

Information Quality on Corporate Intranets: Conceptualization and Measurement

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Abstract

This paper addresses the issue of assessing information quality in the context of corporate intranets. Specifically, it examines which factors constitute information quality on intranets and how they can be measured. For this purpose, the paper presents an application developed and implemented by the authors, called the Intranet Information Quality Radar. The application is based on the theoretical framework of intranets as knowledge media, on interviews with intranet experts and intranet users, and on the work of the authors with various companies (in the form of action research). With the presented application, corporate web masters and relevant decision makers can provide their users with a standardized and comprehensive evaluation tool, and they can aggregate and visualize the resulting quality profile and thus derive improvement measures for deficit areas. The basic premise behind this paper is that high-quality information can be easily identified, evaluated, integrated and applied. This is likely if an intranet offers a reliable infrastructure, various information services, and if its applications are closely aligned with the company's projects, processes, and communities.

Introduction

The issue of information quality has dramatically gained importance in the area of corporate intranets since their status has shifted from a mere “me too” component of employee communications to well organized knowledge media and information platforms for specific internal communities. After a phase in which companies mainly focused on the actual build-up of an intranet, they are now becoming more and more aware of the fact that they need clearly defined *processes*, *responsibilities*, *standards*, and *metrics* to assure that the content of their intranets remains consistent, up-to-date, and reliable, among other things. It is in this sense not surprising that the issue of information quality is now one of the critical issues in intranet development.¹ Based on our work with various companies, we define information quality in the context of intranets as the fitness for use of information and its medium to inform employees and thus enable them to identify, evaluate, integrate and apply knowledge. This view of information quality is derived from the reference model for enterprise knowledge media developed at the Competence Center Enterprise Knowledge Medium.² It is based on the generic model for knowledge media developed by Schmid and Lechner (1999). The following illustration provides an overview of the Enterprise Knowledge Media reference model.

¹ For this view, see also: Harris, K., & Fleming, M. (1998).

² The center is now in its fifth year of existence (see www.knowledgemedia.org). Partner companies are DaimlerChrysler, Deutsche Bank, Bertelsmann, Versicherungskammer Bayern, IHA-GfM Institute for Market Analysis, and the Union Bank of Switzerland. In addition the co-author is working in the intranet task force of Credit Suisse Private Banking.

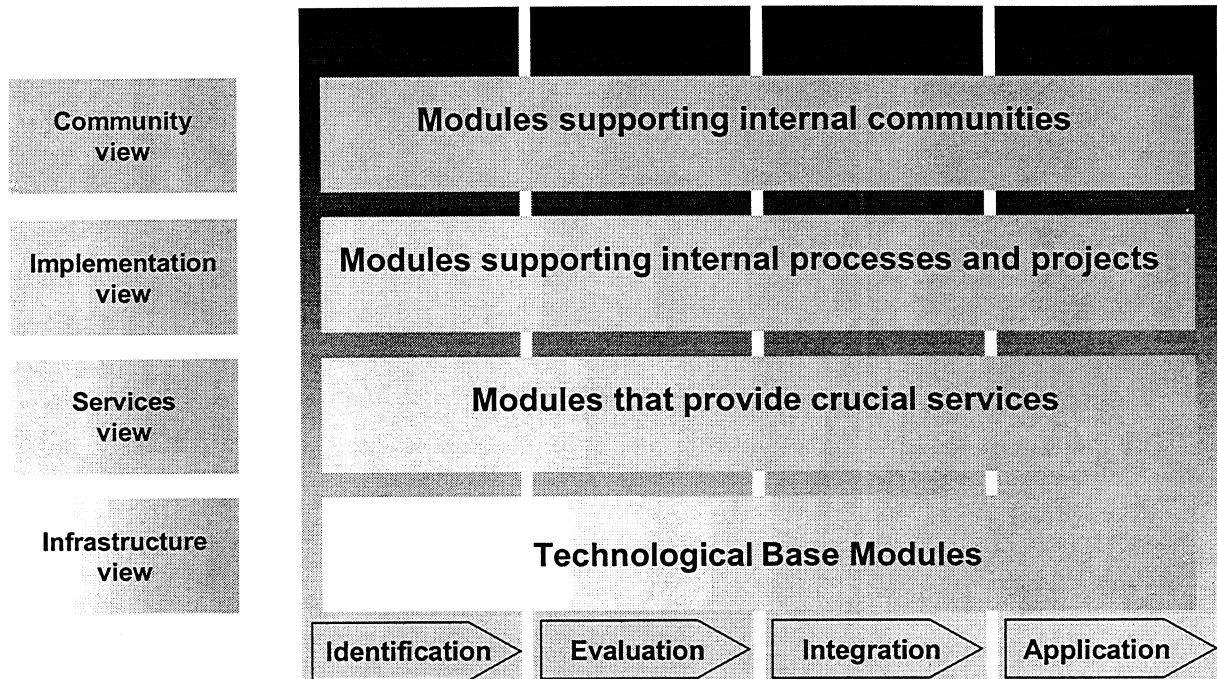


Illustration 1: The reference model for intranets as enterprise knowledge media

The reference model is based on two major elements. The first element is represented by the horizontal axes and labeled as the knowledge management cycle (or in short the phases). The knowledge management cycle consists of the four phases identification, evaluation, integration, and application of knowledge. The second element, represented as horizontal views, outlines the necessary components of an enterprise knowledge medium, described by the infrastructure, services, implementation, and community view. In order to highlight the model's potential for an information quality metric system, we will describe its elements shortly below.

The *knowledge management cycle* (or *phases*) describes the sequence of activities performed by an employee who is using a corporate intranet to inform him- or herself. In a first step, he or she needs to search and find relevant information sources, documents, data bases, contacts, or experts. Here, the intranet can provide assistance with search engines, portals, knowledge maps, filters, navigators, yellow pages etc. When the employee has found various information sources on the intranet, he needs to evaluate their relevance for his current information needs. For this task, the intranet can help by providing meta-information such as author, creation and expiration dates, or target groups. After the potential value of the information has been evaluated at a first glance, the user must be able to integrate the new information into his existing stock of knowledge, that is to say, he must be able to understand the context of the

information (i.e., related information, similar subjects, relevant people, etc.). Once the newly gained knowledge is integrated into the employee's working knowledge, he has to be able to apply and utilize it. The intranet can facilitate this task by allowing him to export the information to other programs (such as Excel, Powerpoint, PDF, Word, or communication software, etc.), or by generally linking the information to the employee's workflow. The more the employee can put the information he finds on the intranet to use, the higher is his perceived value of membership to the community of intranet users.

The four *views* described by the reference model can be seen as the layers of an intranet seen from a knowledge perspective. The first layer, the infrastructure, consists of the necessary hard- and software to enable the functioning of an intranet platform. The infrastructure should assure a steady, secure and speedy performance, as well as serving as an integrating platform for various applications. On a second level, which is based on the first, we position the services layer. It consists of various add-on applications, such as search engines, portals, push and pull mechanisms, etc. These services should assure that the information is found or delivered in a timely fashion and can be evaluated and understood. The third layer concerns the implementation of an intranet, that is to say its alignment to corporate processes and projects. A useful intranet will provide insightful information that is well structured and organized. The last layer in the reference model, the community view, is concerned with the intranet's potential to support the community of users. A high-quality intranet will consist of a critical mass of users that perceive real benefit from their intranet use. It will provide them with ways of highlighting valuable information (i.e., through collaborative filtering or stating target groups or special interest publications).

This brief description of the framework's two axes has already generated various criteria that can be used for quality assessments on intranets, such as insightful, unique information or timely delivery via push services (criteria like these have also often surfaced in interviews with intranet users and webmasters³). In the following section, we will compare the framework's main premise – namely that high-quality

³ See Muenzenmayer (1999).

information can be easily identified, evaluated, integrated and applied – to two other approaches.

Information Quality Characteristics in an Intranet Context

Based on a first, exploratory survey among fifteen employees in five large-sized companies, the above framework has been applied to information quality issues on corporate intranets. The survey was performed through semi-structured user and specialist interviews⁴ of one hour each. In order to gather information quality criteria, the informants were asked to state what an intranet can do to improve the quality of information. They were also asked in more general terms what – in their view – were the constituting factors of information quality on an intranet. Their answers were condensed and clustered according to the four phases mentioned above (identification, evaluation, integration, application) and then restated as check questions. The resulting 34 quality criteria (or key evaluation questions) are outlined in the appendix. They combine two of the three possible metric types proposed by Kuan, Lee, and Wang (1999), namely *individual, subjective assessments* (questions like number 13, 28, or 34 etc.) and metrics that measure along quantifiable, objective variables that are application independent (questions like number 3, 10, or 19 etc.).⁵ The check questions can be delivered to intranet users in the form of a questionnaire through a web-based interface in order to generate an aggregated intranet assessment (see the illustration below for the ‘look’ of this questionnaire).

⁴ Ibid.

⁵ See Kuan, Lee, Wang (1999), p. 60.

Compose a new assessment - Microsoft Internet Explorer

Adresse <http://www.knowledgemia.org/knowledgemia/IQRadar.nsf/23481920d5e9dc23c12565fa00703e0b?OpenForm>

Phase 2: Evaluation
-> [explanation](#)

	strongly agree	somewhat agree	somewhat disagree	strongly disagree	not applicable
Services:					
User interface, ease of use	<input type="radio"/> 4	<input checked="" type="radio"/> 3	<input type="radio"/> 2	<input type="radio"/> 1	<input type="radio"/> 0
Attributability (name of author, date of creation, date of last update, source, ...)	<input type="radio"/> 4	<input checked="" type="radio"/> 3	<input type="radio"/> 2	<input type="radio"/> 1	<input type="radio"/> 0
Implementation:					
Logic and consistent structure of content	<input type="radio"/> 4	<input checked="" type="radio"/> 3	<input type="radio"/> 2	<input type="radio"/> 1	<input type="radio"/> 0
Adequate information quantity (Not too much or too little)	<input type="radio"/> 4	<input type="radio"/> 3	<input type="radio"/> 2	<input checked="" type="radio"/> 1	<input type="radio"/> 0
Good web integration of the information	<input type="radio"/> 4	<input checked="" type="radio"/> 3	<input type="radio"/> 2	<input type="radio"/> 1	<input type="radio"/> 0
User can customize his own portal	<input type="radio"/> 4	<input type="radio"/> 3	<input type="radio"/> 2	<input checked="" type="radio"/> 1	<input type="radio"/> 0
Captures a deep understanding of the subject matter	<input type="radio"/> 4	<input type="radio"/> 3	<input checked="" type="radio"/> 2	<input type="radio"/> 1	<input type="radio"/> 0
(Only) topic-relevant information is provided	<input type="radio"/> 4	<input checked="" type="radio"/> 3	<input type="radio"/> 2	<input type="radio"/> 1	<input type="radio"/> 0

Taskbar: Start, Microsoft PowerPoint - [zw..., IQ-Radar - Assessment Val..., Compose a new asse..., Lautstärke, 18:37

Illustration 2: The entry form for the Intranet IQ Radar⁶

Before we look at the output results of this survey (i.e., the mapping of the criteria results), we shall briefly compare our framework with other information quality frameworks to show that the knowledge media reference model can be used to structure information quality criteria.

Below, we have compared our framework with the information quality frameworks of the Gartner group and the framework of Strong, Lee, and Wang (1997). The Gartner Group approach⁷ identifies four crucial information quality criteria, namely usability, attributability, reliability, and insight. All of them can be fit into the knowledge media framework proposed in illustration 1, as the following figure shows.

⁶ The Lotus Notes Domino database application that is used to generate and administrate the user ratings is based in parts on prior work in a related area, namely that of effectiveness in e-commerce sites, by Schubert and Selz (1999). The screen shot shows the relevant questions for the second phase (evaluation) and therein the services and implementation views.

⁷ See Harris, K., & Fleming, M. (1998).

		Identification	Evaluation	Integration	Application
Gartner Group IQ Framework	Usability	Availability at any time of need, or just-in-time.	Relevant Context/ Absence of non-relevant information.		Right format, that can be automatically integrated into processes or applications.
	Attributability		Author, source and date of creation. User must be able to determine and judge content's currency, credibility and completeness.	Supporting notes e.g. alternatives, best practices.	
	Reliability		Business-specific standards and business area experts review content. No gaps in information or understanding. Currency, actuality.	Completeness to support decisions or generate ideas.	
	Insight		Captures a deep understanding of the subject matter.	Captures its context within company functions, communities or markets. Captures its potential application within its own processes.	Packaged in a way that optimizes potential application in non-related processes.

Illustration 3: Fitting the Gartner Group's information quality criteria into the reference model

The other framework which needs to be considered when checking the framework's comprehensibility is the standard model of information and data quality that is now even part of current text books on information technology for management.⁸ The model offers a systematic approach to information quality criteria by offering four overall dimensions and fifteen associated criteria. It is represented in the following diagram.

Category	Dimension
Intrinsic IQ	Accuracy, Objectivity, Believability, Reputation
Accessibility IQ	Accessibility, Security
Contextual IQ	Relevancy, Value-Added, Timeliness, Completeness, Amount of Information
Representational IQ	Interpretability, Ease of Understanding, Concise Representation, Consistent Representation

⁸ See for example Turban, McLean, Wetherbe (1999), p. 430.

That the elements of this model can be grouped into the four mentioned phases is illustrated by the next table.

		Identification	Evaluation	Integration	Application
Strong/Lee/Wang Framework	Intrinsic		Objectivity Believability Reputation		Accuracy
	Accessibility	Accessibility Security			
	Contextual	Timeliness	Relevancy	Amount of Information Timeliness Completeness	Value-Added
	Representational		Concise Representation	Interpretability Ease of Understanding Consistent Representation	

Illustration 5: Fitting the Strong/Lee/Wang information quality criteria into the reference model

The knowledge media reference model can thus be used to represent a variety of quality criteria in *a logical time sequence* and from an *intranet user perspective* (i.e., the user needs to be able search and find intranet-based information, evaluate it, integrate it into his working knowledge, and apply it to the tasks at hand).

The Intranet Information Quality Radar

Having outlined the analytical framework and the rationale for the chosen quality criteria, we can now examine how these criteria can be presented and used for quality improvement measures. For this purpose, we have developed the following display mode that can be used to represent the user's level of agreement for these quality criteria. Criteria which are – again in the aggregated opinion of the users – not met by the present intranet have low ratings in the chart below (e.g., a little area that is

⁹ See Strong, Lee & Wang (1997)

colored in that segment). The quality-survey results can be represented either by *phases* or *views* of the reference model.

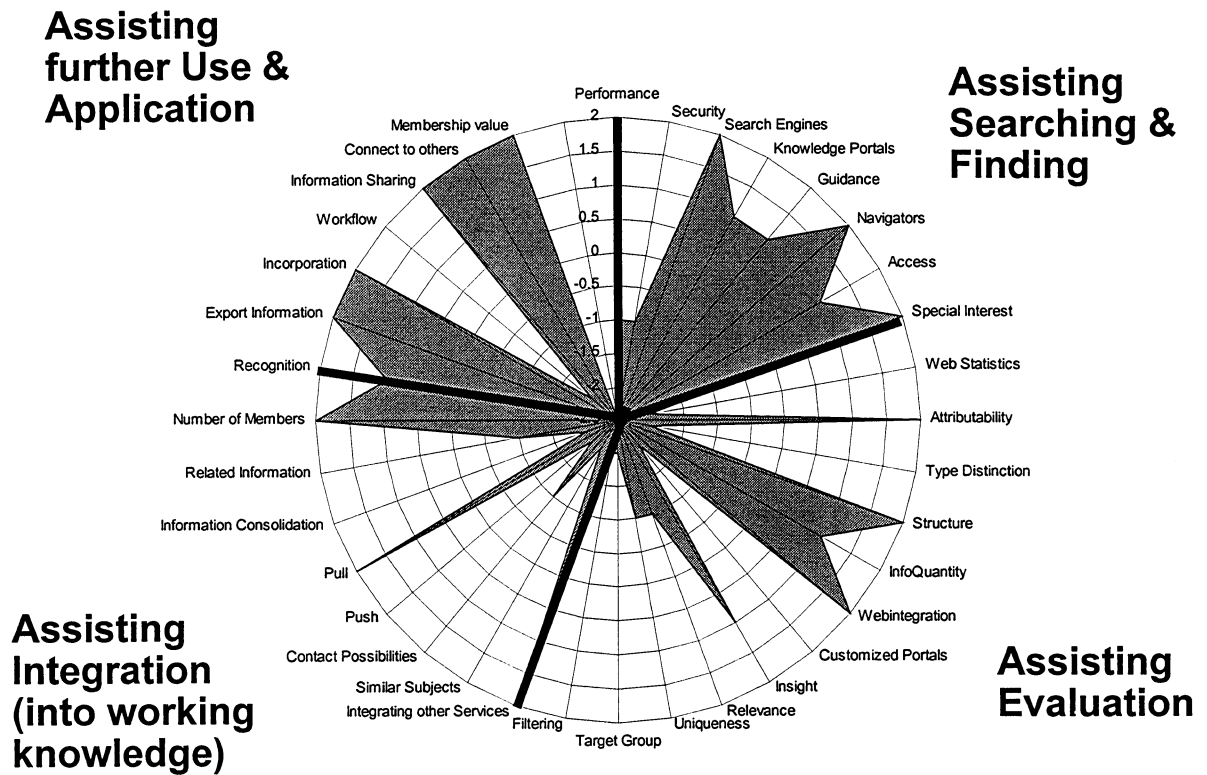


Illustration 6: The result of an information quality assessment structured by phases

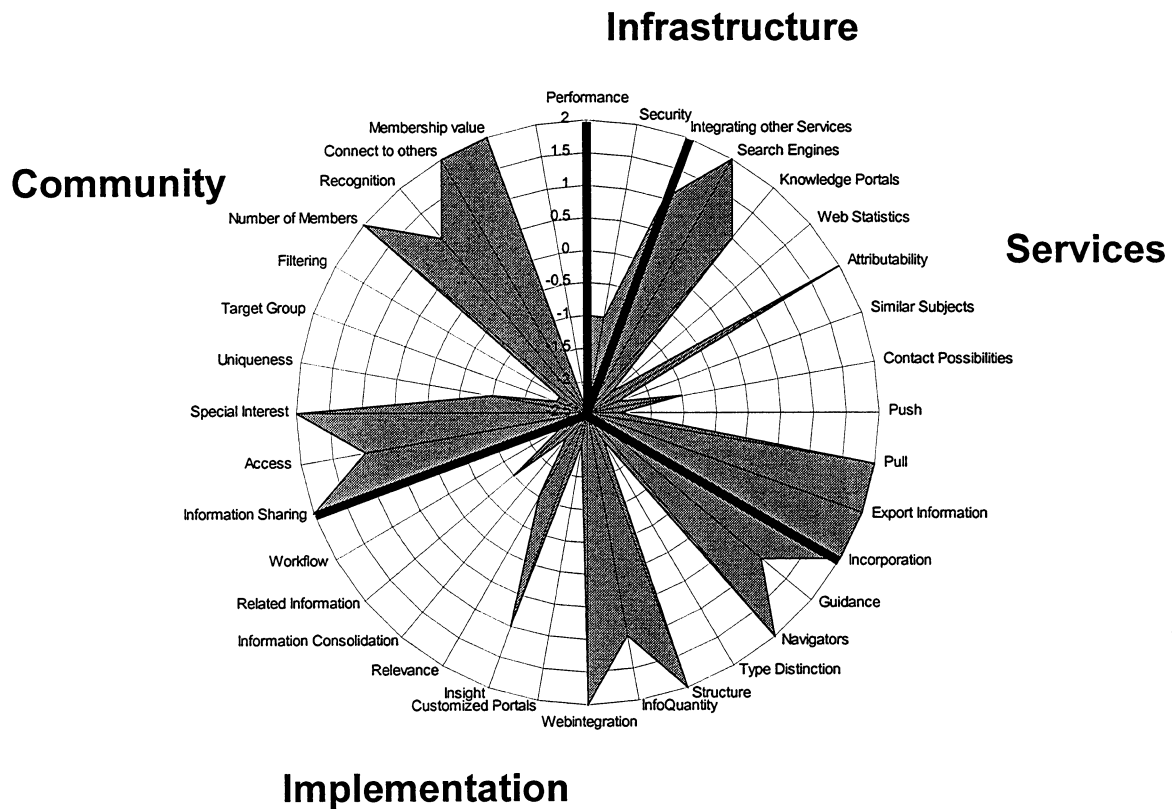


Illustration 7 : The result of an information quality assessment structured by views

The two diagrams (taken from a real-life assessment of a company intranet by some of its users) reveal a lot about the areas of improvement at one glance. The first diagram reveals that the intranet needs to improve helping its users evaluate and integrate information. The second diagram shows that the intranet lacks a lot of the essential information services and needs to be more aligned with the work requirements of the users (i.e., improve its implementation view).

Conclusion

The Intranet Information Quality Radar represents a first step towards a comprehensive evaluation of information quality issues on corporate intranets based on the reference model of enterprise knowledge media. The first field tests in various companies encourage us to further develop the application and perhaps refine or adapt some of the questions and criteria to company-specific needs. The main benefit of the application, however, is already apparent in its current form: It can provide an *effective feedback and controlling mechanism* to corporate intranet managers by gathering, condensing, and visualizing the quality perceptions of their users. In this

way, the application literally highlights *specific* areas of improvement. Through the use of the knowledge media framework the feedback or ratings can be represented in two distinct perspectives. The first one portrays the results by phases and thus illustrates how well the intranet assists the user in finding, evaluating, understanding and applying information. The second one represents the components of the intranet that need to be improved, whether it is the actual infrastructure which has to be made more reliable, the services that still need to be provided, the alignment of the intranet to the core processes (its implementation), or its support of the intranet users as a community.

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Appendix

The following list provides the 34 quality criteria or key questions that are mapped on the radar graph on a scale of one to four. As stated in the text, the criteria have been gathered through face-to-face interviews with intranet experts and users.¹⁰ The questions are listed in the order of the phase they belong to (from identification, evaluation, integration, to application). Within each phase, the questions are grouped according to the view they relate to (infrastructure, services, implementation, and community view).

Identification Phase

1. Good availability/performance of the system (fast access all of the time)
2. Secured but easy to handle access to the intranet
3. Intranet-wide full-text search engine
4. Knowledge portals (corporate taxonomy and link collection with ratings)
5. Good guidance (user can easily find relevant sub-levels)
6. Consistent navigators (user always knows where he is within the intranet)
7. Good access to community (you can find relevant colleagues or specialists easily)
8. Special interest groups can have their own platform on the intranet (peer groups, specialist groups, project leaders, etc.)

Evaluation Phase

9. Easy to use Web Statistics (user can list the most popular intranet sites on a topic)
10. Clear attributability (name of author, date of creation, date of last update, original source, ...)
11. The various types of pages (official vs. unofficial, updated vs. static) can easily and quickly be distinguished
12. Logic and consistent structure of content
13. Adequate information quantity (not too much nor too little)
14. Good web integration of the information (the medium is used adequately)
15. User can customize his own portal (personalization)
16. Content captures a deep understanding of the subject matter
17. (Only) topic-relevant information is provided
18. Uniqueness/Originality of information
19. The target user group is stated at the beginning of a site
20. Well-implemented collaborative filtering (the user community can collectively rate information)

Integration Phase

21. Good integration of other services (e.g. database applications)
22. There is a service that gathers information on similar subjects (New entries, best practices, lessons learned)

¹⁰ The interviews are recorded in Muenzenmayer (1999).

23. Good contact possibilities with content provider or author
24. Good, customized push mechanisms
25. Good pull mechanisms
26. Information is frequently consolidated and removed
27. There are often hyperlinks to other related information
28. Adequate number of members (there is a critical mass of users)
29. I have recognized people I already knew before on this website (community involvement)

Application Phase

30. There is a service that helps to export information from the site (i.e. in PDF, Word, Excel, Powerpoint format)
31. It is possible to incorporate web pages from another website (it is easy to create hyperlinks to other documents)
32. The intranet can be used to support applications and workflows (business processes)
33. It is possible to quickly connect to others (e-mail or phone number given)
34. There is a real added value from membership to this site