to be true about individual and group behavioral dynamics will always end-up attacking only the symptoms of a problem, rather than the problem, itself. We must learn to do it better, not just differently.

As discussed by the author in some detail,[89] individuals and groups resist process improvement almost to the point of habitual failure. Neil Rackman (1988)[90] has written:

> "One of my favorite words, entelechy, is so little known that listeners reach for a dictionary whenever I use it. That's a pity, because the word fills a serious gap in the English language and deserves to be in everyday circulation. It means the becoming actual of what was potential - turning something into practical usefulness as opposed to theoretical elegance…There is no easy way to convert theoretical models into practical skills…No book…will, of itself, improve your…skills, any more than reading a book about swimming will teach you how to swim. The challenge for both author and reader in any book with pretensions to being practical is entelechy-turning theory into practical action…[I]mproving skills is hard work; there is no instant formula…Success in any skill…rests on concentrated, tedious, and frustrating practice."[91]

All learning is based upon human factors. We know, for example, that it is easier for somebody to learn new things related to things already known, that "hooks" connecting previous knowledge in to new knowledge are required to increase knowledge retention. We know that individual learning improves with repetition and practice.

Most important, we know that individuals learn differently, and at different rates. For the organization intent on maintaining excellence, this poses considerable dilemmas on the suitable choice of workers.

Because of differences in our individual ability to learn and our individual temperaments, considerable effort is made to match position responsibilities to demonstrated skill sets. This approach is based upon our commonly held norm of individual achievement. Individual achievement is rewarded handsomely; rarely is group achievement rewarded similarly. Should not our goal really be to create a group of individual achievers? Instead, should not our goal be to create groups that achieve, no matter what their individual make-up may be? Instead of the best individuals, don't we really want to have - to paraphrase a quote attributed to Herb Brooks - the right individuals?

Rackman lists four rules for learning skills:[92]

1. Practice only one behavior at a time
2. Try the new behavior at least three times
3. Quantity before quality
4. Practice in safe situations

It suggests a learning model that is incremental, focused and flexible. This is a very different model of learning than the one practiced by the majority of companies and government agencies, where new skill-sets are acquired either externally through the human resources process, or through internal training processes that are aimed at mere exposure.

Any organization wishing to become agile or wishing to remain agile must actively pursue the goal of entelechy. Defining, acquiring, and - as needed - redefining skill set acumen is the key to entelechy.

[89] Lefcowitz (2007b).
[90] Rackman, Neil (1988). SPIN Selling. McGraw-Hill: New York.
[91] Rackman (1988), p. 147.
[92] Rackman (1988), pp. 148 - 152.

## 12.0 CONCLUSION

This paper has attempted to present a new view of business processes, a view that emphasizes our knowledge about how human beings behave, both as individuals and within groups. It has proposed an updated model of the important elements to business processes; a model where human actors are a primary constraining factor, rather than a mechanical element, in the process.

Borrowing from conflict theory, we have introduced the notions both of rationality and of functionality as a ***methodology*** for aligning vision with process goals, and process goals with process output. Business processes and their goals must be both rational, as well as functional. To the familiar process elements of Information, Resources, and Roles, we have added the elements of Skill Sets, Tools, and Assumptions. We have noted that the presence of irrational and dysfunctional constraints is almost always man-made, and thus measurable and solvable. We have borrowed the idea of entelechy; turning potential elegance into something that is practical and useful.

The model presented here is an attempt to provide a tool that will bring these issues front and center…hopefully to stimulate - at the very least - debate, and perhaps a better understanding of how to assist agile process change.

The world has entered a far more dangerous time than ever before. Growing interdependencies, coupled with growing population pressures, greater competition for shrinking resources in virtually every aspect of our lives, and the increased spread of technological change make the stakes excruciating. The barrier of natural boundaries that once protected us can no longer be counted upon to shield us from the consequences of either our actions, or our inactions. The issue of national efficiency, voiced by Theodore Roosevelt almost a century before, must finally ascend - out of necessity - to the single most important question to be addressed in this coming century.

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