

On a “Common Language” for a “Best Practices” Knowledge Base

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Abstract

Knowledge management systems are becoming embedded in knowledge work. As part of those knowledge management systems, increasingly, firms are developing best practices knowledge bases that summarize a wide range of enterprise processes. Central to those particular knowledge bases are common languages used to facilitate access and navigation through the knowledge base. This paper summarizes some of the evidence as to the necessity of common languages in best practices databases. Further, this paper summarizes some of the barriers standing in the way of development and use of these common languages.

In addition, this paper develops a model that finds that it is “impossible” to rationally choose a common language that meets the needs of all individuals and the firm, unless dictatorship is allowed. Although “dictatorships” are not objectionable in for-profit firms, there can be problems if there is change in the dictator (e.g., executive turnover) or the system is sold to others with different common language and process needs than the dictator.

1. Introduction

Increasingly, firms are developing “best practices” knowledge bases as part of their knowledge management systems. Best practices (or leading practices) knowledge bases provide access to enterprise processes that appear to define the best ways of doing things. At the base of these best practices knowledge bases is what the developers (e.g., Price Waterhouse, 1997) call a “common language” or (International Benchmarking Clearinghouse 1997) a “common vocabulary.”

The purpose of this paper is to summarize the use of common languages in best practice knowledge bases and present an analytic model of the choice of common language concepts that are included in or excluded from the common language. This paper finds that based on a small set of assumptions it is “impossible” to rationally choose a common language that will be optimal for individual members of a group and the group itself, unless “dictatorship” is allowed. Thus, the resulting common languages are likely to meet the needs of the dictator or the needs that the dictator sees are important for the organization. Since the organizations that have developed best practices knowledge bases typically are for-profit firms, this is probably not a problem unless the dictator

changes (e.g., through executive turnover) or there is an attempt to implement the common languages in some other setting (e.g., sell the best practices knowledge base and common language to other firms).

Scope

Consulting firms, such as the “big six” have developed best practices knowledge bases for their own internal direct use. Arthur Andersen and Price Waterhouse apparently were among the first such developers. Each of these firms have publicly available materials regarding their best practices knowledge bases (Arthur Andersen 1997, APQC 1997, International Benchmarking Clearinghouse 1997, Price Waterhouse 1995 and 1997). As a result, the descriptive scope of this paper is primarily limited to information available from those sources.

This Paper

This paper proceeds as follows. Section 2 presents a summary of best practices knowledge bases. Section 3 provides a discussion of the uses and costs of using a common language in a best practices knowledge base. Section 4 analyzes why common languages are necessary in best practices databases. Section 5 investigates the barriers of implementing common languages in best practices databases. Section 6 develops an analytic model of choosing a common language. Section 7 provides a brief summary of the paper.

2. Best Practices Knowledge Bases

Best practices knowledge bases capture information and knowledge about the best way to do things. Best practices knowledge bases have found use in a wide range of enterprises. For example, as noted by Davenport (1997), General Motors - Hughes Electronics capture best process reengineering practices in a database. In addition, major consulting firms, including Arthur Andersen and Price Waterhouse, have developed best practices knowledge bases.

Best Practice Knowledge Bases as Models of the Firm

Best practices knowledge bases typically are based on process models of the firm, with emphasis on particular

processes and how those processes relate to each other. The basic best practice models that are used to organize those processes for Arthur Andersen and Price Waterhouse best practices knowledge bases are given in exhibits 1 and 2.

Exhibit 1 -- Arthur Andersen

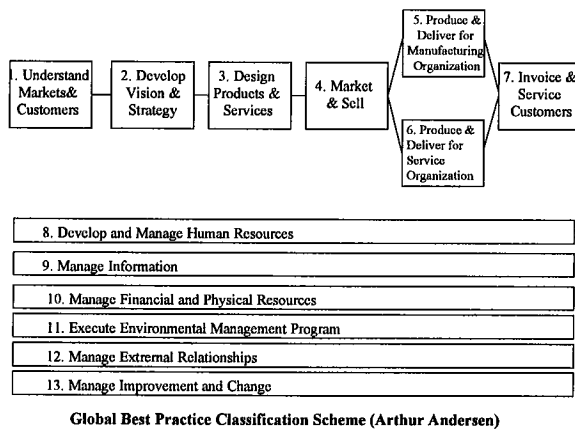
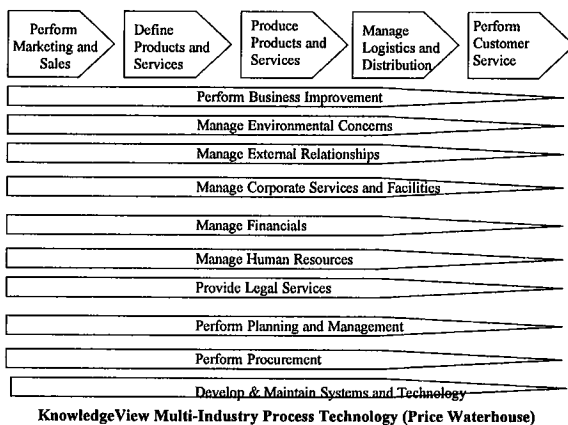


Exhibit 2 -- Price Waterhouse



What is in Best Practice Knowledge Bases?

Best practice knowledge bases include a range of materials. Typically they include text and or graphic representation of best practice processes. Best processes may be generic or designed for specific industries. There may be reference to articles or other descriptions of the processes. Process measurements are also summarized providing a basis for benchmarking. Some best practices knowledge bases include war stories, and information relating processes and technology enabler information. Finally, the knowledge base may have reference to particular experts on the processes.

The information describing the process provides a basis for organization of the best processes. As a result, best practices are organized by process, performance measure

benchmarks, industry-based process information and technology enabler.

When were Best Practices Knowledge Bases First Developed?

Formal best practices knowledge bases apparently are a recent development. Arthur Andersen (APQC 1997) and the International Benchmarking Clearinghouse (1997) apparently began their joint effort in 1991. This is one of the earliest reports of best practice knowledge base development. It is not clear when Price Waterhouse first developed their best practices knowledge base. However, they published information about their best practices knowledge base in 1995 (Price Waterhouse 1995).

Are Best Practices Knowledge Bases for Internal or External Use?

Initially best practice knowledge bases were designed for internal usage. Using best practice knowledge bases, consultants and auditors could have access to the best practices in order to help or understand their client's processes. Clients benefited indirectly through having auditors and consultants who were more knowledgeable.

However, recently firms apparently have become increasingly interested in direct access in order to facilitate "bench marking" with other firms and improving their work processes. As a result, some consulting firms have made their best practice knowledge bases directly available to users. For example, Arthur Andersen's KnowledgeSpace (<http://www.knowledgespace.com>) was made available as a service over the internet to subscribers in 1998. (In addition to access to best practices information, subscribers can access news, discussion groups and other resources.) As a result, clients can now directly access best practice information.

Best Practice Knowledge Bases are Part of a Portfolio of Knowledge Bases

Typically, best practice knowledge bases are treated as a standalone knowledge base. However, best practice knowledge bases are only a part of the portfolio of knowledge management system knowledge bases. In consulting firms, those knowledge bases also include proposal knowledge bases, engagement knowledge bases, news, information and expertise databases and others.

3. Common Languages in Best Practices Knowledge Bases

Best practice knowledge bases typically are organized around a common language / taxonomy. The existence of a common language for best practices knowledge bases raises a number of questions.

- To what extent does a Best Practices Knowledge Base Require a Common Language?
- How are Common Languages Developed?
- How many Best Practice Common Languages are there?
- How do Best Practice Common Languages Interface with other Knowledge base Languages?
- What is the Relationship Between Common Languages and Knowledge Management Ontologies?

To what extent does a Best Practices Knowledge Base Require a Common Language?

There is evidence that developers have found the need for a common language in the best practices databases to be a critical issue. For example, as noted by Price Waterhouse (1997)

A Common Language

It is almost impossible to make intelligent comparisons without a common set of reference point to describe the key processes and core capabilities of a business. Even within the same company, different divisions cannot compare processes when they lack a common language to describe what they do. The challenge becomes even greater when executives attempt to compare separate companies in the same industry or across different industries. Best practices must be accompanied by a common language that breaks business processes into activities that all companies recognize, understand and share.

How are Common Languages Developed?

There is limited information available regarding how these different common languages have been developed and how choice was made between alternative language representations. It is assumed that different groups that will be using the common language are represented by an individual who represents their interests. Within that group choices are made regarding which concepts to include and exclude, what to call particular concepts, etc.

The International Benchmarking Clearinghouse apparently made heavy use of a single source of expertise in order to develop their common language.

The Center and Arthur Andersen & Co. have collaborated closely to bring the Process Classification Framework to life and enhance it over the past three years. The center would like to acknowledge the staff of Arthur Andersen for their research and numerous insights during this effort. (International Benchmarking Clearinghouse 1997)

How many Best Practice Common Languages are there?

It is unclear how many different best practice common languages have been developed. However, to-date there have been reports of a few large companies, such as General Motors (e.g., Davenport 1997), and large consultants (Arthur Andersen 1997 and Price Waterhouse 1995 and 1997) each developing best practices databases and their own corresponding common languages.

Which Common Language is Optimal?

With the existence of all of these common languages, which is best? The fact that different common languages are emerging probably is evidence that developers have different needs and as a result develop different common languages to meet those needs. However, there are some apparent similarities. For example, two of the common languages that have gotten the most publicity (Price Waterhouse 1995 and International Benchmarking Clearinghouse/Arthur Andersen 1997) appear to be based on a common overall model, Porter's value chain model (Porter, 1980).

How do Best Practice Common Languages Interface with other Knowledge base Languages?

As a stand alone knowledge base, best practice common languages generally do not need to directly interface with other knowledge base languages. However, this is likely to change as knowledge management systems become increasingly integrated.

What is the Relationship Between Common Languages and Knowledge Management Ontologies?

Issues relating to common languages in best practices knowledge bases are part of a larger set of issues referred to as a knowledge management ontologies (KMOs).

At the broadest level, an *ontology* has been defined as an explicit specification of a conceptualization (e.g., Gruber, 1993). Within artificial intelligence, ontologies are necessary for multiple independent computing agents to communicate without ambiguity. In addition, in artificial intelligence, ontologies are the center of much research on reusability of knowledge bases

A KMO is a knowledge-based specification that typically describes a taxonomy that defines the knowledge. Within the context of knowledge management systems, ontologies are specifications of discourse in the form of a shared vocabulary for human actors. Ontologies can differ by developer and industry, depending on their human users.

4. Why is it Necessary to have a Common Language?

With each of the reports of best practice knowledge bases,

there is also discussion of the unique common language used to access and organize the knowledge base. The need for a common language derives from a number of factors including, knowledge reuse, knowledge organization, knowledge navigation, facilitation of cross industry comparisons, need to eliminate "insider terminology," and the broad base of constituencies.

Knowledge Reuse

Knowledge can be stored and reused. Knowledge about processes at one firm can be captured and used in other settings. As in artificial intelligence research, a common language facilitates reuse of best practices knowledge.

Knowledge Organization

A common language allows best practices knowledge to be organized in a number of views, based on the common language. For example, Price Waterhouse has organized their best practices knowledge base according to four different views that are part of their common language: business process, industry, performance measure and technology enabler.

Knowledge Navigation

As noted by Arthur Andersen (1997), a common language facilitates knowledge navigation through a best practices database

Our experience taught us that the common organizing framework was very valuable -- it provides us with a common and understandable way to navigate through the knowledge.

Cross Industry Usage

One of the benefits of best practices is to be able to take a process in one industry and adapt it to another industry. Apparently, a common language can facilitate cross industry comparisons (Price Waterhouse 1997).

The challenge becomes even greater when executives attempt to compare separate companies in the same industry or across different industries. Best practices must be accompanied by a common language that breaks business processes into activities that all companies recognize, understand and share.

Eliminates Need for "Insider Terminology"

The International Benchmarking Clearinghouse (1997) argued that a common language allows them to break away from specialized language. In particular, they indicated that they

... were convinced that a common vocabulary, not tied to any specific industry was necessary to classify information by process and to help companies

transcend the limitations of insider terminology.

Broad Range of Constituencies

In addition, best practices knowledge bases are designed for a wide range of users for a wide range of uses. For example, Price Waterhouse (1995, p. 12) notes that "More than 30,000 ... professionals worldwide have access to this tool for the purpose of collecting, refining, and sharing their knowledge with clients to help them enhance organizational competitiveness." As noted by Price Waterhouse, (1995, p. 9)

With a common language to describe the processes and activities of all companies, any company can compare itself to another. Price Waterhouse, The Knowledge View taxonomy can serve as the basis for best practice comparisons across industries, languages, and time zones. In fact the taxonomy is already being used on five continents and has been translated into several world languages.

5. Barriers to a Common Language in a Best Practices Knowledge Base

Although common languages broadly are seen as necessary, there are a number of barriers that stand in the way of their implementation.

Common Languages are Costly to Develop

Best practices knowledge bases are particularly complex and difficult to develop. As noted by Arthur Andersen, 1997, p. 4,

... we underestimated the sheer effort necessary to translate ... knowledge about best practice into useful explicit knowledge. The central team could not, on its own extract the ... knowledge of the consultants and the professionals in the field After a significant effort, the team had produced a CD-ROM with the classification scheme, but only 10 of the 170 processes populated, and with limited information. Further, the information was not actionable -- it added little to those with deep knowledge of the area, and was not enough to help those who had less experience The initial offering almost died an early death -- it seemed much effort for little payoff.

General vs. Specific Vocabulary

A common language forces all users into the same vocabulary, so that users are unable to take advantage of vocabularies that meet specific needs. This is unfortunate, since specific technical vocabularies are typically developed because general language is insufficient (e.g., Kuhn 1970).

Industry Differences are Important

Although common languages work to mitigate some industry differences, in some settings inter industry differences are critical. If the common language does not allow for those differences it can lead the user to erroneous conclusions. For example, financial statement theorists have long argued the importance of industry (Bernstein, 1974, p. 579).

The financial analyst must, however, recognize that there are industries with distinct accounting treatments which arise either from their specialized nature or from the special conditions, such as governmental regulation to which they are subject. The analysis of the financial statement of such enterprise requires a thorough understanding of the accounting peculiarities to which they are subject, and the analyst must prepare himself for his task by the study and the understanding of the specialized areas of accounting which affect his particular analysis.

Incorrect Usage of the Common Language

Simply having a common language does not ensure that users know how to use that language. For example, as noted by Kuhn (1970 p. 204) "To translate a theory into one's own language is not to make it one's own." As a result, there is potential for users to misuse the common language potentially resulting in comparisons that are not sensible.

Communication Problems are not always solved with Common Language

Communication problems are often attributed to lack of a common language. For example, as noted by Price Waterhouse (1995, p. 6) "Even within the same company, different subsidiaries and divisions are often unable to compare processes because they do not share a common language to describe what they do." However, not all communication problems can be traced to the lack of a common language, as noted by Kuhn (1970, p. 201)

... two men whose discourse had previously proceeded with apparently full understanding may suddenly find themselves responding to the same stimulus with incompatible descriptions and generalizations. ... Such problems, though they first become evident in communication, are not merely linguistic and they cannot be resolved simply by stipulating the definitions of troublesome terms. ... They cannot, that is, resort to a neutral language which both use the same way and which is adequate to the statement of both of their theories or even both those theories empirical consequences. Part of the difference is prior to the application of the languages

in which it is nevertheless reflected.

What is included and what is excluded?

Common languages make specific inclusion and exclusion of particular concepts. For example, as noted by the International Benchmarking Clearinghouse (1997)

The Framework does not list all processes within any specific organization. Likewise, not every process listed in the Framework is present in every organization.

How do developers decide what should be included or excluded? How do they choose between different terms to be included in their best practices knowledge bases?

Individual Differences

Each of these barriers suggest that different individuals would have different preferences regarding the various terms and concepts included in or excluded from the common language. For example, some users may prefer information capturing industry-based information, while others would prefer a "generic" view. As a result, even if there is a common language, there are likely to be divergent needs.

These individual differences, and varying levels of expertise suggest that firms would employ a broad range of individuals in order to generate these common languages. Accordingly, a model of how that group can rationally make the choices required for a common language would be a helpful and important contribution.

6. A Model of Choosing a Common Language¹

This section discusses a model of group choice of a common language and vocabulary. Five rationality assumptions are elicited and a method is sought to satisfy those five assumptions in order to generate a rational approach to generate a common language.

Notation

Let $S = (a, b, c, \dots)$ be the set of alternatives available for some concept in the framework. S is the set of alternatives from which the choice will be made. Let $| \cdot |$ indicate cardinality. Let aRb indicate that one vocabulary term a is preferred to or indifferent than some other term b . R is used to stand for the preference relationships between all a and b . For example, R can be specified through a utility function U where aRb if and only if $U(a) \geq U(b)$.

Suppose that there are n individuals responsible for deciding among each of the set of alternatives. Each individual will be treated as one of the participants in the

set G , the group making the decision. Each member in G may be representatives from different subgroups within a company, as with Price Waterhouse (1995, 1997) or from multiple companies, as in the framework developed by the International Benchmarking Clearinghouse (1997). Each participant is assumed to have preferences between the choices made for the common language. For example, consulting and auditing would likely have different preferences and different groups in consulting would also have different preferences. Let R_j represent the preference relationship of participant j and Γ_j be the utility function of participant j . Let aR_Gb indicate that the group as a whole prefers a over b .

Assumption A (Complete Domain)

Assume that $n \geq 2$, $|S| \geq 3$, and aR_Gb exists for all possible aR_jb . That is, there are at least two members in the group, they choose between at least three alternative concepts and a group order can be specified for all possible individual orderings.

Assumption B (Positive Association of Social and Individual Orderings)

If aR_Gb for a set of individual ratings, and if (1) cR_jb , b and $c \neq a$ are not changed, (2) aR_jb and $bR_ja \forall b$ are not changed or are modified in b 's favor, then aR_Gb . This says that if the group prefers a to b and the only changes that occur among individuals is with some additional group members preferring a , then a is still preferred over b .

Assumption C (Independence of Irrelevant Alternatives)

Any two set of the rankings must have identical corporate choices in S or subsets of S . In particular, a choice rule has independence of irrelevant alternatives if and only if aR_Gb (for $a, b \in S'$, $\forall S' \subseteq S$) implies aR_Gb (for $a, b \in S$). If one or more alternatives are removed from the set of choices of concepts, then the choice among the remaining alternatives is identical to the original ordering for those alternatives.

Assumption D (Individual's Sovereignty)

For each a, b , \exists some set of individual orderings aR_jb such that aR_Gb . That is, for each pair of alternatives a and b , there is some set of individual orderings such that the group prefers a to b .

Assumption E (Nondictatorship)

There does not exist some $k \in G$, such that aR_Gb if and only if aR_kb , $\forall a, b \in S$. A dictatorship would exist if one person (or division or company represented by that person) determined the group's common language.

Arrow's Impossibility Theorem

There is no solution that meets assumptions A-E. This result is known as Arrow's impossibility theorem (Arrow 1963). Further, only dictatorships satisfy assumptions A-D.

Discussion

The only group choice method that meets Arrow's conditions is "dictatorial choice." This was a concern of Arrow because of equity issues. As noted by Arrow (1970, p. 86)

... the very act of establishing a dictator or elite to decide on the social good may lead to a distortion of the pragmatic from the moral imperative. "Power always corrupts; and absolute power corrupts absolutely" (Lord Action).

For decisions that influence intra firm common languages for best practices, there may be no "equity" issue. Ideally, common languages would be chosen to maximize the overall company utility. That is not to say that those who establish common languages always will always make optimal choices. In addition, within companies, common language choices are likely to leave some divisions or subgroups as beneficiaries over other divisions and subgroups.

However, as soon as the language is used outside of the organization of the dictator, beyond the bounds of the dictator, there can be concern about the decisions that have been made. Choices made that met the needs of the dictator in some organization, may not meet the needs of

users in other organizations.

7. Summary

This paper has investigated common languages and vocabularies used in best practices knowledge bases, also referred to here as knowledge management ontologies. The paper briefly discussed best practices knowledge bases and the importance of common languages. Advantages and disadvantages of using common languages were investigated in order to illustrate divergent user needs.

A model was developed to understand the group decision process associated with developing a common language. Five reasonable assumptions were generated. However, Arrow's impossibility theorem was used to show that there was no choice methodology that satisfied each assumption. Only "dictatorship" provides a feasible solution. Since for profit organizations are the primary developers of these kinds of knowledge management systems, that is probably not a concern, as long as the database is used internally.

Footnote

1□ This section uses notation and arguments developed in Arrow (1970) and Keeny and Raiffa 1993.

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