Information Management Issues and Challenges in an Enterprise 2.0 Era: Imperatives for Action

Susan P Williams  
University of Koblenz-Landau, Germany  
williams@uni-koblenz.de

Catherine A Hardy  
The University of Sydney  
catherine.hardy@sydney.edu.au

Abstract

The potential benefits of E2.0 such as improved intra- and inter-organisational collaboration and information sharing are now widely acknowledged, however the management of digital information arising from the use of E2.0 technologies is presenting significant issues and challenges. In this paper we report on a research study to identify the issues and challenges associated with E2.0 and digital information management more widely and outline key imperatives for action. Key issues emerging from the analysis include uncertainty about the nature and scope of E2.0 and how the information it generates should be preserved and managed in a dynamic and changing environment.

Keywords: Enterprise 2.0, digital information management, retention, preservation, focus group

1 Introduction

Enterprise 2.0 (E2.0) is a topic of interest to both researchers and practitioners due to its transformative potential (McAfee 2006, Frappaolo and Keldsen 2008). Defined as “the use of emergent social software platforms within companies, or between companies and their partners” (McAfee 2006) E2.0 is widely acknowledged as offering benefits such as improved intra- and inter-organisational collaboration and information sharing, and the reshaping of business relationships. However alongside these benefits are a number of risks and challenges. Some of these challenges are directly related to E2.0 whilst others relate to the wider digital information environment within which E2.0 is situated. For example, organisations are increasingly challenged by the growth in volume and types of digital information that they create and are required to manage. Gantz and Reinsel (2010) report that the “digital universe” grew by 62% to approximately 800,000
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Petabytes (a million gigabytes) in 2009 and predict that by 2020 the volume will grow to 44 times greater than that produced in 2009. Alongside the amount of information is the type of information being created; unstructured information accounted for more than 80% of the total produced in the digital universe (Gantz et al. 2007). These massive stores of digital information are located in diverse systems and technologies, in many instances creating isolated silos. Organisations are still struggling to understand what information they have and in what form it exists. This leads to problems meeting information accessibility, retention and protection requirements in an environment where legal and regulatory mandates for such requirements are becoming ever more diverse (Gantz and Reinsel 2010).

Organisations are looking to E2.0 technologies and to externally hosted services (e.g. cloud computing) as a means of improving the quality and efficiency of their services and enabling greater customer/citizen engagement (Butler Group 2009; McAfee 2009). However in doing so E2.0 is itself a source of further, largely unstructured information, stored in multiple systems and formats. Thus, E2.0 becomes part of the wider problem of managing enterprise information. A recent IBM Global IT Risk Study revealed that social networking, mobile platforms and cloud computing present the highest cause for concern with respect to emerging technologies in organisations. In particular most of the risks were associated with compliance: ensuring accessibility, use and control of data; preventing unauthorised access to confidential, proprietary information; data protection and privacy; and business continuity (Ban et al. 2010, 6). Further a significant area of E2.0 compliance risk is electronic discovery (eDiscovery). That is, information retention policies and practices and an organisation’s obligations and readiness to ensure that records subject to or potentially subject to discovery requests are not intentionally or unintentionally removed or adulterated, unnecessary or incorrect records are not supplied, or that sensitive or legally relevant information is not disclosed using E2.0 technologies that are subject to eDiscovery (ISACA 2011, p.8). A recent Gartner report predicts that by the end of 2013, 50% of companies “will have been asked to produce material from social media websites for eDiscovery” (Logan 2010).

Thus, whilst the potential benefits of E2.0 are considerable and widely discussed, there are a number of potential risks and challenges, particularly in terms of where digital business information is located and how it is shared. To date there have been few systematic, empirical studies to investigate these challenges.

It is against this background we initiated a project to investigate the issues and challenges associated with E2.0 with a specific focus on enterprise information management. The project is part of a broader research program of action research aimed at assisting organisations to develop an information capability and to improve their information management policies, processes and practices.

The paper is structured as follows. The next section provides background information about the study and the research design. We then present the research findings (issues and challenges) and discuss their implications for both theory and practice. We conclude by outlining the next cycle of action research.

2 Research project context and research approach

As stated above, this project is the second phase in a long-term programme of research in the area of enterprise information management (EIM). EIM has been defined as “an integrative discipline for structuring, describing and governing information assets,
regardless of organizational and technological boundaries, to improve operational efficiency, promote transparency and enable business insight” (Newman and Logan, 2006). The focus is on managing business information across its entire lifecycle from creation to destruction. The research programme is a collaboration between researchers and practitioners in Europe and Australia.

The first action research cycle (Hardy and Williams, 2010) identified among other things, that further research into the information management aspects of Enterprise/Web 2.0 was required. In particular, there is a need to understand the challenges associated with the use of E2.0 tools, information stewardship and information assurance and control. The study also revealed that greater guidance was required to understand best practice in this area and to establish effective and efficient E2.0 information policies, processes and practices.

The aim of this study, the second phase of the research programme is to investigate the nature of the risks and challenges arising around E2.0 and their implications for the effective management of digital information. From a theoretical stance our aim is to investigate E2.0 as an element of EIM and to build empirically grounded insights. The findings of the empirical study will be developed into a framework to assist organisations to design effective and efficient E2.0 information policies, processes and practices. Thus combining both a research interest and a problem solving interest in the cycles of action research (McKay and Marshall 2001)

2.1 Research design
To investigate the research aims outlined above, a focus group approach was adopted. This allowed us to bring participants from key Australian organisations together for a round table discussion. The aim of the focus group is to investigate major issues and challenges faced by information professionals associated with the use of Enterprise 2.0 tools in their organisations. Results from this phase will: offer preliminary insights to practitioners in relation to their identified concerns and provide input to the next phase of the research: the development of a framework to guide policy and practice around the information management aspects of E2.0 implementations.

2.2 Data collection and analysis
The focus group was conducted in December 2010 at an industry workshop. The ten participants are key information professionals representing federal, state and local government agencies, media groups and technology vendors. Participants all have key responsibilities for information management in their organisations in roles including records managers, enterprise architects, business analysts and project managers.

The focus group questions and the planning, conducting and data analysis protocols were designed in line with recommendations in the key literature (Stewart, Shamdasani and Rook 2007, Krueger and Casey 2009).

The focus group session addressed the following lead question:

What are the key issues/challenges/concerns that your organisation is facing in regards to Enterprise 2.0 tools, particularly in regards to information management?
The lead question was supported by subsidiary questions to probe further into the participants’ responses. The focus group was organised with minimal imposition from the researchers and an informational and less structured style of interviewing was used (Stewart, Shamdasani and Rook 2007, pp.73-74) to generate ideas and assist in delivering more “novel and useful discoveries” (Rook 2003). In addition, consideration was given to the group facilitation process (Hollander 2004) to ensure that all participants were given a voice and that all issues and challenges were fully explored.

The digitally recorded focus group discussion was transcribed, three hours in total. Content analysis and descriptive coding were used to identify an inventory of issues and challenges arising from the interview transcripts (Saldaña 2009). The focus group participants were provided with a summary report of the findings arising from the first phase of the project for feedback and comment.

3 Findings and discussion

The coding and analysis of the focus group data revealed the issues and challenges shown in Table 1. The issues and challenges (themes) comprise a number of sub-themes; these are presented and discussed more fully in the following sections.

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<td>Blurring of boundaries</td>
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Table 1: Issues and challenges identified through coding analysis
3.1 Defining Enterprise 2.0

Enterprise 2.0 means different things to different people, as do the technologies classified as being Enterprise 2.0.

**Multiple meanings.** The first noticeable challenge to emerge from the data was the diverse views on what E2.0 is and on the technologies that are included in such a definition. This mirrors the variable and sometimes superficial and imprecise definitions found in the literature. Frappaola and Keldsen (2008) conducted a survey of information professionals to establish if there was a clear definition of E2.0 and they also found great variation and confusion surrounding the term. Their respondents identified with a range of terms from the broad “the application of Web 2.0 technologies in the enterprise” and “the next generation of Enterprise Content Management” to the very specific “leveraging metatags to tap into collective wisdom”.

**Multiple technologies.** Delving further into the technology aspects of this theme we found participants reporting a wide variation in E2.0 technology usage between their respective organisations. As seen in Table 2 the most commonly discussed use for E2.0 was for marketing and obtaining feedback from clients and citizens. Thus, notwithstanding the emphasis on collaboration relating to E2.0 the most common uses were for communication – sending messages from the organisation and receiving feedback to the organisation.

<table>
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<tr>
<th>Participant</th>
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<td>Media sector</td>
<td>“We recently employed someone at [my organisation] to actually monitor Twitter and actually sit there on air and actually respond on what's happening on Twitter. So we definitely see it as a growth point in society.... You know Facebook, Twitter at the moment it is the hot thing. It's a good social commentary at the moment of what's going on.”</td>
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<td>Tertiary education sector</td>
<td>“Marketing purposes, business and law schools tend to use them for faculty alumni type things, study groups.”</td>
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<td>Local council</td>
<td>“Facebook that's used quite extensive by community services, parks, environment. We also use Bang the Table but it was really, I guess for members of the public to vent their spleen online as opposed to vent their spleen to a council staff member that you'd have to reply to. So they can fight between different community groups, online as opposed to getting council to intervene between them. But yes we monitor what's going on to get general trends.”</td>
</tr>
<tr>
<td>State government agency - transport</td>
<td>“... we’re expanding into YouTube and stuff for marketing. Bang the Table; using it as a feedback tool for studies and stuff like that”</td>
</tr>
<tr>
<td>State government agency - health</td>
<td>“Our organisation struggles with trying to work out how to do it. I use it a little bit myself. I experiment with a Wiki. We haven’t really done a lot with it. I can see the potential for it. We’re just on the cusp of perhaps getting something happening. It's a cultural thing ... Unless you’ve got people encouraging it ...”</td>
</tr>
<tr>
<td>Commonwealth government agency</td>
<td>“In work it is interesting we had access to Yammer for a couple of days. It got a lot of interest as well and then the [agency] chucked it”</td>
</tr>
<tr>
<td>Not for profit organisation</td>
<td>“[In] our organisation most of the tools are not available or banned. But Facebook is one that you can use personally at work.”</td>
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Table 2: Notions and usages of Enterprise 2.0 technologies
At a broad level there was overall agreement that Enterprise 2.0 had the potential to transform organisations. However, there was concern about the hype surrounding the technologies, uncertainties about different capabilities and whilst fairly well understood in a personal context, there was less certainty about its contribution in the business context. The usages of such technologies also presented a range of additional challenges, as follows.

3.2 Blurring of boundaries

Blended usage. The use of E2.0 related technology was seen as blending professional and personal worlds and this was identified as a key challenge and risk. This theme is beautifully exemplified in the following quotation:

“... the departmental systems were easy to computerise or make into the electronic forms. But once we moved in the clinical area where a lot of nurses and doctors are involved, they have ... a big social interaction. Some of the younger ones are all starting to use iPhones for ... interactions between them and the consultants. So we’re seeing there’s a whole lot of information that’s not in the hospital systems, it’s running in personal systems. So every registrar and resident consultant has got ... their own social network going where all this information is floating around. It’s mixed up with their personal stuff and they may be going to multiple hospitals so what’s its status? From the hospital’s point of view they don’t know anything about it so is it discoverable?”

“... If you give them a normal clinical system, a very clunky, very labour intense from their point of view they don’t want to use them. But if they’ve got a nice little iPhone app and they can take photographs on that, send it to someone and say what do you think? There’s a clinical decision process all made from there that normally would be recorded in a paper record but it’s happening there. So how do you do anything with that? Where does that sit?”

Co-mingling of content. In the example above, whilst it was acknowledged that the iPhone technology was more useful for clinical practice, the more problematic issue was centred on the information. The participants identified the need for further guidance relating to appropriate usages of such technologies in the workplace and how information, particularly private and sensitive information needs to be managed in such contexts. Policies and education around accountabilities and responsibilities for adhering to them was identified as critical in this process.

Attention was also drawn to the fact that much greater emphasis is placed on the IT department’s role and on technology and much less on the information being generated.

“The word technology is the paramount word, not information.... They [IT Department] don't know why that information was created and they don't know the context in which it is going to be used.”

This was a recurrent theme throughout the discussion of issues and challenges.

3.3 Dynamic changing information

Determining requirements for information capture. A key challenge identified in relation to the digital content created with interactive and collaborative technologies is
that of determining what constitutes critical business information and establishing how it should be managed. One participant commented that:

“[With respect to business records management]... we monitor what's going on to get a general trend. But a decision was made that nothing on any of the social network systems was going to be a record unless they [the community users] contacted councils specifically.”

That is, the decision was based on business needs, resources available and the extent to which the information was considered critical and at risk of being lost.

**Capturing information from an E2.0 environment.** Where the need to preserve information arising from E2.0 technologies has been established, participants also identified the challenge of identifying appropriate mechanisms to actually capture that information from an environment that is active and collaborative. For example, how to capture information from a wiki that is multi-authored and dynamic or from mashups where content is combined from multiple sources some of which may be outside the control of the organisation. Establishing what is and how to capture an authentic copy of the 'original' information is an area of great uncertainty. Further complexity arises when information is generated and received through externally hosted services in terms of accountabilities and responsibilities for that information, that is who did what to the information and when; a point we return to in section 3.6.

### 3.4 Retention and preservation

Over-retaining information was identified as another critical challenge. The proliferation of E2.0 technologies is adding an additional layer of complexity in terms of the growing volumes of digital information.

**Multiple meanings and misunderstandings.** One participant identified the problem of accommodating different stakeholder views regarding appropriate retention,

“I mean it's just the bane of my life … over-retaining information … we're keeping more information and it's a bigger risk than destroying it. IT [department] have this fixation of archive of seven years…”

The AS/ISO 15489 Standard for the field of Records Management defines records as “information which is created, received and maintained as evidence by an organisation in the transaction of business, or in the pursuance of legal obligations, regardless of media.” Factors such as laws, regulations and organisational requirements determine the lifecycle of a record incorporating the period of time it should be kept and which records are to be destroyed or archived. Once it is deemed a business record the information cannot be changed or edited. That is, it is considered fixed content and needs to be protected from unauthorised access and be accessible (and available) over time. Making determinations about E2.0 generated content is a major challenge and greater consideration of the status (record or not, discoverable or not) of information requires organisations to reconsider their information policies.

Whilst the field of records management includes the policies and practices for retaining business records as defined by the standard, the practice of retention management also incorporates the retention and disposition of all other information. It is
here that a participant commented about the additional challenge associated with unstructured information in particular:

“I think the problem is that the people at the IT level don't know what's significant. The codified information is much simpler - you can actually put some rules around it and it's much more compact so you can archive it for a long while. But if you're going to unstructured information who is to say what is important? ... The problem is that nobody can tell me what we should be keeping in unstructured information. It's very hard for even the people who own it to know whether it was worth keeping.”

**Archiving and storage.** Another participant also raised the question about the meaning of archiving

“... It depends what you mean by archive as well. Are you talking about just people dumping stuff into an archive folder on a shared drive or are they applying some particular authority to it?”

**eDiscovery.** Over-retaining information was identified not only as an issue for storage operations but was also identified as a potential future litigation discovery liability; raising the multiple meanings of the terms (and practices) of preservation.

The concept of preservation is part of the discovery process itself. That is it is attached to a legal duty to preserve all forms of relevant information, including electronically stored information (ESI) as part of the eDiscovery process, arising from current or anticipated litigation or other regulatory investigations.

Separate and related is the concept of preservation in the information management context. Put simply, ensuring accessibility of information for as long as required. This may have particular regulatory obligation attached to it, such as the Australian Commonwealth Archives Act 1983, which empowers the National Archives of Australia to preserve archival resources of the Commonwealth. The National Archives uses the label 'digital preservation' to describe the related software, infrastructure and processes.

Digital preservation and ensuring accessibility well into the future is challenging particularly where technological obsolescence is so rapid. It requires migrating information to new platforms and formats as well as developing new archiving solutions. There was a general consensus amongst the participants that their IT departments only had a marginal understanding about the need for migrating digital information from a preservation perspective. One participant commented that:

“We need to keep this stuff so it's IT’s job to work out a way of doing it ... they need someone in the domain to work out how are we going to shift these records from this old system we've got here on to the new system ... . It's the people who own the data that have got to work it out. Because they're the ones who understand it and they know how it works. Ask any IT person who's only worried about what version of Microsoft we're running [for example] .... they'll just transfer - possibly use some algorithm to transfer as it looks. But the semantics of it might be quite different between the two systems ... You've got to think beyond the technical side of it. What does the information mean? How's it going to transform? Relying on IT is the wrong approach.”
Cast in terms of E2.0, the participants saw further complexity arising particularly in terms of changing and interactive technologies. Further, whilst IT departments focused on storage solutions, participants discussed the lack of understanding about the concept of context, with one commenting that:

“...storage may be cheaper but the problem is putting the stuff there - what's it mean? If you've lost the software, or you've shifted it through a couple of different systems it's lost all of its context - sometimes it's semantic. It's now useless because it takes too long to work out what it was. Work out does it still make sense.”

3.5 Multiple and conflicting mandates

Organisations are faced with multiple mandates, which may explicitly or implicitly describe the “record” and/or information and the processes surrounding the collection, disclosure and retention. The nature of E2.0 technologies creates additional complexity in terms of identifying how such mandates apply to the exchange of information, particularly when organisations use externally hosted services and so have potentially less control over the systems that maintain and exchange such information. We return to the issue of third party providers in section 3.6.

Mandates may also be conflicting, as noted by one of the participants.

“One of the things we find in local government is contradictory legislation... All these acts have different views and nuances on what you are required to do. Sometimes they are in direct conflict. A good example ... if you lodge a development application to council, [it is] required to publish the information on the web for the public to view it [under the Government Information (Public Access) Act 2009]. But then ... you run the risk of [breaching] privacy laws [because] there may be personally identifiable information [such as] contact details.”

The increasing use of Web 2.0 technologies for community consultation by governments is also opening up new challenges in the arena of privacy. Openness reduces the possibility of “practical obscurity”. Public records, that may have contained personal information, were always technically available for public review under open access laws in the past. However, they were kept “practically obscure” because they were stored in physical files in courthouses and government offices that are geographically dispersed throughout the country. In a digital environment, such information becomes available more broadly.

Relating to E2.0 participants also discussed the use of information, particularly personal information, captured by organisations through different social networking sites and the need to create guidelines about what information they will collect and disclose.

3.6 Security and privacy of information

Mobile devices and distributed information. With the pervasive use of mobile devices that enable ubiquitous access to data, voice, video or images security was also a concern, particularly in terms of securing confidential information and for business continuity purposes. Whilst the devices themselves may be secured and information
Third party providers. Protecting privacy was also a challenge in terms of the collection and use of personal information by third party providers. In particular, whether individuals interacting with the organisation were aware about how and where their information was being stored. For example recent discussion has surrounded the social media site Facebook and the transmission of members’ personal information by third party application providers (Steel and Fowler 2010). Focus group respondents also expressed concerns about whether the client organisation’s policies relating to retention, privacy and security were effectively administered by externally hosted services.

3.7 Support for E2.0 information management
Engaging senior management support has long been recognised as crucial to any organisational endeavour. Participants expressed the difficulty of gaining support for enterprise information management because of the way information management is viewed in the organisation. One participant observed:

“Probably a lot of us in this room view information as an asset. But I think most organisations see it as a set of imposed obligations, you have to do certain record keeping and there's risk of exposure through eDiscovery and you have to cover that. It's seen as a cost. Once it's seen as a cost they get into cost minimisation... if there's an asset then the assets have to be protected properly [but] ... people don't really understand that this is an asset and don't really have a long term view ...”

Another participant commented about the importance of culture

“I just think culture is the thing in terms of our organisation, the attitude about what has to be preserved ... it really depends on the leadership - where the people sit ... the culture ...”

3.8 Collaboration between IT and IM professionals
The lack of collaboration between IT and information management specialists was identified as a key challenge in managing information over its lifecycle and was expected to become more complex because of changing organisational structures and different traditions and approaches.

“... there is a gap between the business and IT. Again both need to work alongside [each other] I think the problem is that you've got an engineering approach perhaps with people in the IT ... Whereas the business is completely looking at a lot of other things.”

As identified in previous sections the long-term management of information generated by E2.0 is not a key focus in many organisations.

3.9 Information governance: getting the policies, practices and technologies right across the organisation
Information governance was identified, by participants, as important in mitigating risk and ensuring compliance with legal and regulatory requirements. However whilst well defined governance structures and policies existed for organisational records,
particularly those covered by laws and regulations there was less certainty about information more broadly as reflected in the following comment:

“The clinical side is governed by local policies […] national and state […] policies about how long things are retained from a clinical point of view. Financial records are a bit the same. The rest of it to a large degree it's up to the individual departments … and I suspect in a lot of areas it's a very ephemeral archive and when people leave that knowledge disappears or that record disappears.”

This was viewed as a critical area for further guidance required for E2.0 technologies because of the multiple technologies and distributed information environments.

4 Summary and future research cycles

The aim of this research study was to investigate the nature of the risks and challenges arising around E2.0 and the implications for the effective management of digital information resulting from E2.0 initiatives. Data collected through an in-depth focus group with key practitioners identified nine key themes. At a broad level there were issues around the definition of E2.0 itself and the technologies that are classified as being E2.0. Two themes related to the nature of the information itself. Information arising from E2.0 initiatives was seen as dynamic and frequently changing and increasingly problematic to manage because of uncertainties around the ownership of that information and the co-mingling of private and professional information sources.

These challenges resulted in additional concerns relating to the long-term management of the digital content itself. These issues included uncertainty around the retention and preservation requirements attaching to such information and matters of security and privacy. These themes highlighted the increasingly complex legal and regulatory environment surrounding the information and issues relating to information governance. Finally a lack of collaboration between IM and IT professionals and limited support for E2.0 information management were identified.

The findings from this study are now being used in the next cycle of research to develop and offer guidance on tools, techniques and methodologies that will assist organisations manage their enterprise information effectively in an Enterprise 2.0 context. There are two main components of this work:

- to assist manage the complex legal and regulatory environment: an interdisciplinary review and mapping of key standards and frameworks for an holistic and integrated view of informative governance
- to assist organisations to develop effective information policies and practices: in depth case studies of the information governance arrangements and policy designs associated with successful E2.0 information management initiatives are being conducted to identify good practice.

The study is not without its limitations as it is based on a small focus group in an Australian context. Further empirical scrutiny is required as set out in the next cycle of our research design. We hope that the analysis presented in this paper may serve to stimulate further interest and debate.
References