Managing Knowledge Content Quality – Lessons from IT-Analysts

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Abstract

In order to ensure the value of an electronic corporate knowledge base, knowledge managers must actively manage the quality of its content. In doing so, they can learn from the systems, policies, and processes that are used by major IT-analyst companies such as Gartner, Giga, Forrester or the Meta Group. These knowledge-intensive companies have implemented effective mechanisms to improve the quality of codified knowledge (i.e., analyses, forecasts, evaluations and recommendations). Typical measures include standardized content formats, a clearly defined knowledge content production process, peer reviewing and ex-post ratings based on explicit content quality criteria, as well as authoring guidelines. Knowledge managers can use these mechanisms to ensure that their KM-applications, from best practice repository to lessons learned database, remain relevant and valid.

The Problem of Content Quality in Corporate Knowledge Bases

Many knowledge bases – from lessons learned directories to best practice repositories – fail due to an insufficient quality of their content. Typical problems of such repositories are outdated entries, contradicting advice, inconsistent formats, incomplete descriptions, ambiguous conclusions or duplicate entries (see Huang et al. 1999). Since many corporate knowledge bases lack adequate *validation mechanisms*, they become trapped in a vicious cycle of decaying content quality: Low quality contributions lead to a reduced reputation of a knowledge base which in return leads to fewer or lower-quality submissions. As a consequence, the knowledge base loses its credibility and acceptance with the relevant staff and experts, thus aggravating the original problem (Probst et al. 2000). By examining the content quality management practices of leading IT analyst companies, knowledge managers can learn how to prevent this phenomenon. They can employ a few simple, yet effective mechanisms to ensure that their knowledge content remains of high quality.

We define knowledge content in this context as (electronic) documents that have been written by knowledge workers (see Schultze, 2000) and that outline a potentially re-usable area of know-how (procedures, processes, tactics, heuristics etc.) or know-why (lessons learned, reasons for failure or success, indicators, evaluations). Quality in this area refers to the fitness for use of content (e.g., notes, reports, charts, slides, statistics, etc.) for other knowledge workers (English, 1999). Content or information quality (Eppler, 2001) can generally be defined through attributes such as consistency, conciseness, accuracy, correctness, or applicability (Wang et al., 1996).

That information quality is in fact a crucial issue for knowledge management systems has been pointed out in various prior contributions (e.g., Huang et al, 1999, Davenport & Prusak, 1997). Below are two quotes from articles that have appeared in this journal which stress this important point.

> The information can become useless if not managed through a quality life cycle and fully organized for corporate usage. Maintaining *high-quality content* and frequently refreshing it with new information is critical for business intelligence (Hu et al., 1998, p. 236).

> The first challenge facing a consulting firm that is seeking to establish an effective knowledge management system is to ensure that the *quality of information* in the system is high (Dunford, 2000, p. 297).

The challenge behind the idea expressed in these quotes is how to achieve high-quality information on a long-term basis. As we will see, IT-analyst companies can contribute to a comprehensive and *sustainable* quality management for knowledge content. In fact, as knowledge content is their main product, analysts have always needed to manage their

content and its quality systematically. However, because of the fierce competition in their field (and because of various scandals involving financial analysts), they have intensified their quality assurance efforts and they have made them public. This brings about opportunities for cross-industry learning in the area of knowledge content management.

This article is based on the premise that corporate knowledge managers can use some of the mechanisms employed by IT-analysts to manage the content of their knowledge bases. To find out whether this premise holds true we have interviewed several analysts, research directors, managers and fifteen clients from four leading IT-analyst companies. Specifically, we have analyzed the policies, systems, processes, and guidelines of Gartner Inc., Forrester Research, Giga Information Group, and the Meta Group. The discussions and the analyses of documents, websites and applications have revealed five effective, commonly used mechanisms to manage knowledge content quality. They are described and evaluated in the remainder of this article.

The Analyst Approach towards Managing Knowledge Content Quality

In interviewing several managers, analysts, and research directors (as well as numerous clients) of the four IT-analyst companies, we have detected several key success factors or mechanisms that can lead to high-quality knowledge content. These mechanisms assure that the knowledge bases used by the analysts (they can be found at www.gigabweb.com, www.gartner.com, www.forrester.com, www.metagroup.com) remain up-to-date, relevant, and valid. These main five content quality mechanisms are:

1. Standardized **content formats**, that is to say a strictly limited number of knowledge content types, typically a short format of one to six pages (often labeled as 'notes') and a longer format ('reports') of ten to thirty pages. Each knowledge content type follows a certain generic content structure.
2. A clearly specified knowledge content **production process,** ranging from identifying knowledge needs to reviewing, publication and continuous updating or removal. Associated with this production process are certain roles, such as reviewer, contributor, or publisher.
3. An informal or formal **peer review** process that assures that the documented knowledge is valid and relevant. This is usually followed by a formal **check by an experienced senior manager** or specialist and by an after-publication **rating** of a report in terms of its demand and impact (including customer feedback).
4. A small set of explicit **information quality criteria** that every contribution has to meet. The criteria are used to measure the quality of knowledge content produced by every analyst. The evaluation according to these criteria can influence the bonus of an analyst.
5. A set of authoring **guidelines** that describe minimal requirements in terms of document content, style, size, ownership (e.g. updating responsibilities), and format (e.g., layout) as well as background (e.g., how to validate sources of information).

Below, we discuss these five mechanisms in more detail. We show how they are implemented in various IT-analyst companies and how they can be used in the context of knowledge management.

1. Knowledge Content Formats

The four analyst companies examined in this article offer various formats for their knowledge content. While they differ in terms of the total number (from four at Giga to nineteen at Gartner) and labels for their content types (the Meta Group has formats labeled as Research Deltas, Views, Flashs, METABits, Reports, Daily Wires, METAspectrum, etc.), they typically distinguish between short (e.g., one to two pages), highly current, and specific contributions and longer, more in-depth articles which often exceed ten pages. For both types of reports, there is an implicit or explicit generic content structure that the analysts should use. In the case of Forrester Research, all research reports follow the same explicit structure: *Abstract, Interviews, Analysis, Action, Related Material, Grapevine, Endnotes*. This structure helps readers and analysts to find relevant content quickly, because they immediately understand the logic of every report. The Giga Information Group uses a slightly different content structure for its reports. It divides every report into the following segments: *Giga Position, Proof/Notes, Alternative View, Findings & Recommendations, References*. Giga also uses a standard structure for its short notes (called IdeaBytes). Every IdeaByte begins with a so-called *catalyst*, the reason why a note has been written (e.g., a client inquiry, a market event, etc.). Then, there is a *question* statement that is addressed in next section of the note, entitled *answer*.

All four analyst companies use the same overall logic to structure their short and their long content formats. They begin with an *overview*, articulate a *position* or opinion, provide *evidence* for that opinion and highlight its *implications* for management. These implications are sometimes especially highlighted. Gartner Inc. refers to them as action items or bottom lines. Within these standardized content formats, the analysts frequently use standardized table formats, indicators (such as Gartner's probabilities) or diagrams, such as Gartner's

Magic Quadrants or Forrester's Wave diagram. Both of these matrices show the leaders and followers in a given industry according to two main criteria.

The lessons to be learned from this aspect of analyst content management is that specific content formats with clear restrictions in terms of length and structure can help to make knowledge content useful and manageable. It enables knowledge content providers and users to find (and modify) relevant information quickly. Standard templates or content formats can provide a helpful and proven frame of reference that structures an experience, a procedure or a heuristic logically and makes it more easily retrievable. Organizations that have used such standard knowledge content formats in their knowledge management are Chevron and NASA. Chevron has used a standardized content structure for all its documented best practices. The content structure includes the following segments to document a best practice: *Process Description, Business Need Satisfied, Original Situation, New Situation, Simplified Flow Chart (optional), Key Customers & Stakeholders, Customer Expectations,What makes the process work?, Performance Measures, Data/Results, Extent of Deployment, Internal and External Sources Consulted* (sources: Greta Lydecker, Chevron Corporate Planning & Quality; O'Dell & Grayson, 1998). In the case of NASA, standard content formats are used to structure and document lessons learned. The structure that is used in NASA's lessons learned information system (www.llis.nasa.gov) contains the following elements: *Subject/Title/Topic(s), Description of Driving Event, Lesson(s) Learned, Recommendation(s), Evidence of Recurrence Control Effectiveness, Applicable NASA Enterprise(s), Applicable Crosscutting Process(es), Additional Key Phrase(s), and Approval Info.* With the help of such knowledge content 'products', knowledge transfer through documents can be improved because of a greater consistency and less 'garbling'.

In the next section, we look at how knowledge content is produced through a well-designed production process.

2. The Knowledge Content Production Process

What has been articulated within information quality research for quite some time, namely to manage information as the product of a well-defined production process (Wang et al., 1998, p. 95), has been implemented successfully by many analyst companies. Table 1 outlines the steps involved in the production of knowledge content at the four analyst companies. All four companies have integrated an *agenda setting stage*, a standard *review mechanism*, as well as *updating* and *rating* mechanisms into the production process of their content.

Take in Table I

To highlight some of the specificities of knowledge content production processes, we outline the production process of one of these companies, the Giga Information Group, in more detail below.

If a customer *inquiry* has been answered in a way that an analyst judges to be relevant to a large number of Giga clients, the analyst rewrites his or her answer to the original question for a more general appeal. In doing so, he collaborates with his peers within the same orbit (i.e., practice group), asking for comments or feedback on his or her answer. The analyst then produces an *abstract* of the IdeaByte or Planning Assumption (if several IdeaBytes have been combined into a larger piece) and submits this summary (e.g., two to four bullet points and two to three descriptive sentences) to the central, worldwide research coordinator. The coordinator will screen the abstracts on a regular basis. Abstracts that are relevant to many analysts will then be *discussed* in the weekly global telephone conference with almost all analysts. In this way, the analysts receive feedback on their ideas and knowledge is shared in

a global ‘conversation’. If the report has the format of a longer piece, a planning assumption, the orbit leader will *review* the document with the author and release it for publication. The research leader may also contact other research leaders or analysts in case that additional clarifications are needed. After the report has been published user statistics measure how many times a piece has been downloaded. The orbit leader then *grades* every report on a scale of one to ten with a ‘quality scoring’. The top thirty percent of all reports are rated again centrally by the head of research.

There are two lessons to be learned for knowledge managers from the analyst’s approach. First, the production of knowledge content should not be left to chance, but must be systematically (and consistently) managed, beginning with the assessment of knowledge needs and ending with follow-up ratings and feedback. Second, in order to assure the quality of the produced content, a knowledge content production process must be *collaborative* and integrate critical discussions, multiple quality gates or reviews before new content is made widely accessible. This brings us to the next key mechanism (that is a part of the production process), namely the reviewing and rating process.

3. Reviewing and Rating Processes

The practice of peer reviewing that is common among academics has been replicated successfully at the four analyst companies examined in this article. While the companies vary in terms of how formally they define and monitor peer reviewing, all of them see it as a necessary and useful stage in the production process. The peer reviewing is usually done at an early stage of a knowledge document. It is later complemented by a formal review through a

domain expert or superior. Below, the peer reviewing mechanism of the Meta Group is described in more detail.

Based on the research agenda and vendor analysis, Meta Group analysts create written output which is posted daily on the metagroup.com website. All of this research undergoes an exhaustive review process. In part, this includes *vendor review* to correct any factual errors relating to products or services. More importantly, Meta Group analysts across the organization provide further input and comments on research in progress — these drafts often are also *reviewed by selected user clients* to obtain real-world input. Finally, one of META Group's three research *directors* reads each research submission to ensure consistency of position across services and as a final quality-control check (source: www.metagroup.com). The review process at other IT-analyst companies functions much in the same way, e.g., combining informal and formal peer reviews with an evaluation by a superior and (in some cases) with external feedback.

The lesson that can be learned for knowledge management from these reviewing and rating processes is that peer reviews can ensure validity and relevance, whereas reviews by superiors can ensure consistency and currency. Ex-post ratings can help to signal crucial or outstanding contributions. For all three processes (peer and superior reviewing as well as content rating), one common set of content quality criteria seems to be helpful. Examples of such criteria are given in the next section.

4. Explicit Content Quality Criteria

Aligning the various expert opinions and contributions in a knowledge base to a common set of information quality criteria and linking the analyst's bonus to how well he or she meets the

defined criteria is a proven practice among analyst companies in the information technology domain. These information quality criteria are used throughout the production process. They outline the ideal attributes of a research report or note. Analysts use them to review their own work and that of peers or subordinates. Forrester Research employs the following four quality criteria.

1. Content: amount of relevant facts
2. Execution: how well are the facts presented. Flow of the story, compre-hensibility.
3. Accessibility/research implementation: how acceptable are all the supporting data and facts? How accessible are the Excel models? How was it built, how did the predictions come about?
4. Degree of difficulty: how hard was it to get the facts, to build the model? (multiplier of the others)

Another approach has been taken by Giga Information Group. Its core criteria are formulated as key evaluation questions:

1. Is the (client) question answered?
2. Are there metrics or guidelines for measurement?
3. Are quantifications provided or suggested that help the customer judge a situation or a development internally or externally?
4. Are there conclusions and (actionable) practical recommendations at the end of the text?
5. Is there a specific Giga position that is articulated in the text?

Still a shorter version of quality criteria is used by the Meta Group which stresses *objectivity, accuracy, consistency,* and *applicability* in its internal reviewing.

The lesson from these examples is clear: Only if quality in the context of knowledge content is explicitly defined by criteria and made measurable through evaluation questions can it be achieved in a consistent manner. Again the NASA lessons learned knowledge base can serve as an example from the domain of knowledge management. NASA has articulated clear quality criteria that any newly submitted lesson learned has to meet. These criteria include the following attributes: *relevant, understandable, beneficial, valid, approved for release,* and *realizable*. Content quality criteria, however, are not enough by themselves. They need to be enforced through a few binding rules. These guidelines are discussed in the final section below.

5. Authoring Guidelines

As mentioned earlier, it is not enough to just articulate quality standards. A company must also transform its standards into specific action guidelines. Gartner's authoring guidelines, for example, focus on the *size* (e.g., maximum number of pages for a given report type), *style* (e.g., the choice of words), and the *structure* (e.g., report templates) of reports. There are no editorial guidelines regarding the content of the reports because the management does not want to interfere with the analyst's opinions with regard to vendors or products. In terms of format, however, the guidelines can be quite specific, ranging from how to write informative titles, how to evaluate sources, to the colors used in diagrams. The guidelines assure that content is consistent, validated and maintainable and that readers can quickly find and understand its key messages. Examples of such guidelines taken from the four companies are listed below:

- no bullet point without justification or evidence,

- every argumentation or calculation must be transparent (no black box arguments) and well-reasoned,
- basic background assumptions (or estimates) must be made explicit,
- you must always offer an alternative view to the taken position,
- base your evaluations on at least five (independent) sources,
- every report must close with at least one action item.

The application of these guidelines is usually practiced in the introductory seminars of the analyst companies. In addition, the analysts are reminded of these general rules by their peers and even by the document management system.

The idea of guidelines can be applied to corporate knowledge bases. Knowledge managers should try to define minimal guidelines tailored to their specific knowledge repository. Guidelines for authors contributing to a lessons learned database may include interviewing key stakeholders or referencing related lessons learned. Authoring guidelines typically consist of style-, format- (e.g., adding meta-information), content- and structure-related issues.

We have now surveyed the five major areas in which knowledge managers can learn from IT-analyst approaches. In the conclusion we summarize the main findings.

Conclusion: Implications for Knowledge Managers

Although knowledge management should strive to connect experts directly and thus facilitate the transfer of knowledge, documents that are stored in an electronic repository are still a

major element of most knowledge management initiatives. In order to increase the value of such repositories, knowledge managers must actively manage the content quality of their knowledge bases. To do so, they can start with the following straightforward steps:

They must define **product categories** for the knowledge content that is stored in their knowledge base. Each category is defined by certain characteristics, such as maximum length, structure, or level of validity. Then, knowledge managers must define a generic **production process** for knowledge content including (peer and expert) **reviewing** and (feedback- and impact-based) **rating** mechanisms. This requires that they define and publish minimal information **quality criteria** (and corresponding metrics) that authors or contributors have to meet. Finally, knowledge managers must set authoring **guidelines** that help authors comply with the defined categories, the production process, and the relevant quality criteria. In all of these steps, knowledge managers of 'regular' companies – that do not have knowledge content as their core product – must take into account the time (and energy) constraints of their staff. Consequently, they should streamline the formats, processes and guidelines as far as possible and avoid fruitless standardization or bureaucracy. They must find a balance between *encouraging participation* and *demanding high-quality contributions*. IT-analyst companies try to achieve these two goals by giving their analysts *recognition* (in terms of internal and external visibility) for high-quality contributions.

If knowledge managers succeed in implementing the described mechanisms in a way that is rigorous and systematic and at the same time cost-effective and motivating, the corporate repository can develop into a true knowledge base. If not, knowledge managers run the risk of creating yet another data graveyard.

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Table I: **Knowledge Content Production Processes**

Gartner Inc.	Giga Information Group	Meta Group	Forrester Research
1) Scenarios 2) Search 3) Data Collection 4) Pattern Recognition 5) Stalking Horses/ Planning Assumption 6) *Review* 7) Document 8) Combine/Update	1) Catalyst / Research Agenda 2) Search of Data 3) Articulation of Strategic Assumption 4) Abstract & Documentation 5) *Review* 6) Revision 7) Publication 8)Combination/ Compilation 9) Quality Scoring	1) Research Agenda & editorial calendar 2) Search 3) Documentation 4) Internal and External *Review* 5) Publication 6) Updating	1) Research Agenda 2) Event screening 3) Interviews and surveys 4) Evaluation of sources 5) Documentation 6) *Reviewing* 7) Publishing 8) Updating 9) Ex-post Verifying