Abstract

Purpose – The purpose of this paper is to provide organizations which are keen to implement wikis with insight into its usefulness and possible role in the knowledge sharing and management process through lessons learnt from implementation of wikis by organizations ranging from SMEs with less than ten users to those with a vast network of 193 million members. These organizations are from the non-technology as well as technology-based sectors.

Design/methodology/approach – The paper takes the form of a general review. It provides a background into the advent of wikis and briefly discusses related work on use of Wikis in corporate, public and educational context. This is followed by review of three case studies carried out on implementation of wikis and an analysis of the review.

Findings – The review proposes a framework for the wiki adoption process which may be used as a guide for in future adoption by organizations. It also found that some benefits which move these organizations towards the usage of wikis include its ease of use, ability to track and edit, its influence on the building of a trusting culture and as a central repository of information. One significant and tangible benefit from the use of wikis is its ability to save time and therefore, money. Issues to be addressed include security, control as well as technical issues such as data migration.

Research limitations/implications – The paper presents examples based on case studies conducted by other authors and a framework based on the observation of the key push factors and commonalities among the cases. Further empirical testing is needed to demonstrate the framework introduced in this paper.

Originality/value – The paper suggests that wikis may be the key to a viable and usable knowledge management tool due to its ease of use and collaborative nature, which ultimately leads to time and cost savings. A preliminary framework to represent the implementation flow of a wiki is also presented and may serve as a guide for organizations considering the use of wikis as a knowledge management tool.

Keywords Knowledge management systems, Knowledge sharing

Paper type General review

1. Introduction

The advent of Web 2.0 has taken the web and information community by storm. It is believed to be the antidote to many barriers in information sharing. Many organizations such as IBM, General Electric, Procter & Gamble, Shell and Airbus have abandoned cumbersome knowledge management systems in favor of Web 2.0 applications such as Blogs, wikis and other social software applications. Some believe that the current economic crisis may force Web 2.0 into the business mainstream. A downturn often raises questions of how an organization is structured and how they have been managing their knowledge entities by tapping into expertise of employees, suppliers and customers (Twentyman, 2009). Enterprise 2.0 – the use of Web 2.0 applications by businesses have been providing valuable answers to these questions.

One such application is the wiki. Its introduction has brought fruition to the earliest hopes for the internet. That is, a democratic, accessible community of users responsible for its own content, supported by an open model of knowledge creation and communication. Wikis in
particular embodies the highest attainable information sharing dream of an organization where a group of its members is voluntarily and unselfishly collaborating and creating knowledge and working towards a common goal to benefit the organization. This has implications on the management, culture, technology and knowledge base of the organizations and will also inadvertently change the dynamics of organization communication. It brings with it, a unique set of challenges which an organization seeking to implement wikis need to recognize and resolve through well thought out and crafted policies.

2. Background on wikis

Ward Cunningham dubbed as the father of wikis started the World’s first wiki in 1995. Wikis evolved from an open source and Usenet philosophies and community tenets and is the most current iteration of user-driven tools, resources and power. Leuf and Cunningham (2001) define wiki as a freely expandable collection of interlinked webpages, a hypertext system for modifying and storing information-a database where each page is easily editable by users. It is a collaborative space due to its total freedom, ease of use and access, simple and uniform navigational conventions and is also a way to organize and cross-linked knowledge. It is a webpage created using wiki engine allowing a process of bottom up editing, where users can delete, edit and add content. Users may read the contents using a web browser. The expertise is not in the hands of the few, but rather emerges from the combined efforts of many. One of the best-known examples of wikis is the Wikipedia. Characteristics of wikis are:

- easy editing as users are not required to know HTML or scripting languages;
- links and references to other web sites that are related to terms mentioned in the wiki, to help visitors better understand the context;
- change tracking, often at the individual line, word, or even character, creating a very detailed audit trail of who changed what;
- built-in search function.

Specialized search engines such as Qwika (see www.qwika.com/) are used to search for wikis on the worldwide web. It currently searches 21,964,380 articles in 1,158 wikis. Wikis are coded using AJAX, Java, PHP, PERL and RIA (Rich Internet Applications) and may reside on a local server to allow more control and customization or hosted on external server by hosting sites. Organizations may choose to obtain free wiki hosting services from sites such as ElWiki (see www.elwiki.com/) and Wikia (see www.wikia.com/wiki/Start_a_new_Wikia) or purchase software known as a wiki engine for installation. There are many free corporate wiki solutions available, some popular ones include TWiki which is not only a wiki but also a document and project management system (Chu, 2008), Clearspace which incorporates blog and wikis, MediaWiki which is the platform which Wikipedia resides on, etc. Big corporations such as Microsoft Windows Sharepoint version 3 also includes Wiki support as well as IBM’s REDWiki project and its Lotus Connections product which can be found on the IBM homepage.

Many types of Wikis are in existence today. They include:

- Personal Wiki where user keeps it as a form of concept map or journal for an idea.
- Semantic Wiki where knowledge used is described in a formal term which allows for machine-processing like a semantic web.
- Corporate wiki where it is mostly used internally in a corporate context contrary to public wiki on internet.
- Structured wiki combines benefits of sharing and collaboration of a plain wiki with structured elements of a database by allowing the structuring of information when needed.
- Peer-to-peer wiki where wiki sites are shared between peers on a server-less system. It is stored on computers of the users and provides less security features.
3. Use in context

Many sectors have begun using the Wiki technology. On such example is the Library and Social Science sector, e.g. University of New York Library where librarians can have a library homepage “comments” wiki. It is also used in the education sector for capturing tacit knowledge of teachers into a knowledge repository and for building of communities of practice (Sheehy, 2008). In a corporate setting, it is a way to promote two-way communications between users as well as a form of tracking meetings. It is useful for highly collaborative publishing efforts, such as creating technical documentation, policies and procedures, and knowledge bases. They are also used by many organizations for project management: not only do many projects create published deliverables; they also generate volumes of project documentation including requirements documents, project plans and schedules, and reports.

4. Case studies review

This section aims to review the adoption and usage of wikis by three organizations; Mapa, a research company specializing in benchmarking; EBay and Ingenta, a provider of technology and services to the publishing and information industries. These organizations have been chosen to showcase usage of wikis under diversified structures and conditions. From a small organization like Mapa with less than ten users to a medium sized organization like Ingenta and finally, Ebay with a vast network of 193 million members. These organizations also come from non-technology (Mapa and Ebay) as well as technology-based background (Ingenta). This will provide a more complete picture on the implementation of Wikis.

4.1. Case Study 1: Mapa

Mapa is a UK-based market research consultancy which specializes in competitor benchmarking for the online financial services industry. It is categorized as an SME and their plans to expand abroad have created a need to capture developments and new knowledge so that it can be shared for current and future use. After a process of needs identification, the knowledge management solution proposed needs to allow storage of key knowledge and the interactions between employees to be recorded and maintained easily and quickly (McKelvie et al., 2007). The system should also capture recent news articles and reports. After deliberation among social softwares, blogs, e-mail, intranet and wikis, wiki was chosen because of its ability to not only capture explicit and migratory knowledge but also tacit and embedded knowledge which is critical to the knowledge intensive nature of the business. Mapa also decided to adopt wikis for its user-friendliness so as to reduce impact of culture shock. The ease and low manpower for maintenance will also reduce time taken away from employees. Its capability for expansion and growth is also an advantage in view of future expansion.

It was also chosen over the conventional KM software due to its flexibility to be able to store information in context which means the location: gives users background and perspective relative to the information retrieved and allows in-depth comprehension of the relevance of the piece of information. Users were also already familiar with the application it will run on – the web browser. After the selection of the media for information storage, the company moved on to selection of the specific wiki, a comparison tool known as WikiMatrix (available
at: www.wikimatrix.org) was used to compare three Wikis, Twiki, MediaWiki and MoinMoin. Subsequently, MediaWiki platform was chosen because of the staff’s familiarity with Wikipedia. The wiki was coined the MapaWiki. In the implementation stage, a dedicated section in weekly meeting was given to increase exposure to MapaWiki.

There were training sessions held at first but due to the different levels of technical skills possessed by employees, this soon became ad hoc. An initial difficulty encountered was users being uncertain about how to classify the articles. The first wave was for management to decide on key knowledge areas which include business, customer, market, processes. Next, users were involved in discussions on the types of wikis which was anticipated to be most commonly added. This served as the backbone for the Wiki architecture and hence, reduces uncertainty. An organizations lead-developer was appointed to manage and maintain MapaWiki. However, it is hoped that employees will soon take ownership of maintenance and management of the wiki and to improve the user-friendliness through utilization of WYSIWYG.

MapaWiki has become a central tool for collaboration and starting point for new activities in Mapa (Human Resource Management International Digest, 2008, p.6). Progress can be seen from initiative taken by users to add, edit and link articles without reminders. Many users have been seen trying to perform new tasks rather than calling for help. The implementation of Wikis is a success in Mapa despite its ‘non-techie’ staff.

4.2. Case Study 2: eBay

eBay was started in 1995 and has a vast network of 193 million members comprising buyers and sellers, the continuous proliferating community posts over 100,000 messages on the message boards every week. These messages need to be organized and indexed for quick reviews. After much review, eBay decided to have a wiki tool assimilated as a mean to amass community members to one coherent location to share their experience. They picked JotSpot’s wiki technology, the wiki system allows all registered members to contribute and edit eBay wiki’s content (MacManus, 2006a, b). By restricting the authorization to registered members only, system administrators can easily monitor edit history and deploy penalties if necessary. It is also a way to validate the authenticity of content and for details of contributors to be displayed, including their previous transaction records on eBay. By setting out guidelines to all contributors, eBay also provides other platforms such as blogs and discussion boards for more opinionated entries.

Still in its beta version, eBay wiki already has 346 articles written and made available pertaining to trading issues on eBay within the wiki. The user friendly interface (WYSIWYG) facilitates a range of users from novices to experts. The systematic arrangement of topics according to subjects provides users the convenience to examine the overall directory before reading. Taken into consideration that the information will grow and hierarchy will become complex, the search capability embedded into the system is a good function for future development. Besides eBay policies and seller tools, a great number of articles are collaboratively written for new users by expert users. The information can assist novice users to adapt to the online trading concept and self learn the culture and workings of eBay. With no doubt, the adoption of wiki by eBay may act as an exemplar for tech savvy organizations of which collaborative projects are mandatory.

4.3. Case study 3: Ingenta

Ingenta, a provider of technology and services to the publishing and information industries, decided to deploy wiki in year 2003 as an adequate content/knowledge sharing infrastructure (Wiki Wiki What?, 2005). As knowledge proliferates, it is imperative for Ingenta to capture and share information as well as update the existing knowledge database to stay on the edge. The implementation of wiki tool allows internal exchange of information, especially for new staffs at the stage of adapting to the new environment, for the company went through a several acquisitions. Before adoption, collection of information was done by
different teams using various tools and technologies. The dispersed effort resulted in information silos.

The implementation received warm welcome from engineering team, for they already had similar experience prior to the adoption of wiki tool. They were comfortable with web-based environment and could install and maintain their own wiki. There was hardly any sharing barrier, for the tool was easy to use and documentation could be added and maintained with least effort dedicated. The procedure of getting documents across departments for approval also became concise because discussions could be captured by wiki, unlike e-mails which could get lost in the unknown abyss on the internet. The reviewers could track the edit history of the document and make alterations when necessary.

One of the significant success examples using internal wiki is the IngentaConnect project featured on the corporate web site. The entire build and launch of the project was specified and documented using wiki tool which later laid the foundation of external wiki. The external collaboration with McGraw-Hill's AccessScience included wiki as a platform where staffs from both companies could access to regularly updated information from a coherent, indexable location.

5. Lessons learnt

A framework was developed based on the implementation and analysis of the three case studies. Commonalities as well as key pull and push factors were identified to provide insight as to what enticed organizations to select wikis as a knowledge sharing tool. This is followed by a brief address on some challenges facing organizations seeking to employ its use.

5.1. Selection and implementation process for a wiki

Figure 1 is a pictorial representation of the Wiki adoption process based on the review of the three case studies.

Problem identification as a catalyst. From the case studies, the successful adoption of a new technology like Wiki must begin with the identification of a problem or information need in the organization, that is, the existence of a “push” or “pull” factor. This is sometimes recognized first by management and cascaded to employees or vice versa. In the case of Mapa, their expansion abroad serves as a catalyst to push the technology internally. eBay was driven by a need for a central location to organize their massive number of members and their posting...
and lastly Ingenta faced the problem of information duplication and inability to respond to requests which may threaten their survival.

Evaluating wikis against information need. Next, the selection and evaluation process of any knowledge management tool is influenced by the organization's information need. This will determine the type of wiki chosen, who will be using it, how secure it should be, proprietary versus freeware, etc. From the information management model (Choo, 2001), wiki is identified to be utilized in the information acquisition stage by Mapa where it is driven by the need to acquire tacit or explicit knowledge for organizational growth and survival.

Wikis is used to fulfill the information organization and storage needs of Ingenta and Mapa by creating a collective memory that is the active repository of the organization's knowledge and expertise. The knowledge intensive nature of these two organizations in terms of competitive intelligence and technical know-how means that the resignation or loss of a member will be a great loss to the organizations unless their tacit knowledge is being captured (McKelvie et al., 2007).

Wiki served to fulfill eBay's desired goal of information distribution where information will be widely shared among its members. As members put up their suggestions and articles in the wiki, other members can read, edit and link to other relevant resources. Also, with the sharing of information in organizations like Ingenta, this brings about organizational learning and insights to solving novel and non-routine problems which is vital for a provider of technology services. A survey carried out by Majachrzak et al. (2006) on corporate users reflected results that wikis are most useful when performing tasks that require new solutions as well as inputs from others.

Internal wiki before external. Next, in most organization an internal wiki could serve as a pilot collaboration effort before launching of an external wiki as in the case of IBM where an internal WikiCentral (McCarthy, 2008) eventually led to launching of REDWiki externally. This was also demonstrated in the case of Ingenta where internal success led to the launch of an external Wiki and inter-company collaboration. The implementation of internal wikis can be seen as useful experience in a safer and controlled environment prior to utilization of the collaboration tool externally. The experience and knowledge pertaining to utilization of internal wiki serve as precaution against technical issues arise in future.

5.2. Advantages in the usage of Wikis

There are many perceived benefits associated with the usage of Wikis such as its bottom-up and informal approach, ability to build trusting culture, etc. Based on analysis of the three case studies, some more compelling ones are mentioned in the following sections. Further, the analysis has also highlighted one significant benefit found by organizations using Wikis, that is, its ability to save time. These include time saved in training employees on the use of Wikis versus a highly-technical knowledge management system, time saved in traveling long distances for collaboration, timed saved for employees through reduction in e-mails as well as less dealing with customers. In business terms, time savings equals money savings.

Ease of use. From the case studies, the most frequently cited benefit was the ease of using a Wiki. This is particularly preferable in organizations which had fallen victim to expensive and unusable knowledge management systems like in the case of Ingenta. Employees would rather turn to alternative sources for information. The usage of wikis overcomes this problem as the users are now presented with technical tools and functionality they feel in control of and that mimic their use of technology in their daily lives (Sinclair, 2007; Twentyman, 2009). This familiarity with Wikis due in part to the popularity of Wikipedia has set a good platform for its introduction. Another implication that comes with the ease of usage is the low training cost associated in monetary terms as well as time taken. It is significantly lower as compared to other proprietary KM systems.

Central repository for information. Intranet wiki serves as a coherent repository for information. By accumulating inputs from its users with different expertise, it becomes the central database for knowledge and information gaps can easily be filled. This in turn helps in facilitating the information sharing culture, for the content becomes comprehensible with
The successful adoption of a new technology like Wiki must begin with the identification of a problem or information need in the organization.

...the annotation added in. It is extremely vital for learning organizations when it comes to single or double-loop learning, as it not just helps increase the level of knowledge among employees, but also reduces training cost. It is best delineated in the example of Ingenta which experienced several acquisitions and new staffs were to adapt to the working environment in the shortest time span possible.

**Tracking and revision feature of wikis.** Another major advantage of intranet wikis is that they can be revised any time and from any device with access to the network. Malicious attempts to misinform or disinform can be revised quickly or reverted to previous versions. This was evident in the case of Wikipedia where several ill-intentioned editing made to change ‘abortion’ to ‘murder’ was reverted quickly within minutes. The edit history of wiki content also can be used to track down the perpetrator by system administrators. In the case of eBay, occurrence of misinformation is avoided as identity of contributors can be tracked down and the authorization is only open to registered eBay members. The presence of the user directory provides details of organizational use which includes their contact details and current assignment and this can serve as a deterrent to intended vandalism. Another implication of this feature in a corporate setting is the ability to manage and encourage members who had contributed to a larger extent (Andersen, 2004). Their engagement can then be rewarded formative and normatively. The normative aspect here may be due to the enhancement to reputation of users as all contributions made are visible.

**Collaboration between organizations.** Wikis’ asynchronous nature of collaboration – sitting between formal and informal communication – allows a natural flow of conversation leading to knowledge construction. This will benefit organizations as they expand their business to different regions or develop collaborative projects with other regional organizations, as mentioned in the case studies of Mapa and Ingenta. With external wikis, organizations can incorporate with one another without needing to handle staff allocation. Feedbacks from customers or partners can also be gathered through wiki as a way to identify emerging business opportunities. Consult-co, a consulting company, works in this way by providing client project spaces to share documents and develop specifications. The use of wikis have created a common record of the project and left an audit trail of decisions made, saving time and thus, money (Payne, 2008). In quantifiable terms, the collaborative approach of the Wiki has been delivering gains in customer support. Average call times has been found to reduce by 10 to 30 percent when frontline employees make use of wikis in their dealing with customers. The hours of employee time saved in turn translates into cost savings (Twentyman, 2009).

**Solving information overload by e-mail.** Another point cited in the case studies is the preference of usage of wikis over e-mail. E-mail has become another information management challenge as it often involve exchanging numerous drafts as attachments, resulting in questions as to which version is the right one, whether everyone has seen the draft, and who has and has not commented. As more drafts are delivered through e-mail, they take up more space and become increasingly difficult to manage. The publishing of the draft document on a wiki means users will always know which version is the correct one and who has accessed it and what they have done and when. When the document is completed, the latest version can be “published” by turning off the ability for any users to make changes. In business terms, using the wiki not only lowers the amount of e-mail storage required but also means less cost incurred for storage. With some organizations reporting a decrease of up to 50 percent in project-related e-mails, this translated to savings in employee time and ultimately, an increase in productivity (Twentyman, 2009).
Building a trusting culture. The devolved and informal approach that wikis take towards collaboration allows users to have a voice in the organization. The wiki is a work tool but with spaces owned by the people working on it. They are there because they want to collaborate (Payne, 2008). It rides on the invisible informal structure present in the organization and is a welcome change from the traditional top-down approach. This appeals to the social nature of humans and supports their desire to be pulled into groups to achieve goals (Boyd, 2005 as cited by Patrick and Dotsika, 2006). Moreover, users can track their own involvement and define themselves through homepages and at the same time create the categorisation structure for the wiki. This flexibility and ownership builds up a trusting culture which is vital for information sharing to take place.

5.3. Challenges in implementation

Security. With the freedom and flexibility that comes with the using of a wiki means that someone in the organization must monitor wikis to make sure applications are secure and the content does not present legal, regulatory, or competitive problems for the organization. Access control is especially critical for regulated industries such as banking and healthcare which needs to safeguard sensitive information of clients and patients. Some considerations are limiting access to certain wikis and deciding how much oversight is needed for content. It was found that organizations take about 80 percent of development and deployment time to implement measures such as authentication and authorization for customer-facing and internal tools (Hoover, 2007). Companies need written policies and guidelines as to how much information in the wikis to make public eventually and internally and to govern and protect security and integrity of information. This has implications on the type of software organizations may choose to procure. Freeware may be seen as less secure as compared to customized vendor provided solutions.

Data migration. Before implementation, management must perform rigid scrutiny to examine the adaptability of the wiki engine to adopt. The variant usage of mark-up languages by different wikis has made it difficult to migrate existing content from one wiki engine to another (Chawner and Lewis, 2006; Lamb, 2004). As for those organizations which opted for open source wiki engines, architectural stability becomes an issue (Lamb, 2004; Wagner, 2004), for frequent updates, bug patches and new releases are capable of jeopardizing platform stability as well as content integrity. This is an issue that organization must consider at the selection and evaluation stage in the Wiki's adoption process as well as design and implementation process. The usage of a prototype or a smaller scale migration at departmental level will be useful in smoothing the process and sorting out possible issues. This implies that there must be close cooperation between IT as well as information department to ensure smooth transition.

Training issues. Although most employees are required to be computer literate nowadays, the introduction of wikis to these word processor accustomed users is still a somewhat novel attempt. The ‘absence of an explicit organizing structure’ may require more time for some users to learn and adapt to the framework (Lamb, 2004). However, it is possible that not every employee in an organization has used Wikipedia or other social software. Hence, all will begin at different level of technical skill, this serves as a problem during training as in the case of Mapa. The expert users get bored and the novice users cannot catch up. This needs to be overcome through the use of a training needs analysis to help employees recognize their needs and create the desire to learn. Its usage will assist organizations to tailor training program to different levels of need.

Categorization of information. The notion of folksonomies in Wikis where employees decides on the structure and categorization of explicit and tacit knowledge is often based on natural language and is subjective. This poses difficulty for retrieval of information as well as posting of information as users may be unsure on what type of information should go where. In the case of Mapa, this was overcome by involving users in the design of the categories and finding out the most common type of articles which will be posted and for the organization to do an internal review and the key knowledge areas for the organization. This could be in...
terms of Business knowledge, market knowledge, customers, competitors, etc. Drawing up of a graphical representation of structures has been found to be useful in the area of Mapa.

6. Conclusion

Will wiki become a fad in the history of organizational information sharing? From the survey (Majachrzak et al., 2006), it is clear that even corporate users believe that wikis is sustainable due to its user-centered focus and functions. The analysis of the case studies reveals strong organizational benefits as wikis can be utilized in the information acquisition stage, the information organization and storage and information distribution stage of the information management cycle. The strongest push for organizations embracing wiki technology is its ease of use and ability to facilitate knowledge sharing. They believe it will build a trusting community within an organization and solve information overload problems. An organization seeking to utilize this tool must adopt a pragmatic view of its implementation and not think of it as a “quick” fix. However, in order to have the best chance of success, organizations should be mindful to address the aforementioned challenges that include security, data migration, training, information structure issues and consider the methods which these successful organizations have deployed in order to have a clear framework and implementation to address and overcome all potential hurdles.

There are some limitations in this paper. First, the derivation of Figure 1 was based on the three cases studies and literature review and hence is non-generalizable and non-conclusive. The organizations hail from industries relating to the information science sector. Hence it may not be representative of those in other industries. More studies need to be done to verify the rigor of the wikis Implementation Framework proposed in this paper. Next, the three case studies presented are that of organizations which are based in the USA and the UK. Countries with highest penetration rate for wikis. The deduction is that the usage of wikis may be impacted by the culture of the organization and country as a certain amount of risk-taking is required. This is because the notion of ownership is so deeply embedded in some societies that users may not be comfortable with editing the work of others especially in an Asian context (Guy, 2006). Wikis challenge the norm that entities are created by their creators and this requires a paradigm shift for users. More studies need to be done with regards to implementation of wikis in an Asian country and possible influence of cultural factors.

The usage of wikis as a knowledge management tool has provided intangible value to the users. However, few organisations and literature reviewed have provided truly quantifiable Return-on-Investment on their use. Future studies should examine this gap in the valuation of Web 2.0 tools by organizations using them. The valuation and calculation of ROI translating intangible benefits to tangible ones may be the catalyst and the key to furthering the use of Wikis for businesses.

A few salient points were presented in the paper as preliminary considerations of implementing Wikis and there are many other issues that may impact its usage such as ways to encourage risk taking, incentive systems, management tight rein on control and the need to have a champion to fight the cause for its implementation, which necessitates further investigation. These issues aside, this paper echoes the optimistic view expressed by authors in the many articles and literature reviewed and their belief that Wiki technology will pass the test of sustainability. Not only so but the author looks forward to its evolution from a collaboration tool to a fully professional shared workspace. All in all, Wikis present tremendous potential as a collaboration tool and value as a knowledge management tool in many types of organizations and environments and is definitely a worthwhile venture.

“The strongest push for organizations embracing wiki technology is its ease of use and ability to facilitate knowledge sharing.”
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