Using Wikis in a Corporate Context[1]

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This is a draft, please comment

Abstract
This paper investigates the technology of Wikis and their current and possible future role within a corporate context. It argues that the phenomenon of Wikis should be understood as not one, but two concepts: A simple and intuitive technology which allows its users to generate documentation and support knowledge-based processes easily and deeply; and a management philosophy that manages knowledge creation through evolution of norms and values rather than directives and incentives. Managers seeking to make effective use of collaborative tools can benefit as much from adopting the Wiki's management philosophy as by adopting the technology – but need to make sure that Wikis are used for what they are best for.

Introduction

> *They're Web sites anyone can edit – and they*
> *could transform Corporate America*
> BusinessWeek[2]

Every new collaborative technology, from cue cards via email to real-time meeting support systems, holds the promise of revolution. Collaboration remains both opaque and hard, and technology will not make it easy or painless. Wiki (along with its cousin the weblog) is, at the bottom, just another collaborative technology. It does, however, distinguish itself by it simplicity and by the fact that it has evolved through collaboration itself. Like many intuitive technologies, such as spreadsheets, it can be hard to distinguish between the technology and its instantiation.

The word "wiki" means "quick" in Hawaiian. On the World Wide Web, it is used both to mean a web site or collection of web pages that are communally written, and the underlying technology that facilitates the web site's creation. The technology was invented by a programmer named Ward Cunningham, a programmer and software architect based in Portland, Oregon. However, most people know wiki technology from the Wikipedia (www.wikipedia.org), a phenomenally successful on-line encyclopedia.

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[1] The author would like to thank Håkon Styri (www.digme.no) and Tim Bevins, The Concours Group, for useful suggestions.
[2] Hof, Robert D.: "Something Wiki This Way Comes", *BusinessWeek*, June 7, 2004

Central to the concept of wikis are certain aspects of the technology
- A simple design which allows for quick and easy creation of web pages, by making each page editable in an HTML-based editor
- Simple rules for linking pages: You link to another page within the Wiki simply by writing the name you want in a certain fashion (normally by enclosing it in [[square brackets]]). If the page exists, it becomes a live link. If not, clicking on the link will take you to the editor to create a new page.
- Saving of all old version of pages, so that errors can be corrected simply by going to a prior, correct version.
- Tracking of who have edited what, for each version.

…..and certain aspects of management philosophy:
- most common is that *anyone* can edit *anything* – that is, if a reader of a page spots an error or wants to extend it (or create a new page), he or she can do that directly, simply by clicking a button
- that overall direction of the content and style of the Wiki is set by the readers in common, and that leadership is taken by those with time, energy, expertise or charismatic fiat

There are many implementations of Wiki technology, for instance
- Freely available wikis, such as the the original wiki at c2.com or Flexwiki (http://www.flexwiki.com/), a wiki implementation initially developed within Microsoft, now with the source code posted on SourceForge.net
- Commercial wiki technology, such as EditMe (www.editme.com), a simple and inexpensive server-based wiki service, or SocialText (www.socialtext.com) a more comprehensive set of tools sold to corporations. The latter also includes blogging[3] and other forms of collaborative technology.

Understanding Wikis: Exploring the Wikipedia

Wikis are evolving technology – there is considerable innovation going on both in the underlying technology and in the user interface, in addition to the technology being combined with other collaborative or publishing technologies[4]. To understand the technology, thus, it is important to study active wiki sites – and none is more active than the Wikipedia.

Wikipedia is an on-line, collaboratively written, multi-language, free collection of encyclopedias, at the web address www.wikipedia.org. The Wikipedia was started in 2001 by Jimbo Wales, a software developer, who first started a more traditional online encyclopedia called Nupedia, with a traditional setup of controlled submission and reviewing of articles written by experts. Though well written, the articles were slow in coming, so Wikipedia – where anyone can write – was born. This has grown exponentially and now (October 2004) has about 10,000 authors and more than

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[3] A technology allowing easy updating of personal or group web pages, normally formatted into diaries with postings in reverse chronological order. The word comes from "web log", and is one of the fastest growing uses of the Internet – more than 3 million weblogs have been established as of Fall 2004.
[4] Combinations of blogs and wikis – *blikis* – are being developed.

300,000 articles in its largest, English version[5]. During this time, the web site has evolved dramatically both in its interface and its underlying structure and functionality.

Meeting the Wikipedia - the front page
A visitor to the Wikipedia will first see the front page, which is divided between navigational features, such as searching, pages describing the most recent changes, or a popular link called "random page". Along the top of the page is information relevant to the individual user – who can be logged in, or anonymous[6]. There is a welcome message that links to various explanations and introductions of the Wikipedia, and a section that shows content that is changed on a daily basis, such as a "featured article" as well as links to entries that are relevant to current events.

The main page also continues (below the fold, so to speak, i.e., under the first screen) with a structural overview of the encyclopedia, and links to other, non-English versions.

Lesson: The design and structure of the Wikipedia main page is the result of much experimentation by many users, and carries many lessons for those wishing to use a Wiki in a corporate setting: It is very important to quickly provide an overview of the structure, content, and culture of the collaborative space, as well as mechanisms both for getting involved and for tracking the results of one's own and other participants'

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[5] There are many international versions – totaling more than one million articles as of Fall 2004.
[6] In which case many of the links that need an identified user, such as "my contributions" and "my watchlist" disappears.

involvement. For a collaborative technology to work, it must be relevant, overviewable, encourage personal involvement and further a group culture. The Wikipedia front page shows just that, and also gives some pointers to what can be automated in the technology itself, and what (such as the choice of particular content) requires human intervention and judgment.

The individual entry
Diving further into the Wikipedia, we can look one particular entry, such as the entry for King Louis IV of France:

The tabs at the top of the article show the three core features of Wikis:
- The *edit this page* tab, meaning that anyone can rewrite the page if they want to.
- The *discussion* feature[7], which leads to a page where authors can discuss what should go into the article, give source references and seek information from other authors.
- The *history* page, which tracks the changes to the page and the authors that have contributed to it. Version tracking is a key feature of wikis, and one of the main ways to control the quality and evolution of wiki content.

If we go to the history page, we will see something like this:

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[7] This is implemented in different ways for different Wikis – for instance by having comment sections, displayed below the article, where users can comment on the page without rewriting its contents.

As we can see, this page has been heavily edited, by both anonymous writers (identified only by their IP addresses) and people who have logged in and registered themselves (such as NDStagliano and Silsor). Note also that some edits are reversions, where someone (Silsor, for instance) has decided that the edits done by one user were detrimental to the article and has reverted to an earlier edition.

Version tracking and the ability to reverse edits are key features of wikis, but the ability to revert someone else's edits is probably less important in a corporate setting than within the anonymity of the Wikipedia[8]. In a corporate setting, the ability to track versions allows for tracking who contributes to the common content to a larger degree than with most other collaborative and content management software. The tracking is visible to all, meaning that everyone can see who contributes. This has important implications for how to manage and encourage participants' engagement with the wiki, allowing for both formal and normative reward structures.

Editing an article
The central concept of the wiki technology is that most things are editable by most participants. If a user chooses to edit a part[9] of the Louis XIV page, he or she would see the source text of the page, which might look something like this:

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[8] A key feature of the Wikipedia is the policing of content by thousands of readers and writers – since the site is open to all, vandalism (people destroying pages) can be a problem, and is dealt with by the reverse edit feature and by shutting out IP addresses or users that repeatedly sabotage the system. This is an interesting and unique feature of the Wikipedia, but is largely irrelevant in a corporate setting and is therefore not described here.
[9] The Wikipedia has many long pages, and so has facilities for letting the user edit only a part of an article rather than the whole article. This is not common in other, company-oriented Wiki implementations.

Editing Louis XIV of France (section)

From Wikipedia, the free encyclopedia.

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==Early reign==
Officially, Louis's mother ceased to be Regent when Louis turned thirteen in 1651.
Louis XIV, however, continued to allow Cardinal Mazarin to control the affairs of
state. Cardinal Mazarin died in 1661, and was due to be replaced by [[Nicolas
Fouquet|Nicolas Fouquet, Marquis de Belle-Isle]], the Superintendent of Finance.
Instead, he was removed and imprisoned on account of his failure to properly manage
the nation's finances. Louis announced that he would not appoint a new chief
minister; instead he would govern the realm by himself. His most trusted advisors
were members of the ''conseil d'en haut'' (High Council); the most influential
ministers were [[Jean-Baptiste Colbert]] (for internal affairs), [[Hugues de
Lionne]] (for foreign affairs) and [[François-Michel le Tellier, Marquis de
Louvois]] (for war). Louis excluded the higher nobility from the ''conseil'',
leading the aristocratic diarist [[Louis de Rouvroy, Duc de Saint-Simon]] to refer
to the reign as the "reign of the lowborn bourgeoisie."
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If saved, this portion of the page would look like this:

Early reign   [edit]

Officially, Louis's mother ceased to be Regent when Louis turned thirteen in 1651. Louis XIV, however, continued to allow Cardinal Mazarin to control the affairs of state. Cardinal Mazarin died in 1661, and was due to be replaced by Nicolas Fouquet, Marquis de Belle-Isle, the Superintendent of Finance. Instead, he was removed and imprisoned on account of his failure to properly manage the nation's finances. Louis announced that he would not appoint a new chief minister; instead he would govern the realm by himself. His most trusted advisors were members of the *conseil d'en haut* (High Council); the most influential ministers were Jean-Baptiste Colbert (for internal affairs), Hugues de Lionne (for foreign affairs) and François-Michel le Tellier, Marquis de Louvois (for war). Louis excluded the higher nobility from the *conseil*, leading the aristocratic diarist Louis de Rouvroy, Duc de Saint-Simon to refer to the reign as the "reign of the lowborn bourgeoisie."

The source text illustrates the ease with which pages are referenced and created in a wiki: Any word or set of words can be turned into a link by surrounding them with [[double brackets[10]]]. If a page already exists (such as the one for "Jean-Baptiste Colbert" in the example), it shows up as a link to that page. If not (such as the one for "Hugues de Lionne" above) it will still show up as a link, but in a different color, typeface or otherwise set apart[11] to indicate that the page does not yet exist. If a user clicks on a page that does not yet exist, an edit window will open, allowing and encouraging the user to create the missing page.

The edit example above illustrates another core concept of wikis: The simplicity of editing. Though complex formatting, pictures and advanced structuring is possible in most Wiki implementations, much can be accomplished by simply entering text, bracketing anything that the user thinks should or could be further detailed in its own page. This feature allows for the rapid creation of complex and interlinked content – the users do not need to worry about whether a page exists or not, and can safely write what they want, save it mid-way, and other users can pick it up and continue from there.

Tracking individual involvement and articulating goals
Like all collaborative endeavors, a wiki will not work unless the participants feel engaged in the process, understand the common goal, and feel empowered by the

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[10] Some Wiki implementations also require that the words within the brackets be CamelCased, i.e., all spaces removed and each word capitalized.
[11] Most commonly by keeping the brackets in place in the displayed text.

technology. Wiki technology has features for users both to define themselves and track their own involvement (as part of the technology), but also features that allow for meta-content to be created (normally as part of the use of the technology, not as a feature in itself). In the Wikipedia, each user can create their own home page or set of home pages describing themselves to the other participants. They can see a list of all articles they have worked on, and quickly create a "track list" of pages they are interested in following. There is also a "recent changes" page that lists all changes to the Wikipedia in reverse chronological order.

Meta-content is created by a number of pages that address needs of the community of authors and readers, such as written statements of what the goal of the wiki is, pages that explain how to edit pages (both in terms of syntax and content) for novice users, discussion pages for content, cultural statements such as definitions of what constitutes a good or less good contribution[12], pages that point out areas or single entries that needs improvement, and a large number of pages that contribute to the culture in general, such as pages containing jokes or listings of particularly good or stupid statements from other pages.

Uses of Wikis
The most common uses of wikis – and what seems to work best – are when they are used to manage collections of ideas under a common theme[13]. The first Wiki technology was created to manage something called the Portland Pattern Repository[14], "an online journal for patterns about programs and the de facto home of the extreme programming[15] discipline." A pattern is this setting is a description of a certain way of doing something – say, a way to organize documentation or program a certain function. This meaning of the "pattern" comes from Christopher Alexander's book *A Pattern Language*[16]*,* which described 253 principles of design (called patterns) for town planners and building architects. Each pattern was simple (for instance: "Verandas should be more than six feet, otherwise they won't be used" or "Design rooms, if possible, with natural light from two different directions") but by linking the patterns together ("this pattern works particularly well with that pattern") the book describes a coherent architectural philosophy emphasizing flexibility, user control and humanity.

The content of the PPR consisted of ideas that had something in common, which evolved based on experience, and require that they be both linked together and mutually adjusted to form a coherent whole. The "open" wikis found in general have many casual users, and then a few users that, through a process of self-selection, take

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[12] The central common standard in the Wikipedia is NPOV, or Neutral Point of View, meaning that all entries should be unbiased and only contain content that the authors can agree upon as facts. The concept has been honed through many discussions, is well defined on its own page, and used to evaluate whether a page is good or not, with comments like "edited for non-NPOV" frequently used to describe changes. Other central concepts include the absence of copyright for Wikipedia's content, meaning that all content either must be original (written by Wikipedia readers) or that copyright has been explicitly removed by the copyright holder.

[13] Socialtext, a company producing wiki software, refers to this as "jointly authoring a hyperdocument".

[14] Which can be found at c2.com/ppr/.

[15] Extreme programming is a systems development philosophy emphasizing testing, structured work, and teamwork. Read more about it at www.c2.com.

[16] Alexander, C., S. Ishikawa, et al. (1977). *A Pattern Language: Towns, Buildings, Construction*. New York, Oxford University Press.

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it upon themselves to take responsibility for more than their share – to rework information structures, standardize formatting, and look for information in those areas of the whole where there are holes.

In corporations, most wikis seem to be used differently – by small teams, frequently geographically widely distributed, who need to create multi-linked documentation about complex topics that involve judgment in the descriptions. Since writing in a wiki is self-directed and requires organizational skills, the groups using have so far tended to be highly skilled both in expression and in computer use – systems developers.

Stata labs, a software development company, seems to be a case in point. The company has developed an email client which provides advanced searching capabilities, and used the Socialtext wiki software to manage the development of its projects[17]. The software is used to develop product specifications, and provides a "group memory" which has, the company claims, significantly reduced development time and increased the quality of the specifications.

There are other cases of uses of wikis – for instance, a number of individuals have created their own wikis, such as the well known blogger and venture capitalist Joi Ito[18], who uses his wiki to write papers and share his travel schedule with friends and collaborators. The author and technology thinker Neal Stephenson has created a wiki[19] for his book project *Quicksilver*, the first of a trilogy called *The Baroque Cycle.* The trilogy is long (close to 3,000 pages) and involves many historical characters, and Stephenson has used his wiki to stay in touch with his readers, track errors, and give background and explanations for his very complex and deeply researched books. A few companies have created wikis for their customers, and there are wikis used to address needs of specific groups of people that may help each other, such as the German wikis Gründerwiki[20] (for entrepreneurs) and Jurawiki[21] (for people interested in law[22]. Some companies have created wikis for customers, but one can question whether the technology in itself adds anything – that is, whether not a weblog or other technology would serve equally well.

A common reason for using wiki rather than blogging technology seems to be the need to let the participants in the wiki get involved not just in its content, but also in the setting up of its structure. The technology may be held back a little by difficulties in converting an interlinked set of web pages into a linear document. However, both technical of wiki software, especially its inclusion in more traditional software for document production, as well as the fact that more and more documentation is only provided online, indicates that this should not be a long-term obstacle.

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[17] See www.socialtext.com/customers/customerstata/.

[18] See http://joi.ito.com/joiwiki/.

[19] See http://www.metaweb.com/wiki/wiki.phtml.

[20] See http://www.wikiservice.at/gruender/wiki.cgi?StartSeite

[21] See http://www.jurawiki.de.

[22] There are also a number of companies and collections of hobbyists who have created wikis, such as a wiki for people interested in the sailboat designs of Carl Alberg (http://www.alberg30.org/collaborate/FrontPage). However, in many cases the wiki technology in itself does not add much, and is used mainly as a tool to manage web page creation.

Wiki culture and culture management

> *After talking myself warm about how wikis erase the
> difference between knowledge producers and
> knowledge consumers […] [a person in the audience
> remarked "I went looking for [teaching] material in the
> Wikipedia, but couldn't find what I was looking for. I
> didn't think it was very good.*
>
> Eirik Newth[23]

A recent newspaper story[24] about Wikipedia asked a number of topic experts what
they thought of the quality of the online encyclopedia. The experts each came up with
a few items to look up in Wikipedia, comparing it to traditional encyclopedias and
their own knowledge. The verdict was almost unanimous – Wikipedia was
"surprisingly good". However, the experts found errors and were concerned with the
legitimacy of knowledge written largely anonymous volunteers. (Other investigations
into the quality of the Wikipedia found that vandalism and "normal" errors were fixed
fast[25], whereas more subtle errors went unnoticed[26].)

So, the wiki approach seemed to work rather well, though it could get better. However,
to someone familiar with the culture of wikis, one aspect stood out: Despite finding
some rather obvious errors – wrong dates, for instance – none of the experts
interviewed considered fixing the errors they found, even if doing so would be just a
question of clicking "Edit", fix the error, and then save[27].

Wikis are powerful in terms of their simple technology – but they will not work
without a corresponding culture of "ruthless editing", of constant involvement, and a
clear understanding of the goal the participants are working towards. While the
problem of vandals or hijacking of entries by people with an axe to grind may crop up
in a corporate setting, it can be dealt with by removing anonymity and referring to
corporate policy. Participants in a corporate wiki do not come in straight from the
street – they participate in the wiki as part of a technical and social context.

A further technical issue is that as the wiki grows, there is an increased need for
automated tools to keep track of it doing things like searching for orphaned pages,
setting up redirects for duplicated items, doing mass changes and recategorization by
robots, search on meta-data as well as straight context, and provide cleanup and
managed discussion spaces. Most wikis lack these capabilities at this point. Given
the state and the nature of the technology, it may be prudent for IT management to

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[23] Translated from Norwegian, link at http://www.newth.net/eirik/archives/000444.html, Oct. 2, 2004
[24] "Overraskende bra", *Aftenposten*, October 4, 2004, see
http://www.aftenposten.no/nyheter/nett/article883070.ece.
[25] IBM has an excellent illustration of this at
http://researchweb.watson.ibm.com/history/images/islam_group.gif.
[26] See, for instance, Simon Waldman: "The success of Wikipedia", *The Mail and* Guardian, October 26,
2004, http://www.mg.co.za/Content/l3.asp?cg=Leisure-Online&o=140475&sa=106. See also Ed
Felten's discussion of Wikipedia vs. Britannica quality, at http://www.freedom-to-
tinker.com/archives/000675.html.
[27] When asked why (by the author of this paper) one of the experts said he had not considered fixing
the error he found, giving lack of time as the main reason.

have a toolsmith on hand, to develop the wiki technology to follow the needs and behavior of the wiki participants.

A Wiki-enabled technology architecture
The technical context is relatively easily dealt with: Wikis are part of a set of new technologies that are making their way into corporations. These tools are less distinct applications than new capabilities added to a growing and flexible toolchest: Tools for searching (such as internal use of Google and other search technology); tools for self-publication (such as blogging and other forms of simplified web publication); tools for free-form organization of personal information (PIMs, email/calendar/notetaking combinations); and newer types of within-group distribution of content (for instance, RSS and RSS readers). These tools, taken together, create opportunities for advanced users to self-configure their personal information environment, in ways that the more traditional but less intuitive groupware applications, such as Lotus Notes, cannot do.

Wikis currently come as stand-alone applications, delivered through standard browser interfaces. The expected evolution is that wiki technology gradually will become a standard option[28] for organizing personal and group information – most word processors and editors today have interfaces and formatting tools that support HTML creation, and it is a short step from that to creating support for the relatively simple formatting and structural control a wiki demands.

Disney Corporation has been noted as a company that uses Wiki technology as part of an information sharing strategy with new, flexible tools. The company uses wiki technology for internal discussion and idea generation, as well as documentation. It also uses internal blogs, which generate RSS feeds[29], picked up by the RSS reader Newsgator, which integrate into Microsoft Outlook, leading to a situation where people interact through a tool that seems very much like their normal email client, but which handles the many-to-many and incremental content management necessary for a complicated collaboration over time. If it is to work, it has to be a natural part of the toolset the user knows and understands, and the incremental value[30] of the new tool must be visible to the user directly.

Managing the Wiki

> *The bottom line is that moderating a newsgroup wisely takes serious dedication to, familiarity with, and commitment to the subject matter and willingness to put oneself into an intrinsically sensitive position. It does not work well if someone is arbitrarily assigned to the task.*
> Peter G Neumann[31]

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[28] Microsoft, as the dominant vendor of productivity software today, has created a Wiki application, and, rather untypically, made it freely available under a Creative Commons license.
[29] A standardized version of published web pages.
[30] RSS feeds and RSS readers, in particular, are popular because they are free of spam, i.e., unsolicited and/or commercial email.
[31] Personal communication, 1995. Peter Neumann is Principal Scientist at SRI International and has managed an on-line collaboratively written newsletter, The RISKS Digest, since 1984. For more information, see http://www.csl.sri.com/neumann/.

Jonas Söderström, Swedish human-computer interface expert, sees weblogs as a bottom-up tool for creating intranets. Much of what he says also applies to wikis[32], which are:

- personally driven
- with knowledge socially tied to individuals
- with explicit and "soft" valuation and validation of knowledge
- support for networked work patterns
- making individuals' good work visible in the organization
- at a cost that is a fraction of traditional groupware

Wikis have, so far, been associated with groups of experts and/or enthusiasts freely sharing what they contribute. This is, of course, the way you want to do it in a corporate setting as well – however, a few factors may intervene.

Managing a wiki is all about turning readers into editors, of underscoring that if you see an error or an omission, you should fix it, and fast. There are strong network effects both in terms of numbers and quality of participants. In my opinion, wikis should be managed to take advantage of these attributes rather than try to fight them. So, the prudent wiki managers should

- understand the importance of momentum, and make sure that energy and resources should be channeled to encourage wiki contributions
- carefully evaluate one's own involvement. There is a fine line between too much and too little here: Too much involvement can lead to posturing from the other participants, who will contribute to get brownie points rather than to get value out of the wiki. Too little quickly sends the message that the wiki is not important and hence not worth spending time on.
- think carefully about incentive systems, and try to make them normative (praise, citations, peer respect, influence) rather than instrumental (pay, promotion, other forms of tangible rewards) as much as possible
- encourage risk-taking: While public wikis have to struggle to establish a common culture, corporate wikis have to struggle to overcome the established culture, especially the one of awaiting management approval before changing anything.
- establish joint ownership of content. In Wikipedia this is expressed as removal of all copyright – in a company, this has to be established in a similar form. The best way to do this is to make valueable contributions yourself.

Often, management itself may be the biggest obstacle. For example, in a recent discussion with a large organization with considerable technical complexity and a high need of practical, helpful documentation, this author suggested setting up a wiki. The documentation could then be written by the people out in the field – of course after seeding the wiki with the standard operating procedures. This would enable the operators out there to add practical advice to standard procedures, as well as giving them both the means to and the rewards for keeping technically up to date. The response from management was very negative – in no way would they accept that the person using the equipment in question every day would have new knowledge to contribute or the ability to articulate it.

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[32] See http://kornet.nu/blindhona/arkiv/001020.html (November 2004, in Swedish)

Wikis consume moderator energy. In this they resemble traditional groupware tools, but because of the technology's simplicity and the fact that structure is provided by a process of categorization and recategorization, the importance of having a moderator (or a group of moderators) that have opinions on content as well as procedure increases. As with open source software, a wiki may work well for structured information that needs corrections and minor edits, and will need a core group of very active people to make strides in innovative content or categorization.

As has been argued by John Seely Brown[33] and others, commoditization of technology can lead to new jumps in productivity, as companies learn to use the technology to further specialization of work without sacrificing flexibility and interconnection. The technology is no longer a rigorous specification of how a process should be done – it can be, of course, but by choice rather than necessity. Instead, the technology is free-form and the coordination is done via values and norms, as well as visibility of who contributors are and what they are doing.

Wikis are still evolving, but are more evolvable than most technologies. In a corporate context, wikis should be used for tasks that involve teamwork, complexity, and deliberation. They are hard to manage, but very useful when they work. Properly used, they can free up collaboration and increase employee engagement. Improperly used, they are not worse or better than any other collaborative technology out there.

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[33] See www.johnseelybrown.com.