



Knowledge Consultants, Inc.

KCI White Paper

The Business Use of Phrase Analytics Leveraging the Hidden Semantic Asset



What are Phrase Analytics?

A Key Technique for Business Analysis

Paper Abstract

All too often today, the methods that business analysts, consultants and architects use to analyze an organization focus on documenting the organization and conclude the engagement or project without drawing conclusions or providing actionable results about management options.

Organizations spend large amounts of money (\$349MM over 10 years in the case of the US DOD) doing such documentation. They document process flows, system components, data structures, decisions and other components using models. Unfortunately, there is often little to show for these efforts since there are very few analytics that provide management with any insight for action.

In other cases, analysis confirms that changes need to be made in the structure and direction of an enterprise but it is not clear where to start and end the efforts. With limited resources, the change effort must be targeted to improve the bottom line results.

Phrase analytics is a key management technique for analyzing change and assessing the implications of decision-making. By looking at the phases used to describe the business, management applies this technique to understand the impact of change and assess various business alternatives.

There are well established analytical techniques that support quantitative and monetary types of analysis. These techniques use quantitative and visual presentations to show performance results but few are able to show and quantify the underlying relationships **between** the subject areas.

Consider this: all analytic techniques use phrases to describe the subject area being examined. Much of the gathered documentation during analysis is captured in phrases such as “Prepare Purchase Order” or “Review Claim”. In essence, phrases provide the linkages that define the business structure. These phrase linkages



can be used to trace impacts, provide rankings and do comparative analysis.

Once phrase material is captured, **phrase analytics**, along with the traditional quantitative and monetary analytics, are applied to gain insight into strategic, tactical and operational alternatives. Working together, this triangle of three analysis types are used to determine the implications of change. This change has strong consequences relating to business components such as organization, structure, culture, processes and systems.

When phrase analytics are applied to all the documentation, key insights are uncovered, such as:

- Ranking techniques can be used to establish order and determine priority
- By comparing and contrasting candidates based on the phrases used to describe their processes, better decisions can be made regarding their suitability for mergers, acquisition, or consolidation.
- Impact analysis is used to help assess the degree of change management that will be required.

Decision-makers need rapid assessment approaches and tools to capture and manage the results of phrase analysis. The wealth of material available for analysis demands tools that are highly-effective and produce rapid, actionable results. Afterspyre fills a unique niche that allows organizations to read between the lines and leverage their analysis to the next level so they can achieve the results they need in an ever more competitive environment.



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Semantics Based Analytics

The last decade and more has seen a move from traditional semantic analysis focusing on language and language understanding to the analysis of content. Content is defined by the set of words that are used and their relationships to one another. So, if you are doing text analysis, you are searching for things in blocks of text like paragraphs in a document or a field of a database. If you are searching the web, you are looking for relationship type connections (e.g. the ‘semantic web’'s metadata idea) between words to find something or navigate web pages and their content.

However, if you are in an organization looking at its structure then you are looking at *phrases* made up of a single word or several words. These phrases do not stand by themselves but make up the models (explicit or implicit) that define an organization. *Phrase analysis* is looking for and identifying the multitude of such models like a chart of accounts, bill of material, process flows, decision structures, strategy lists and so on. **Phrase analytics** are those algorithms that are used for analyzing these models individually or in groups of 2 or more.

Analytics for text analysis and semantic web tend to focus on finding something or doing a ‘where used’ on a word or set of words. There are also analytics, such as keyword analysis based on frequency of use and number and types of close relationships. These analytics are very useful for certain types of work such as identifying what word customers use most often when complaining about a product, or common words used to describe a product or service.

However, these techniques are not strong enough for **phrase analytics** used to analyze models in a business. Compare, contrast, rank, infer, and other phrase analytic algorithms provide insight in reaching a decision about some action or direction in the organization. For example if a company is merging two operations, how do you know if the business functions, processes, database structures, application systems, decisions etc. are compatible to combination? Also, if you are installing software packages or a reference model how do you know it fits your organization? These are typical of the questions that are answered using **phrase analytics**.

Phrase analytics have been used in one form or another by consultants for many years now. The algorithms they use are loosely defined and depend on the experience, skill and training of the consultant. The techniques were often done by hand. Today there are new tools and limited features of existing software tools emerging that can do basic **phrase analytics**.

Analysis Techniques and Analytics

Analysis techniques in general

The 3 basic categories of analysis techniques and supporting methods (with tools) are:

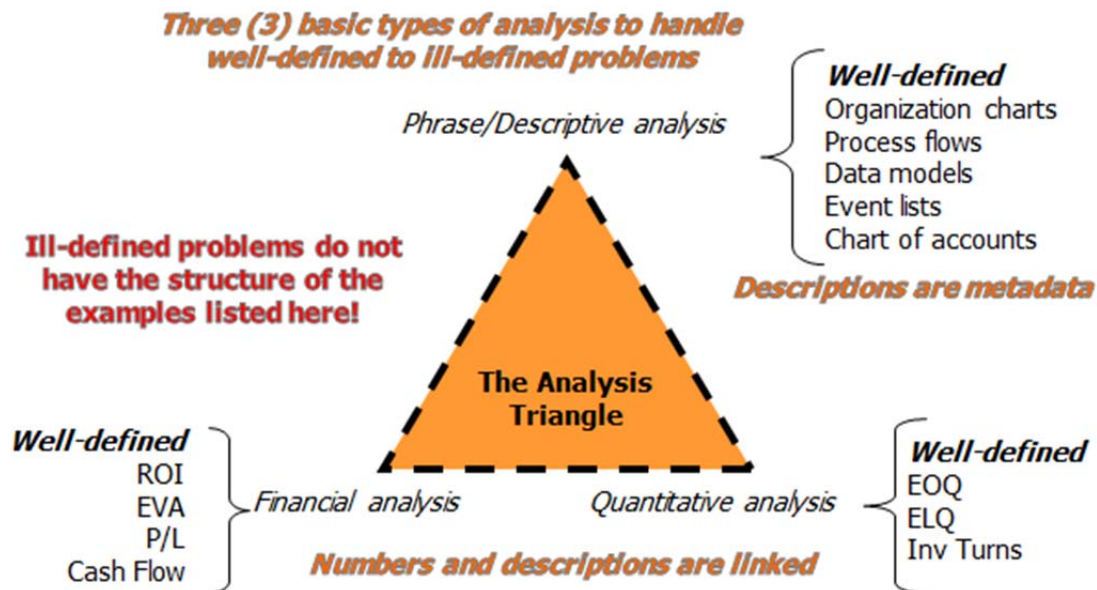
- **Financial** – where the analysis is based on the use of monetary ‘what if’ methods such as varying the values of a rate of return for a given amount of principle.

- **Quantitative** – where the analysis is based in the use of quantitative ‘what if’ values in the business. An example is to vary the cost of order in an economic order quantity equation to see the impact on order size.
- **Descriptive** – where the analysis is based on relationships defined by phrase models representing structural components of the business. An example of descriptive analysis is changing a strategy and assessing the impact on products, functions, processes, systems, locations, documents or any other component of the business by using analytics on phrase models.

The diagram below shows the three types of analysis with a few examples. Financial analysis usually works with analytical techniques like ratios and formulas such as Economic Value Added (EVA), Return on Investment (ROI), Profit and Loss (P/L) and many others. There are over 500 ratios that are used in financial analysis.

Quantitative analysis and analytical techniques deal with numbers, such as Economic Order Quantity (EOQ) and Economic Lot Quantity (ELQ). There are also hundreds of quantitative values that are used. There are also libraries of Key Performance Indicators (KPIs) and Key Results Indicators (KRIs) that have thousands of indicators listed and defined.

Phrase analysis is based on the descriptions used in the enterprise. The phrases exist in large quantities but few analytics have been defined for them. The phrases exist as part of the many models that are used to describe the enterprise.



These techniques also relate to each other. A financial analytic technique also have descriptions as names that go with the values, quantitative values also have names and descriptions also have currency and numbers that go with them.

Consultants, business analysts and architects should know about all three of these techniques, especially the phrase methods. The phrase methods are used to analyze business problems, structures and architectures to come up with some conclusion or result as an indicator to

management regarding direction. This approach uses matrices with a particular structure to accomplish the impact assessment, quantitative and enumeration attributes of models for ranking options and comparative analytics for comparison and contrast. **Phrase analytics** are applied to 5 basic models types: lists, flows, trees, networks and matrices.

As an example of the analytics purpose consider the matrix model type. The matrices contain phrases that define the business. The models also have attributes on the relationships which are financial and quantitative as well as qualitative enumerative. Inferencing can be done across matrices to assess impact of change. The quantitative values in the model can be used indicate the degree of change and magnitude of impact.

Semantic techniques in specific

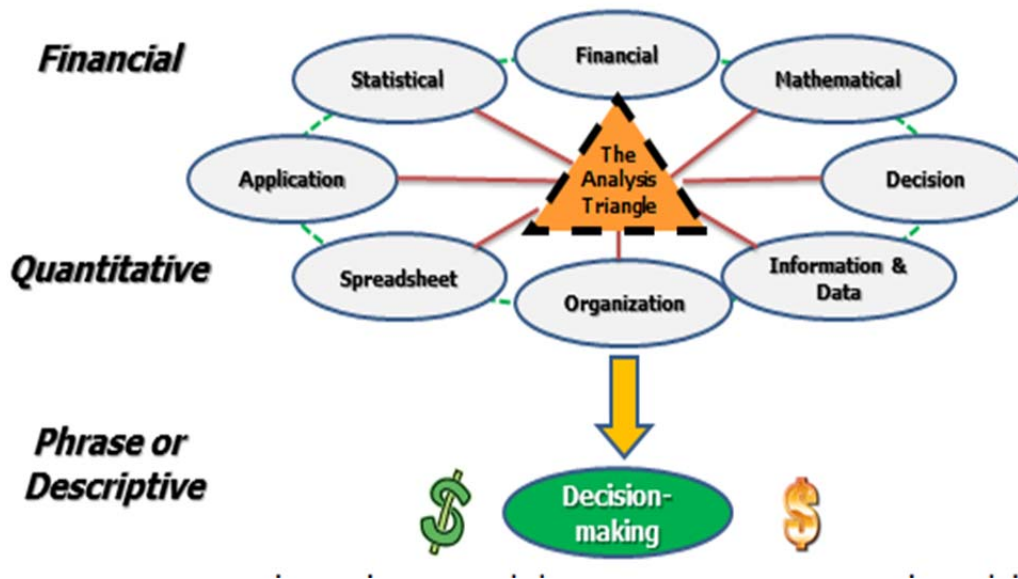
Executives, managers, and professionals in business today are looking for more efficient and effective methods to analyze enterprises. Most analytical techniques are focused on financial or quantitative values. These techniques are well known and taught in many venues. Recently there has been an intensive focus on qualitative methods of analysis. The three types of analysis emerging today are semantic in nature, as they depend on language. They are:

- **Text Analysis** - used on blocks of text to find patterns in word and word neighborhoods used in documents and text fields in databases. Keyword analysis is a core technique here with keyword phrases being constructed from the list of keywords and words in the neighborhood or related to the keyword. Useful for analyzing customer complaints, help desk issues. Source of material is any text such as text fields in databases, emails and documents.
- **Semantic analysis** - used on the web for searching and navigation purposes. The source of the semantics is what the user puts in and the taxonomies and glossaries developed for websites and indices of web content that are subject to the search.
- **Phrase Analytics** - used to analyze various models used in an enterprise like charts of account names, process flows and decompositions, system diagrams, decision structures, product structures, bills of material, location and data structures etc. Most importantly these analytics are used on business structures or 'architectures'. They are also used in '*enterprise architectures*', those are architectures that focus on the digital part of the enterprise and involve IT.

The first two semantic approaches use word pattern analysis. The least known of the three approaches is the **phrase analytics** approach which uses inferencing, comparative analysis and ranking analytics based on the typical models in a business.

Where is the value?

All three types of material - financial, quantitative and phrases - are used individually and in combination to get to a result involving a decision, a conclusion, a direction or evaluation of alternatives. Models representing material for all three types of analysis are readily available in most enterprises. These models, along with other analysis gathering methods, supply the input for phrase analytics. Additionally, the phrases are the material that ties together quantitative and financial number. Without definitions and names the numbers cannot be understood.



In the above diagram, a number of different sources of material and methods of analysis are shown. **Phrase analytics** can be used as the integrating factor for the various types of models used in a particular business analysis project. Often the financial, quantitative and phrase values are used together as in sets of instances like the elements of a flow model that have:

- Phrases used, e.g.: *Send Purchase Order*,
- Financial value used: *Cost of flow cycle*
- Quantitative values used: *Performance indicators such as cycle time, queue time, transport time, efficiency*

Key questions that business executives face

Phrase analytics are useful on all levels of the structure of the enterprise. Businesses are faced with a number of questions that need decisions. Managements know that several programs or initiatives are needed to make their company perform better, such as: changes in the structure of the business with new strategies, business operations, capabilities, performance management and several others. These are associated with quantitative factors like: cost, yield, risk and some qualitative enumerated factors, such as: impact (small, medium, large), importance (very high, high, medium, low, very low) and so on. Broad direction types of phrases are used on the strategic level while more specific phrases are used on the tactical level. Finally detailed phrases are used on the operational level. Regardless of how you vertically partition the view of the enterprise, phrase analysis and **phrase analytics** are useful. **Phrase analytics** also apply horizontally across the enterprise or across enterprises.

For direction in analysis start with tactical view at the initiatives



Regardless of level, the point of **phrase analytics** is to aid in decision making. The different techniques for analysis can be linked together to form an integrated business analysis approach. Linking financial, quantitative and phrase techniques together provide a powerful approach to business analysis and business problem solving. The diagram below shows the many sources of the three types of material used in decision making. Phrase analysis can be used at any level of the enterprise.

Below is an example set of questions typical of most enterprises regardless of type, business, government, educational institution, non-profit and so on. Each answer to the question would require some element from the Analysis Triangle but use phrase analytics at their heart.

Strategic:

- How do you consolidate and integrate major parts of the enterprise?
- How can I make this merger execute more smoothly?
- Will this merger work?
- Does this acquisition fit?
- Will adding or deleting products or services have a negative or positive impact on the business?
- How do we align IT or another function and the business?
- How can we evaluate effective use of management disciplines such as: Value Chain, Competitive Intelligence, Business Architecture, Balanced Scorecard, Mergers and Acquisitions, Business consolidation and Integration.

Tactical:

- Do our capabilities match our needs?
- What impact will new initiatives have on the organization?
- Which business initiatives have the most risk and impact?
- How do you consolidate/integrate functions of the business?
- How do we make sure flow across the business works best?

Operational (functional, product, mission critical process or system focus):

- How can I assure the implementation of new or changed processes, systems, databases etc. will match requirements?
- Does this new software package or reference model fit the business?
- What is the impact of business change on data management?
- What is the impact of the process renovations?

Business analysis starts at any level of the enterprise and in fact usually starts at several levels at the same time. Analysis proceeds vertically as shown above or can be done horizontally across functions, operating units or business units as well as individual companies.

The reality of business change

There is an adage in quality that says 'fix it in the design not in production'. The same is true for any operational activity, 'fix it in the analysis not in deployment'. Just to pick a few of the key questions above to illustrate value consider the following:

- The current emphasis on big data, business intelligence and performance management highlights the need for understanding data management across the business. Knowing the impacts of change and what factors are ranking performance measures the highest can focus management on the best yielding and targeted opportunities.
- Integrating across functions, operating units, locations and systems provides added opportunities for performance improvement. Impact analysis identifies those touchpoints that are related to an initiative, requirement, strategy, capability and project identifying linkages.
- Process renovations require both vertical and horizontal integration across the enterprise. Getting full value from workflow is achieved when these linkages are well known and not identified during implementation.

Typical of reality are failures of various business initiatives, projects and various types of integration of: systems, organizations, *data* and processes that have had significant publicly exposed failures as evidenced from recent history.

For exampleⁱ, Airbus - A380 plane's design was impacted by a single decision.

ⁱ Extracted from <http://calleam.com/WTPF/?tag=examples-of-failed-projects>

Date: December 2000 – October 2007

Cost: \$ 6.1Billion in additional costs due to project delays

The decision made was to proceed with the project, despite the fact that two CAD systems were in use. That decision resulted in design inconsistencies, mismatched calculations and configuration management failures. Another impact as those who have done merger type projects know, merging disparate entities into a single homogeneous whole is not easy. Because of their differing origins, different parts of the organization inherit different corporate cultures, management styles and IT systems. Those differences can be both hard and expensive to overcome and at Airbus a number of such differences were still deeply entrenched when the A380 project began.

Another example is J.P. Morgan Chase & Co. who developed a financial risk analysis solution called the New Synthetic Credit VaR (Value at Risk) Model in Excel.

Date: September 2011 (project) – Apr-Jun 2012 (operational failure)

Cost: Approximately \$ 6 Billion

As reported in J.P. Morgan's report to their shareholders that was published following the major loss, the spreadsheets "had to be completed manually, by a process of copying and pasting data from one spreadsheet to another". The London trader who used the tool causing major losses was unaware of the history of the models development and its issues.

Cited issues in the report were: (1) Inadequate resources were dedicated to the development of the model. (2) Model Review Group required only limited back-testing of the new model, and it insufficiently analyzed the results that were submitted. (3) Model Review Group did not compare the results under the existing Basel I model to the results being generated under the new model. (4) The model was approved despite observed operational problems with spreadsheets using a manual process and "error prone" and "not easily scalable." (5) CIO Risk Management played too passive a role in the model's development, approval, implementation and monitoring. (6) The CIO's implementation of the model was flawed by relying solely on the model creator, who reported to the executive offices, to operate the model. The creator uploaded data manually without sufficient quality control, spreadsheet-based calculations were conducted with insufficient controls, and frequent formula and code changes (algorithms) were made without controls.

Having the capability to assess various business situations provides the foundation for good decision-making and minimization of risk.

Phrase analytics completes key analytical techniques leading to improved business understanding and performance.

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