2006-2016: TEACHING BUSINESS PROCESS IMPROVEMENTS – MAKING THE RIGHT CHOICE

Frank Kowalkowski, Knowledge Consultants

Frank Kowalkowski is President of Knowledge Consultants Inc., a professional services firm founded in 1984. He has 30 years of management consulting and industry experience in manufacturing, distribution, insurance and financial services as well as the public sector. He has been involved with wide range of projects that include e-commerce, application integration, ERP, change management, content management, benchmarking, business performance measurement, business and competitive intelligence, technology deployment and process improvement. He is the author of a 1996 book on Enterprise Analysis (Prentice – Hall, ISBN 0-13-282-3365) and over 70 papers. Frank has been the keynote speaker as well a conference chair at several conferences. He conducts frequent seminars nationally and internationally on a variety of business management and information technology topics.

Gilbert Laware, Purdue University

Gil Laware is an Associate Professor at Purdue University in Computer Information & Technology department. He has over 30 years of consulting and industry experience in projects that span world-wide data management and web/database solutions, business process and knowledge management, and enterprise application integration. He is the Vice President of Research for the DAMA Foundation. Gil specializes in developing business and application solutions, metadata (business and technical) to support enterprise application integration, knowledge management, and data warehousing. He has developed and teaches courses in Enterprise Architecture, Systems Analysis and Design, System Architecture, Data Management and SQL. He consults in both the public and private industry sectors. Gil holds Master degrees in Management and Management Science.

Teaching Business Process Improvements – Making the right choice

Abstract

A significant question in today's competitive market that has direct business ramifications is how to assess the impact of business improvement projects and information technology changes before a commitment is made since an impact assessment can affect expectations of yield, return and quality improvements. Projects are often started without the baseline measures needed to asses the degree of improvement. More importantly, the ranking and impact assessment is often completely subjective. While subjective impact is important, it needs tempering with simple but more objective methods. Current approaches used to measure the performance of the business relate to processes, such as dashboards of metrics, value chain performance, and value-management that all focus on the operational results rather than the processes are at the heart of the question. None of them provide preliminary insight or an assessment of which processes that should be improved, where the largest return is related to the larger risk or what will provide the greatest corporate impact for the least amount of investment or risk. There are few known business techniques or analytics that provide the insight required to assess the most significant business improvements prior to making that choice.

Most analysis includes both qualitative and quantitative elements. Together, they provide the foundation for reasonable decision-making with regard to the situation being examined. Business processes are a series of actions or operations of producing something. The attributes of a business process can be either descriptive or quantitative. Businesses usually use one or more of these attribute(s) or metrics to represent the performance of the process (i.e. cycle time, inventory turns, and ratios of various sorts). Requirements for process improvement are statements supporting the need to change the actions within the process to improve its overall performance. This is a form of general requirements analysis. While some believe there is no way to generally analyze an enterprise others have examines some techniques to do so (Kowalkowski and McElyea).

This paper will provide a step-by-step approach to examine and assess current business processes using a context based assessment method that allows you to understand the implications of changing the processes from various business perspectives. These context based methods also require some descriptive analytics to manipulate the working models. They provide a focused way to improve business processes based on requirements while examined the impact of the proposed changes to the business processes. Coupled with some quantitative measures, they can provide a means of assessing both *return and risk.*

Background: The Competitive Environment and Processes

Few disagree with the statement that the marketplace and environment for enterprise is more dynamic and complex today than at almost any other point in history. Given the competitive business world of global markets, there is an ever-increasing need for critical assessment of enterprise problems which demands a different set of analytic and problem-solving skills to assess those requirements. It also requires chaining different types of requirements together. In today's market, it is essential to react to a business situation by (1) formulating the problem, (2)

analyzing the problem, (3) searching for solutions, (4) deciding upon an appropriate solution, and (5) specifying the solution. Of course, this approach to analysis has to be accomplished on time and within budget, and produce high quality results. Many organizations realize that gathering and organizing information about the enterprise is an on-going effort. Likewise, in building information systems, different requirements (statement of needs) are gathered and organized into a clear vision of why and what is required by whom, in some time period (when) and where it is needed. The on-going effort of maintaining this information can have a significant payback. What are the three types of requirements we deal with today?

1. Business requirements related to and resulting from some problem or situation the business faces such as entering a new market, a merger, consolidation, performance issue etc. The business itself is a complex adaptive system and must change with its environment or die.

2. Business system requirements created as the result of a response to the solution to the original business problem or situation. Examples are such as supply chain management, value chain improvement, customer relationship management, performance management etc.

3. Information system requirements focused on the automation aspect of the enterprise. This would include Business Intelligence, work flow, E-flows, core transaction systems etc. In other words, a 'well engineered' response to a set of 'well articulated' requirements of the business. Information systems are complex but not adaptive and can be engineered.

Most published material deals with the last point as the purview of information technology or information systems capability in the enterprise. Less has been written about assessing the impact of changes due to those requirements. In each case it is important to know the type and the degree of impact. The other two are dealt with by various other parts of the enterprise, often by outside consultants. The adaptive nature of the business requirements requires a more general approach to analysis than that for an information system. The impact of change is determined through techniques of general analysis where the relationships of components of the enterprise are articulated and then related to each other.

In the sense of business requirements, business process improvements are *essential requirements*. These requirements are descriptive statements that are relevant to the context and context envelopes of the organization. Therefore, requirements focus on these purposes:

1. Seeking improvement in efficiency and effectiveness, the business view.

2. Constructing information solutions to improve operational efficiencies, the systems view.

Requirement statements stipulate desired needs. Within these statements, we find relationships that are expressed or implied between some resource, object or dimension of the organization. We suggest four key analysis points are supported by a change in the focus of analysis:

1. Identify the best place (highest yield, shortest time to yield etc) to start the business process improvement program.

2. Reduce the time to complete the analysis, a time to market or yield issue.

3. Improve analytics to drive the right results.

4. Know when you are done, have done enough analysis or further analysis will not help you.

What is the Issue with Business Process Analysis Today?

Many papers have been written about the failure or low yield of process improvement efforts. We have been using system development techniques to analyze processes. Sometimes they work and sometimes they don't. The development techniques take more time and are more expensive. Process analysis and change must respond to the business need and as such it is part of the business systems requirements as opposed to the information systems requirements. They link to the problem – solution effort in the business and tie to the business requirements. Improving the analysis of processes to identify likely candidates for improvement has been a goal of many companies. The sheer volume of processes and the variety brought about by changing business configurations due to merger, acquisition, divesture, privatization and other strategies of businesses has put pressure on the analysis effort.

Business processes (actions that are taken to support some purpose by a person or automated procedure) are never executed in a vacuum although some people may believe so. They are executed in context with many assets and enablers of the enterprise. Further, they have constraints or relationships that impact their usage. The enablers have characteristics of their own that may be severely impacted by process change or conversely impact the implementation of the new process. The entire set of influences or factors on a process is called "*its context*". The context places pressures on the process and causes it to be analyzed for some improvement action. The degree of influence determines which processes might be a target for action. In addition, the results are used to identify the set of *requirements*. Requirements, as defined in the dictionary, are things essential to the existence or occurrence of something else and relate information about who, what, where, when, how, and why something is needed. This information must provide sufficient detail so that something can be engineered or built. Several strategies such as process replacement, workflow development, and automation via applications and so on are approaches used to fulfill those requirements.

Along with the *context* of the process, there are *attributes* of the "*context envelope*". A context envelope is a particular set of dimensions or categories of business elements connected to the process. Each dimension has attributes that distinguish the members of that dimension from one another. If the envelope is defined by documents (or screens) there are considerations such as how many documents are there, how often are they used; how big are they; and when are they used by a process. These dimensions of context influence the ranking of the processes. Each influencer has some set of attributes that can relate to the ranking of processes for improvement strategies.

Technique Used: Descriptive Analysis

Analysis can be defined in different ways: (1) the separating of any material or abstract entity into its constituent elements or (2) a process used as a method of studying the nature of something for determining its essential features and their relationships. (Merriam-Webster, p.1058). Descriptive analysis is clearly different from financial and quantitative methods. But, in either of these methods, some descriptive content is essential for the reader to understand the context of the analysis. For example, the annual report of most enterprises contains descriptive material about the business that supports financial and quantitative analysis.

Up until now, we have been using systems engineering based techniques that result in rigid structures to define requirements as opposed to techniques that result in flexible structures. But, because businesses are messy and not as orderly as an engineered system there must be some flexible connection between the enterprise and the environment it operates as the business adapts to the changes in the environment. Our choice was to use descriptive analysis to achieve this flexibility.

Descriptive analysis allows us to constantly re-arrange the requirements material in the business. In design, descriptions are assigned to a particular component and have a long life there. In systems this problem shows itself when object structures are required to relate across each other not just within. The consequence is that the approach to descriptive analysis is adaptable where the rules are flexible and the approach to design is rigid where rigid means following the very well defined rules needed for engineering a result. It is no wonder then that there is such difficulty in building systems that can change or adapt with the enterprise.

Methodology Used

The text nature of flexible requirements implies the use of descriptive models. The core model used in descriptive analysis is the matrix, the right arm of the business consultant for many years. We start by first with making a series of observations about the dimensions of the enterprise such as the organizations, locations and technology. This establishes the validity or truth of ranking process interest by dimension characteristics. For example, you would create a list of organizations and their characteristics (attributes) and rank the organizations based on the importance of the attributes. A second list consisting of processes is also developed. The two lists are then combined in a process to form an organization matrix. The organization rank is then used to order the processes according to which one is most important based on the relationship to organizations. Additional objective observations strengthen the ranking. Finally we infer across matrix models to assess the impact of the ranking and any changes we want to make. These matrices form the context envelope.

Let's look at this in more detail. Below is an example of a context envelope on processes and how to use them to identify process candidates for transformation or renewal. There are four types of context we usually consider in workflow analysis; locations, organizations, documents and technology. Here we will talk about just two; *locations* where the process is executed and the *technologies* that enable the process. Later we could add *documents* (or screens) used by the process and finally *organizations* that use the process.

There is a basic context analysis protocol or general series of steps for the analysis of context that we can use:

1. Gather material about key context categories such as locations, organizations, technology or documents.
2. Gather/locate the target processes of interest
3. Create a core set of context matrices
4. Assess impact and create a ranking by category
5. Combine ranks into a composite ranking
6. Use three analytics techniques:
    a. Ranking of dimensions by attributes
    b. Ranking by frequency
    c. Inference of impact related to changers in:

A combination of frequency of reference plus some quantitative and qualitative attributes of the members of a category is used to get the discrimination needed to pick the process that would be a good candidate for improvement.

An Example of a Context Envelope

Locations are all the places where work is done. Besides meaning a specific geography, locations are all the places that have distinguishing characteristics and can be characterized in a variety of ways including;

- Types of locations such as: Outsourced, off-shored, collocated supplier, collocated customer, and supplier.
- Globalization factor, such as Local, area, country, region, global
- Size of facility in square area
- Costs of maintenance per year per square area
- Classification, such as warehouse, office, combination, plant, works, facility etc.
- Number of employees at location
- Purpose of the location
- Structure such as a network of locations showing interrelationships in a flow of goods through a distribution channel or a tree structure showing the breakdown of the location memberships. An example is a geographic structure showing physical facilities by country (a matrix) or an organizational structure of locations such as a roll up by geography.

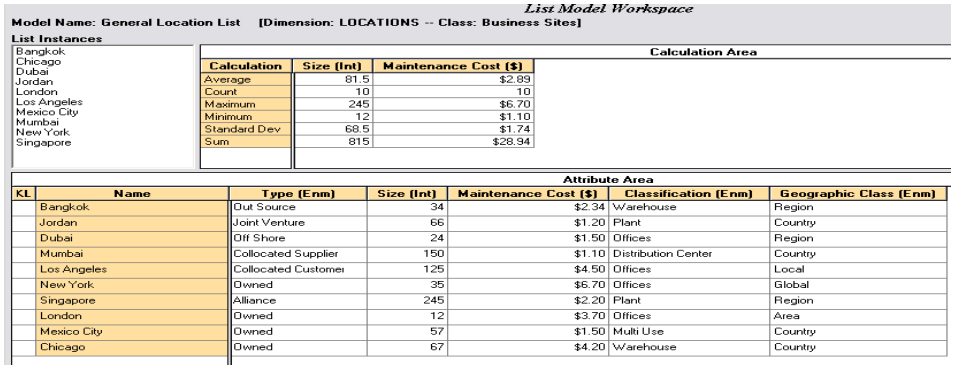
Start by ranking locations by their importance based on the attributes and interpret the result. This will point to the locations that are the most important. The ranks are tied back to business strategies and initiatives. If the business interest changes from cost containment to growth then the interpretation and ranking of the results might change.

Given the above distinguishing characteristics you consider most important, you have to gather all the material about locations and processes. In this analysis, you would:

1. Gather your list of processes (actions)
2. Gather the list of locations
3. Create the process-to-location matrix by building a relationship between the process and the location like the one shown below in Figure 2.
4. Start the analysis of the results by determining the most frequently referenced location and process
   a. Rank locations by most important attribute (second and then third attributes also)
   b. Rank processes by the most important attribute (second and then third attributes also)
   c. Most frequent location
   d. Most frequent process
   e. Infer the impact of changes, e.g. strategy, technology, organization etc.

Some of the results of analyzing the material you have gathered is shown below.

Accumulating attributes as measures for locations



List Model Workspace

Model Name: General Location List [Dimension: LOCATIONS -- Class: Business Sites]

List Instances

Bangkok
Chicago
Dubai
Jordan
London
Los Angeles
Mexico City
Mumbai
New York
Singapore

Calculation Area

Calculation	Size (Int)	Maintenance Cost ($)
Average	81.5	$2.89
Count	10	10
Maximum	245	$6.70
Minimum	12	$1.10
Standard Dev	68.5	$1.74
Sum	815	$28.94

Attribute Area

KL	Name	Type (Enm)	Size (Int)	Maintenance Cost ($)	Classification (Enm)	Geographic Class (Enm)
	Bangkok	Out Source	34	$2.34	Warehouse	Region
	Jordan	Joint Venture	66	$1.20	Plant	Country
	Dubai	Off Shore	24	$1.50	Offices	Region
	Mumbai	Collocated Supplier	150	$1.10	Distribution Center	Country
	Los Angeles	Collocated Customer	125	$4.50	Offices	Local
	New York	Owned	35	$6.70	Offices	Global
	Singapore	Alliance	245	$2.20	Plant	Region
	London	Owned	12	$3.70	Offices	Area
	Mexico City	Owned	57	$1.50	Multi Use	Country
	Chicago	Owned	67	$4.20	Warehouse	Country

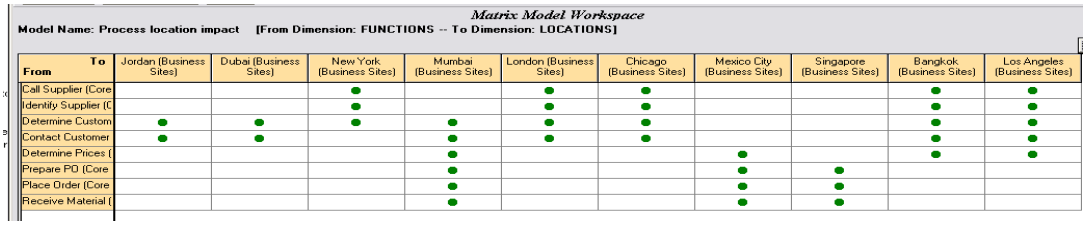
Figure 1 – Summarizing Attributes for Locations

We make several key observations for the analysis of the attributes shown above. They are:

- Greatest maintenance cost is $6.70 per sq
  - Average is – $2.89
  - Most expensive are in US
- Largest of facility at location 245 sq (in thousands)
  - Average size is – 81.5 sq
  - Largest is in Singapore, a plant
- Most facilities are country or region in scope, you need the geographic structure to see the relationship of facilities by geography
- Offices are the most typical class of facility
  - Probably sales offices if you had more detail
- There is only one distribution center

When creating the process-to-location matrix, you are identifying a relationship that exists between the process and the location. Figure 2 below shows you an example of such as relationship matrix. Start by creating this matrix by identifying which processes are executed at which locations. This is usually done in an interview with management. Later you create attributes that classify the relationship such as degree of automation at a site, volume of process execution or process characteristics by location or even a subjective estimate of impact using High, Medium and Low classification to start with. All of this is location oriented.

A typical process executed at location relationship matrix



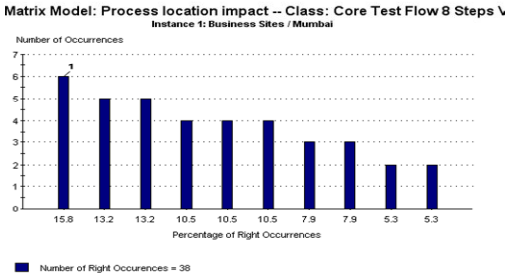
From \ To	Jordan (Business Sites)	Dubai (Business Sites)	New York (Business Sites)	Mumbai (Business Sites)	London (Business Sites)	Chicago (Business Sites)	Mexico City (Business Sites)	Singapore (Business Sites)	Bangkok (Business Sites)	Los Angeles (Business Sites)
Call Supplier (Core			●		●	●			●	●
Identify Supplier (C			●		●	●			●	●
Determine Custom	●	●	●	●	●	●			●	●
Contact Customer	●	●		●	●	●			●	●
Determine Prices (				●			●		●	●
Prepare PO (Core				●			●	●		
Place Order (Core				●			●	●		
Receive Material (				●			●	●		

Figure 2 – Relationships between Process-to-Location Matrix

Interpreting the observation results

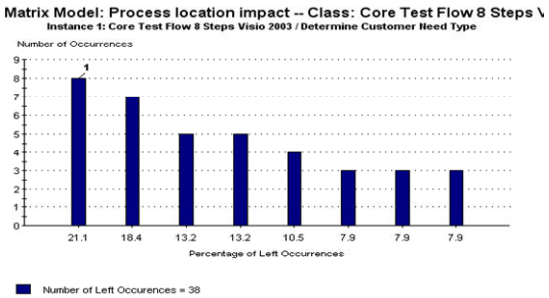
Figure 3 below is the report version of analyzing the frequencies of occurrence of process-to-location relationships. Here you are interested in which locations are impacted by the most processes and which process impacts the most locations. This helps identify the targets of change. With these measures you can assess some degree of the impact of the change. If you couple this with the volumes, you get a sharper distinction of impact. Considering 2 to 3 attributes is sufficient to get a good composite for ranking. A good example is frequency and volume. A third attribute might be cycle time or cost of the process.

Frequency analysis of relationships



Location Instance Rank Report
Matrix Model: Process location impact
Number of Occurrences: 38

1	6.0	Mumbai
2	5.0	Los Angeles
3	5.0	Bangkok
4	4.0	Mexico City
5	4.0	Chicago
6	4.0	London
7	3.0	Singapore
8	3.0	New York
9	2.0	Dubai
10	2.0	Jordan



Process Instance Rank Report
Matrix Model: Process location impact
Number of Occurrences: 38

1	8.0	Determine Customer Need Type
2	7.0	Contact Customer
3	5.0	Identify Supplier
4	5.0	Call Supplier
5	4.0	Determine Prices
6	3.0	Receive Material
7	3.0	Place Order
8	3.0	Prepare PO

Figure 3 – Examining Number of Relationships for Location or Process

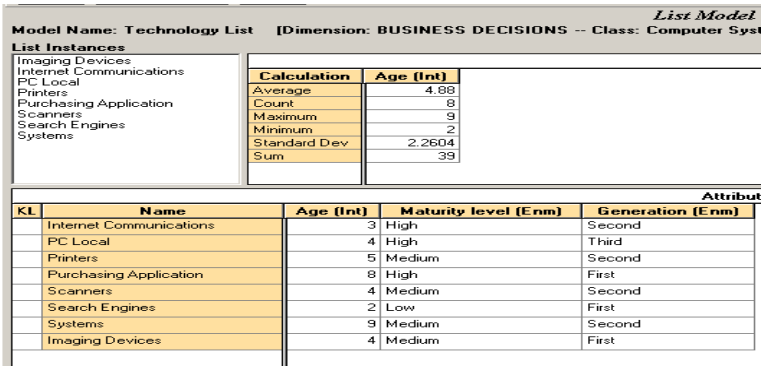
From this example, Mumbai has the largest number of processes and given the interaction with the processes, you can assess the impact of changes to "Determine Customer Need Type and Contact Customer" processes on Mumbai as part of a business process improvement program. The implication is that making a change to almost any step impacts Mumbai. As a result, you know early on in the project that this is where there will be significant impact! While Singapore is the largest it is not impacted by many of the steps. In fact they are some of the simpler steps and the facility may not be owned by the enterprise. However, Mumbai is a collocated facility with a supplier and the impact will be on both the supplier and the enterprise.

The technology dimension - Understanding process context based on technology

When you couple these results with other context analysis such as organizations impacted by processes, technology, documents impacted, strategies that relate to processes you can infer the type of impact and the scope. With the measure attributes you can determine the degree of impact. At this point you can make a decision (an informed judgment call) as to the most desirable processes to tackle first and even in what order. Of course this can easily be overruled by a management decision of what to deal with first but at least the results can be predicted with some reasonable assurance. At least, you know how much trouble will result from a random or emotional decision on where to start.

Next, we extend the analysis to technologies starting with a technology inventory.

A simple technology inventory



List Model

Model Name: Technology List [Dimension: BUSINESS DECISIONS -- Class: Computer Syst

List Instances

Imaging Devices
Internet Communications
PC Local
Printers
Purchasing Application
Scanners
Search Engines
Systems

Calculation	Age (Int)
Average	4.88
Count	8
Maximum	9
Minimum	2
Standard Dev	2.2604
Sum	39

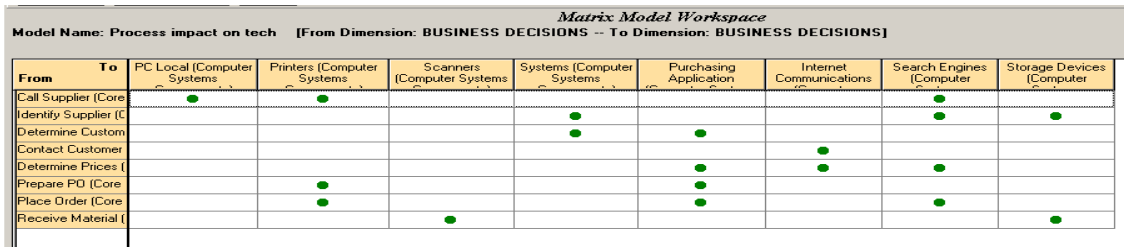
Attribut

KL	Name	Age (Int)	Maturity level (Enm)	Generation (Enm)
	Internet Communications	3	High	Second
	PC Local	4	High	Third
	Printers	5	Medium	Second
	Purchasing Application	8	High	First
	Scanners	4	Medium	Second
	Search Engines	2	Low	First
	Systems	9	Medium	Second
	Imaging Devices	4	Medium	First

Figure 4 – Technology List and its Attributes

We use the previously defined processes to show the relationships that exist between the processes and the technology they use. This is shown in Figure 5 as the Process-to-Technology matrix as shown below:

A process impact on technology matrix



Matrix Model Workspace

Model Name: Process impact on tech [From Dimension: BUSINESS DECISIONS -- To Dimension: BUSINESS DECISIONS]

From \ To	PC Local (Computer Systems	Printers (Computer Systems	Scanners (Computer Systems	Systems (Computer Systems	Purchasing Application	Internet Communications	Search Engines (Computer	Storage Devices (Computer
Call Supplier (Core	●	●					●	
Identify Supplier (C				●			●	●
Determine Custom				●	●			
Contact Customer						●		
Determine Prices (					●	●	●	
Prepare PO (Core		●			●			
Place Order (Core		●			●		●	
Receive Material (			●					●

Figure 5 – Process-to-Technology Matrix

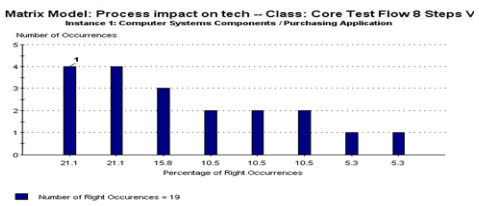
Again, certain columns and rows are denser (or frequent) than others. This means a greater range of impact, that is, more things are impacted. A low density row or column means fewer things may be impacted. Couple this with the frequency analysis charts for an easier view of where the action is in terms of impact.

Again in this example, technology changes to "Determine Customer Need Type and Contact Customer" processes by changing the Purchasing Application or Web Application on Mumbai could significantly impact their business. You would have to assess the business risk and

understand the Return on Investment (ROI) to determine if an upgrade to the underlying Technology would make a significant change to their business processes.

Frequency analysis of relationships

Technology references



Process references

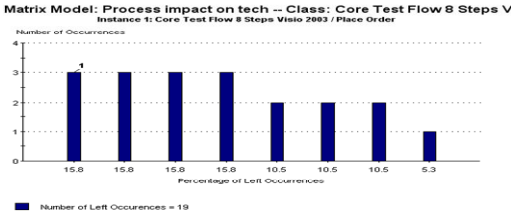


Figure 6 – Examining Number of Relationships for Technology or Processes

Figure 6 charts report absolute values of each relationship for either the technologies used or the processes examined. For a small matrix like those shown, you can do this by inspection and counting the intersections. However, in the real world it is not unusual to have a matrix of 20 by 30 (600 possibilities) where this is more difficult. Using a tool for frequency analysis you can show the number of interactions of technology and those associated with the current processes.

The frequency is very balanced and evenly distributed in this example

What does this mean?

Technology Instance Rank Report
Matrix Model: Process impact on tech
Number of Occurrences: 19

1	4.0	Purchasing Application
2	4.0	Search Engines
3	3.0	Printers
4	2.0	Internet Communications
5	2.0	Storage Devices
6	2.0	Systems
7	1.0	Scanners
8	1.0	PC Local

Process Instance Rank Report
Matrix Model: Process impact on tech
Number of Occurrences: 19

1	3.0	Place Order
2	3.0	Determine Prices
3	3.0	Identify Supplier
4	3.0	Call Supplier
5	2.0	Receive Material
6	2.0	Prepare PO
7	2.0	Determine Customer Need Type
8	1.0	Contact Customer

Figure 7 – Relationships between Technology and Processes

We can see in Figure 7 that from a technology perspective, the Purchasing Application and the Search Engines are the most frequently used. Likewise from a process perspective, the first 4 items (Place Order, Determine Prices, Identify Supplier and Call Supplier) are closely related to the Purchasing Application and Search capabilities. The implication being that Mumbai has to be closely examined since we know that any changes to the above processes will in fact, impact other location's technologies as well. But, broader implications can be developed by examining other dimensions and attributes in testing the hypothesis of changing either the processes

themselves or the technologies used by these processes. Either change may have significant impact on the operation of the business (e.g. the inability to place a purchase order). This impact analysis also highlights the potential need for different resources, skills, and training as part of the implementation plan.

The Implications

The bottom line in this approach is that it provides an agile and essential Business Process Management (BPM) analysis that is useful to sort out the processes for improvement. As in this example consider capturing the context envelope about who, what, where, when, how, and why something is needed with sufficient detail so that it can be engineered. This is the data about the organization and this is referred to as the organization's metadata. It is always part of the fundamental requirements. (Laware, 1993) These descriptive statements reflect the current or desired needs by providing specific organizational data about who, what, where, when, how, and why something is needed. We can see that this information (location, process, and technology) is a complete and precise description of the implications of the desired change from an organizational perspective.

So, what are we looking for in this type of analysis?

We want to:

- Identify the best place (highest yield, shortest time to yield etc) where to start the business process improvement program.

By examining relevant dimensions to the context of the problem, this approach efficiently and accurately describes the facts. These facts are examined from different perspectives allowing the team to pinpoint key areas to examine quickly. This approach has been shown to reduce analysis time by about 30% to 35% depending on the type and degree of analysis needed. For example, to understand the implications of consolidating different processes that result from a merger or a series of acquisitions or a consolidation, this form of analysis identifies areas of differences or redundancies very quickly. It produces a clearer focus (and a higher yield) partly due to judicious use of tools that aid in the structured semantic integration efforts required. This means that the implementation of the business process improvement costs less with fewer teams required to do the analysis.

- Reduce the time to complete the analysis, a time to market or yield issue.

Most projects are now taking one year or more to do an effective business process analysis. The time taken and cost related to the labor intensive efforts make some of the analysis prohibitive and educated guessing takes place. The methodology and approach described here reduces the time (not the effort) due to analysis by almost 50%. This means that smaller time frames can be used to realize the benefits of change and particularly to assess whether they are successful or not. This fits better with today's business environment than more traditional methods that might take 2 or 3 times as long. Also, more traditional systems analysis and requirements elicitation approaches are largely directed towards the development of an automated business process

solution and narrow the view of the analysis efforts by ignoring other forms of yield to the business such as accuracy and quality improvements.

- Use improved analytics to drive the right results.

In the context and envelope of the analysis, the choice of the categories or dimensions to be examined is very important. However, there are certain context factors that contribute to quickly narrowing down the results. These are the factors or dimensions of location, technology, documents and applications. The methodology and approach described here highlights the business areas to be closely examined and converges on key areas very quickly. The conclusion is that the results are more predictable and more closely aligned to the business requirements since it requires fewer staff to audit and confirm the results of the analysis. This approach also ensures that more than one source for a particular ranking, starting point or impact assessment is used to ensure the quality and accuracy of the results.

- Know when the analysis will not improve results:

Many information system types of analyses have been used to facilitate an understanding of business processes. Due to their specific intent to build an information system, they capture large amounts of material that may not be relevant to the business process analysis desired. Thus, this activity can be lengthy and costly. Whereas, this step-by-step methodology allows the business participants identify the key areas (dimensions) to be chosen for the analysis which are more relevant to the business requirements. This type of analysis focuses on three to four key dimensions to yield significant results. It is our observation that more than four dimensions do not provide significantly improved results.

- Examine additional insights

Because of the business focus, additional characteristics associated with the different dimensions are made visible. They provide additional insights that may result in improved requirements for systems and possibly identify new opportunities. Also, the focus of the business process improvement may change due to the analysis. This drives other results that may produce greater yields, better direction or even better business solutions.

This approach, with certain tool support, provides decision makers with a realistic assessment about relevant information (our example of location, process, and technology) that has multiple sources of supporting facts (inductive conclusions drawn from observations) and precise descriptions that show some of the assumptions and the implications (through inference and other deductive means) of the desired business process change. From an organizational yield perspective, it provides a sound framework and foundation for the implementation of the "desired" business process suite.

Teaching business process analysis from an information technology perspective limits the participants from clearly understanding the business drivers, the implications, and the power of dimensional, inductive, inferential, and deductive analysis. This approach provides a method that shows participants how to achieve the desired business process change that explores the facts, assumptions, implications, and the areas most affected by that change.

Biographical References

Booch, G., (1994) Object-Oriented Analysis and Design with Applications, 2nd ed., Benjamin/Cummings, Redwood City, CA.

Bruegge, B. & Dutoit, A.T., (2004) *Object-Oriented Software Engineering: Using UML, Patterns, and Java*. Prentice Hall, Upper Saddle River, N.J.

D'Souza, D.F. & Wills, A. C. (1999). Objects, Components and Frameworks with UML: the Catalysis Approach, Addison-Wesley, Reading, MA.

Higgins, James M (1994). *101 Creative Problem Solving Techniques*: *The Handbook of Ideas for Business*, Winter Park: The New Management Publishing Company.

Jones, M.D., (1998). *The Thinker's Toolkit: Fourteen Powerful Techniques for Problem Solving*, New York: Three Rivers Press. p. 5.

Juran, J. M. (1986). *The Quality Trilogy: A Universal Approach to Managing Quality*, This paper was presented at the ASQC 40th Annual Quality Congress in Anaheim, California, May 20, 1986. p.2.

Kowalkowski, F. F. and McElyea, L., (1996). *Enterprise Analysis*. Prentice-Hall, Upper Saddle River, N.J.

Laware, G., (1993). Achieving Business Goals through Information Systems Technology *Handbook of Information Systems*, Boston, MA. Auerbach Publishing, S3-S22.

Martin, J., (1990), *Information Engineering: Book II Planning and Analysis*, Prentice-Hall, Englewood Cliffs, N.J.

Merriam-Webster's Collegiate Dictionary, 11th Edition, Merriam-Webster, Inc., Springfield, MA, 2003, p. 478.

Merriam-Webster's Collegiate Dictionary, p. 1058.

Rumbaugh, J., Blaha, M., Premerlani, W., Eddy F. & Lorensen, W. (1991) *Object-Oriented Modeling and Design*, Prentice-Hall, Englewood Cliffs, N.J.

von Halle, B., (2002). *Business Rules Applied.* New York: John Wiley & Sons, Inc. p. 93.

Whitten, Jeffrey L., Bentley, Lonnie D., Dittman, Kevin C. (2004). *Systems Analysis and Design Methods*, New York: McGraw-Hill/Irwin. p. 236.

Zachman, J.A., (1987). A Framework for Information Systems Architecture. *IBM Systems Journal 26*, no. 3, 276-92.

Zachman, J. A., (2000). *Architecture Artifacts Vs Application Development Artifacts* This paper is part of e-Book 2001. p.1 Zachman, J.A., (1987). A Framework for Information Systems Architecture. *IBM Systems Journal 26*, no. 3, 276-92.