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# Web 2.0 and Organizational Learning: Conceptualizing the Link

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## ABSTRACT

The Internet has brought the next dimension of collaboration to the door steps of organizations, and its name is 'Web 2.0'. While there is a lot of hype around various concepts associated with the term, little academic research has so far been conducted on the implications of this new approach for the domain of organizational learning. This paper seeks to conceptualize the link between Web 2.0 and organizational learning through a framework that assesses its adaptability as a learning tool. The paper provides an integrated perspective on the broader contribution of Web 2.0 to organizational learning. The proposed framework can assist organizations in prioritization and evaluation of learning tools. Future research may extend its applicability and understanding by examining the constructs of the proposed framework empirically.

## Keywords

Web 2.0, Organizational Learning, SECI Model

## INTRODUCTION

Web 2.0 is a set of trends and tools for using the Internet. These socio-technological innovations have introduced a new way to interact. People are able to collaborate and interact freely, through tools like Social networking, Blogs, Wikis and RSS (O'Reilly, 2005). Web 2.0 has enabled interactivity and gathering of knowledge through experience and practice on a global scale. This combination has the potential to create personalized, yet collective, learning. There may be an emerging opportunity for organizations to adapt Web 2.0 for learning through knowledge sharing and interacting with people. This opportunity addresses the need to learn and the process of learning in organizations.

First, we examine the need to learn. Organizations are unique in several respects; from their sizes to the industries in which they operate. They are unique in the way they understand their internal and external environments and adapt accordingly. Employees are also directly involved in this adaptation, whether they are top managers or field workers. They continuously need to be trained and provided with a platform of learning in order to close the gap between their practices (what is actually done) and the processes (formally organized) in the organization (Brown and Duguid, 2000; Bekerman, 2003). Thus, organizations are in a consistent search for new and dynamic ways to learn effectively and collectively. The collaborative characteristics of Web 2.0 offer new ways in which this need can be addressed. This brings us to the method or process of learning.

Second, although the need is recognized, the systems and tools that enable such learning needs must also be given recognition in order to benefit from them. Organizations have formal and informal learning methods that they adopt. Formal methods are structured and created with the purpose of learning. These include meetings, discussions and conferences. Many organizations have deployed learning management systems (LMS) for the purpose of structuring the learning process. These systems are designed to manage user learning interventions (Ismail, 2001). Informal methods are built on the informal means

of communication; they are unstructured and depend on situations to be created. Dixon (1997) calls these informal places of organizational learning (OL), 'hallways'. In knowledge-driven companies like software houses, learning is an important aspect to their business strategy and employee skills. Not all employees in such settings have the same skills and knowledge. Hence, managers in software companies encourage information sharing in a less formal setting (Cusumano and Shelby, 1995: 343). In this respect, there are claims that Web 2.0 can fill the gap with 'social aspects of the content' (O'Reilly, 2005); supported by connectivity of people and knowledge sharing (Drasil and Pitner, 2006).

Though there seems to be some opportunity; questions concerning how Web 2.0 can be effectively used to support organizational learning activities remain fairly unanswered. Publishing, content aggregating, social networks and peer-to-peer connections seem to share collaborative features, is it all just for fun, or do they offer more? Should organizations adapt these tools just because of what they are; should they be assessed before they are used; how do they actually assess them from the learning perspective? These questions are the foundation of this paper. The new theory of learning tools and usage in organizations requires essential and urgent research (Ebner, 2007).

Studying in detail, we question how to link Web 2.0 and learning: '*How can Web 2.0 enable learning in organizations*'? This is the main question this paper attempts to answer. We seek to create a framework that assesses Web 2.0 tools and applies them to OL. The framework opens a new insight to the evaluation process for learning tools and an area of IS research where a handful have ventured. The paper is structured in four sections, the first being the introduction. The second section is develops an organizational learning framework. The third second section explores Web 2.0, examining how Web 2.0 tools may be linked with the concepts of OL. The last section concludes the paper with the research implications and future directions.

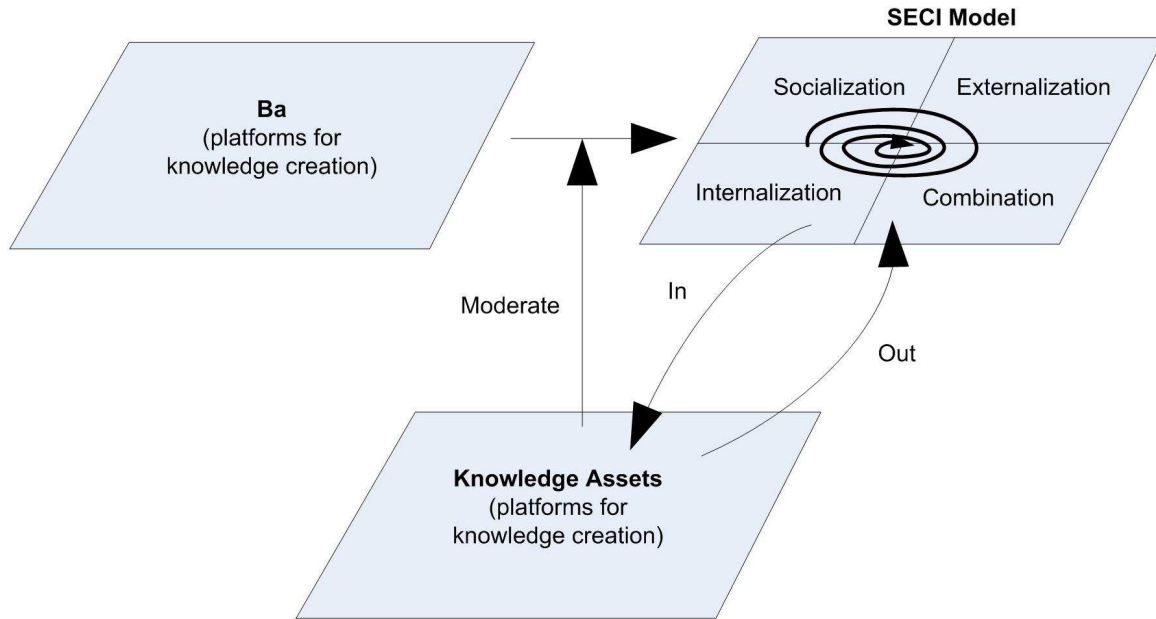
## HOW DO ORGANIZATIONS LEARN?

Organizations are large communities which allow individuals to interact, create context and enable learning within that context. By understanding how individuals learn, we can understand what OL is. Individuals have three learning methods: first, direct sensory experiences; second, through the verbal transmission of information; and third, by reorganizing what they already know into a new configuration, thereby creating new knowledge (Dixon, 1994: 12). Learning in itself is the process of acquiring knowledge (Cook and Yanow, 1993). Using experiences as 'pre-knowledge', a person acquires, processes, and gives meaning to information through a context. However, while individual learning is necessary, it is an inefficient condition for OL (Argyris and Schön, 1978: 20).

Previous literature tends to posit a diversity of theories and conceptual frameworks which explain OL. These include Single loop and Double Loop Learning (Argyris, 1994), OL Cycle (Dixon, 1994), and Action Learning (Mumford, 1995). This paper adopts theories and assumptions proposed by Nonaka and Takeuchi (1995) and Nonaka, Toyama, and Konno (1998; 2000) to explain OL.

Nonaka and Takeuchi's (1995) assumption is that an organization is not the sum of individual learning; it can learn and create knowledge through dynamic interactions between employees. This definition of OL is based on the pre-assumption that individuals go through a knowledge conversion process which enables them to learn. They argue that "*...human knowledge is created and expanded through social interaction between tacit and explicit knowledge*" (ibid: 61), this interaction is 'creation of knowledge'. The authors emphasize that knowledge conversion is a continuous process through which one transcends the boundary of the 'old self' into a 'new self' by acquiring a new context, a new vision, and new knowledge (Nonaka et al., 2000). Such interactivity facilitates access to a larger pool of meaning (Bohm, Senge and Nichol, 2004) which cannot be accessed by employees as individuals. These knowledge creating processes (KCPs), also known as the SECI model, can be identified in four conversion modes (Figure 1) (Nonaka and Takeuchi, 1995):

- *Socialization* – tacit to tacit conversion, a process of sharing experiences or through face-to-face communication and creating tacit knowledge such as shared mental models and technical skills;
- *Externalization* – tacit to explicit conversion, a process of articulating tacit knowledge into explicit through the use of abstractions, metaphors, analogies, or models;
- *Combination* – explicit to explicit conversion, a process of creating explicit knowledge by bringing together other explicit knowledge from a number of sources; and
- *Internalization* – explicit to tacit, a process of embodying explicit knowledge into tacit knowledge. Internalization is facilitated if the knowledge is codified or conveyed in terms of explicit knowledge.

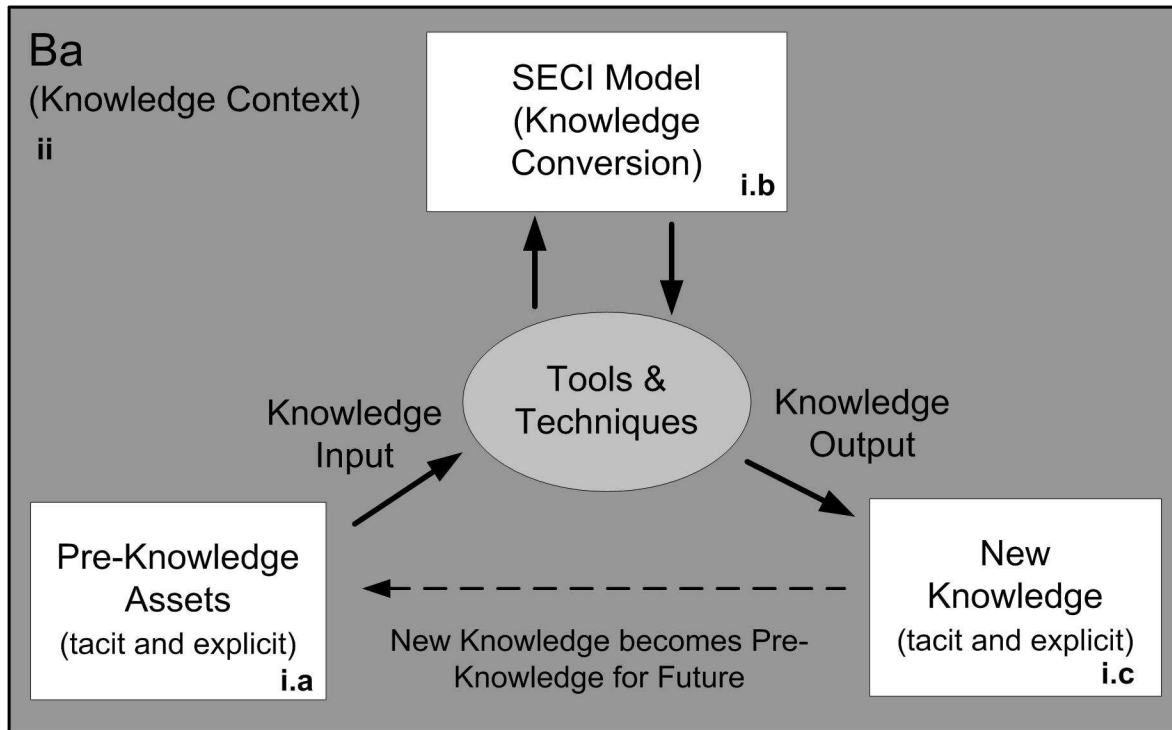


**Figure 1. The Knowledge-Creating Process**

Source: Adapted from Nonaka and Takeuchi (1995); Nonaka et al. (2000; 2001)

The authors explain that the knowledge-creation processes (KCPs) occur within shared context (Ba) and through knowledge assets. Knowledge assets comprise of knowledge already created and the knowledge used to create further knowledge (Nonaka et al., 1998). Ba is the foundation of the KCPs, it is the context in which knowledge is shared, created and utilized (Nonaka, Toyama, and Byosiére, 2001). An example of Ba is a software project team, which is a place where people of different capabilities are brought together in order to generate knowledge. Ba provides a platform for advancing individual and collective knowledge. If knowledge becomes separated from Ba it becomes information. The importance of assigning contexts to data and information has been emphasized by other scholars (Dixon, 1994; Bhatt, 2001). Ba is the place for resource concentration of knowledge assets and intellectualizing capabilities within the KCPs.

KCPs define the dynamic processes through which an organization creates and manages knowledge in its tasks and processes. As a theory, the KCP model, along with SECI model have received a fair share of criticism. Critics usually highlight that the model is very generic and cannot be sustained for all studies (Gourlay, 2003). We argue that the model gives a generic picture that can be adapted into the context of its application. It lends the understanding that organizational learning occurs when knowledge is made more accessible within an organization. Accessibility comes through storage and retrieving of knowledge in tacit and explicit form. To achieve that, the organization needs a context, pre-knowledge and conversion processes. Tools and techniques allow this accessibility by being able to store knowledge and retrieve information at the required time. They provide the access to input and output processes which are the bases of the knowledge-creating processes (Nonaka et al., 1998). This accessibility has a tri-relation with KCP, first that they form part of means through which pre-knowledge assets are accessed (input); second, that they allow new knowledge to be generated (output) by supporting the KCP; and third, they store knowledge for future use. It is important to note that the context – Ba –; be it the whole organization or a department, influences how these tools and techniques are adopted which would directly affect their effectiveness. In this respect, we propose an OL framework for learning tools that reflects these relations (Figure 2).



**Figure 2. OL Framework for Learning Tools**

Source: Adapted from Nonaka and Takeuchi (1995); Nonaka et al. (2000; 2001)

We propose that the above framework conceptualizes how organizations can use tools and techniques to make knowledge accessible and thereby facilitate organizational learning. The first part is tool-driven, while the second part looks at the broader angles to the tool. Hence, to assess the applicability or adaptability of a tool for OL, an organization has to answer the following questions:

- i. In what ways does the tool make knowledge accessible?
  - a. Accessing pre-knowledge for knowledge creation
  - b. New knowledge through the knowledge conversion processes
  - c. Storing new knowledge for future knowledge creation
- ii. To what extent does the tool influence the context – Ba – and vice versa?

We argue that learning tools should be able to create interaction, enable knowledge sharing, access pre-knowledge, and generate and store new knowledge. Organizations need to assess tools for these characteristics. Such assessment is possible through the framework developed. The next section considers how Web 2.0 can be used as an OL tool using this framework as an analytical lens.

## TOWARDS AN OL FRAMEWORK THROUGH WEB 2.0

'Web 2.0' is just an invented term, by Tim O'Reilly who came up with it during a brainstorming session (O'Reilly, 2005). The term itself, has received a lot of publicity and criticism. Therefore, "...pinning down Web 2.0 is like trying to scoop up water with your hands" (Treese, 2006: 15). There are no definite lines drawn in literature for its complete definition, therefore people confuse tools of Web 2.0 (blogs, wikis, podcasts, RSS) with the concept itself (Anderson, 2007). Ultimately, the label 'Web 2.0' is far less important than the concepts, projects, and practices which are hidden behind it (Alexander, 2006). We conceptualize Web 2.0 as a combination of new and old trends of accessing and using the Internet which originate from tools and applications that "deliver richer user experiences and harness collective intelligence" (CDGGT, 2008: 2; O'Reilly, 2005). The tools and applications enable interaction, content syndication, inter-networking and other means of social collaboration. There is therefore a build up from individual expression towards a more collaborative, participative and co-operative group information exchange platforms.

To dismiss Web 2.0 as just another Internet fad, would be to overlook one important area in which its approach does substantially differ from traditional information management practices and in which Web 2.0 can perhaps make its most valuable contribution; accessibility, creation and contextualizing of knowledge (Tredinnick, 2006). From earlier discussion, this highlights learning related processes in organizations. To understand how Web 2.0 is an influential resource that may be linked with the concepts of OL, we would need to go back to the definition of OL and assess the two main issues of accessibility and context.

### Accessibility

At the organizational level, knowledge assets must be made accessible by the tools that enable learning; Web 2.0 facilitates this. The objective is to make internal knowledge visible and to access external sources of new knowledge through 'boundary spanning' tools (Pawlowsky et al., 2001). Web 2.0 partly initiates and mediates KCP, through its tools and applications.

Before one goes into exploration of the relations between Web 2.0 and OL; functions, tools and web applications need to be differentiated to enhance understanding. Functions are the roles that Web 2.0 tools perform, and these tools are themselves classifications of the web software applications or which are normally called websites. For example, Wikipedia is an application utilizing the concept of Wikis (tool) and performing the function of 'collaborative publishing' (Ebersbach, Glaser and Heigl, 2005). Thus, categorizing them under the functionality that they perform supports the argument that the concept is much more important than the tools (Alexander, 2006). Classifications given by McGee and Diaz (2007) and Richardson (2007) are more related with the focus of this paper. They classify the learning aspects of these collaboration tools (Table 1).

Type	Function	Tools	Web Applications
<b>Communicative</b>	To share ideas, information, and creations	Social networking, Blogs, Audio blogs, Video blogs, IM tools, Podcasts and Web-conferencing	Facebook, Blogger, YouTube, MySpace, Twitter, BumpIn, Vidipedia etc.
<b>Collaborative Publishing</b>	To work with others for a specific purpose in a shared work area	Authoring, Editing tools, Virtual communities of practice (VCOPs), Wikis	Wikipedia, Vidipedia, Netcipia, Wordpress,
<b>Documentative (Content Management)</b>	To collect and/or present evidence of experiences, thinking over time, etc.	Blogs, Videoblogs, E-portfolios, Open Journalism	SeeNReport, Calameo, Varti.fi, Joomla
<b>Generative</b>	To create something new that can be seen and/or used by others	Mashups, VCOPs, Virtual Learning Worlds (VLWs),	Amazon (customer comments), Second Life, Flickr, YouTube
<b>Interactive</b>	To exchange information, ideas, resources, materials	Social bookmarking, RSS, VCOPs, VLWs	StumbleUpon, Delicious, Facebook, MySpace

**Table 1. Classification of Web 2.0 Applications**

Source: Adapted from McGee and Diaz (2007) and Richardson (2007)

### Knowledge Conversion through Web 2.0

Web 2.0 facilitates knowledge creation and sharing by involving, engaging and empowering people, and by creating a collaborative environment for those who need to share and those who hold the knowledge (Patrick and Dotsika, 2007). This link is revealed when one explores the SECI model and examines how Web 2.0 tools enable each process separately (Table 2). Placement of tools are done on the basis of their most visible knowledge processes, e.g. all SECI processes may be facilitated by collaborative publishing tools (Wikis), but externalization and combination are the most prominent ones.

Conversion	Processes in the SECI Model	Type of Tools
<b>Socialization</b>	1. Capturing Individual Knowledge 2. Sharing Individual Knowledge 3. Interaction of Shared Experiences 4. Feedback Without Criticism	a. Communicative b. Interactive c. Generative d. Collaborative Publishing
<b>Externalization</b>	1. Communication (Dialogue) 2. Capturing Collective Knowledge and Explicit Knowledge Creation 3. Diffusion of Knowledge at the Collective Level 4. Instantaneous Feedbacks and Exchange	a. Communicative b. Collaborative Publishing c. Documentative (Content Management)
<b>Combination</b>	1. Organizing and Categorizing Of Knowledge 2. Integration of Sources Of Knowledge 3. Platform for Collective/Collaborative Knowledge Creation 4. Searchable/Accessible and Distribution 5. Collecting Internal and External Knowledge	a. Generative b. Collaborative Publishing c. Communicative d. Documentative (Content Management)
<b>Internalization</b>	1. Access to Explicit Knowledge 2. Re-Experience Others Explicit Knowledge 3. Asynchronous Learning (Any Place Any Time) 4. Experiential (Actualizing Concepts and Methods)	a. Communicative, b. Generative c. Interactive

**Table 2. Organizational Learning Processes and Web 2.0 Tools**

The link between knowledge creation processes and Web 2.0 is discussed here.

**Socialization** – Socialization enables employees to focus on extending their ideas and concepts rather than being defensive, or criticizing other employees’ ideas. They share their experiences, expertise, understandings and skills from their previous activities through observation, imitation and practice. Web 2.0 tools that are categorized under communicative, collaborative publishing, generative and interactive, support socialization processes separately and in grouping. They enable *sharing and capturing of individual knowledge* and create a space’ for interaction that brings the seekers and the keepers of knowledge closer to find out who has the knowledge they need.

**Externalization** – Externalization process enables the diffusion of knowledge from an employee to a group of employees. It involves the process of concept creation and is triggered by dialogue and collective reflection (Nonaka and Takeuchi, 1995). Web 2.0 has given a new dimension to this conversion, by providing individuals with a stand to create *metaphors* and *analogies* through the information they receive. The *communication* that these tools provide is through dialogue (usually not speech). Web 2.0 allows multiple streams of externalization events, which makes the difference, better *diffusion* of knowledge and the flow of information is very dynamic and relatively *instantaneous*.

**Combination** – Individuals exchange and combine their explicit knowledge through exchange platforms like social interaction processes and information storage mechanisms. Innovative tools of Web 2.0 facilitate *integration* of different bodies of *explicit knowledge* into one large accessible system; topping the list are Wikis, Blogs and Mashups. The collaboration through these applications allows better contextualization and organization of knowledge (O’Reilly, 2005). Furthermore, with *distribution* and *accessibility*, social networking and social applications sustain this knowledge conversion by networking people socially and through virtual communities like Secondlife. Similar applications gather content from various sources and reassemble it, into a single Mashup, Google maps and Facebook.

**Internalization** – Internalization focus primarily on *access to explicit knowledge* and that is where Web 2.0 comes again to the rescue. Tools that are communicative, generative and interactive enable internalization. They include virtual communities

of practice (VCOP), Virtual Learning Worlds (VLW) and role-playing simulations. These tools allow individuals to *re-experience* what others have shared as explicit knowledge; and *apply and experiment* with that knowledge. They also support *asynchronous learning* and remote communication, for which trainer and learner do not have to be in the same place at the same time.

Consequently, looking at Web 2.0 through the first part of the OL framework shows that these tools are capable of supporting accessibility to knowledge. Though each SECI process is considered separate by its authors, the lines between them are very thin, making the functionalities of the tools overlap. This explains the reason why it is relatively hard to create concrete boundaries around the concepts and tools of Web 2.0. We, subsequently, suggest seven key characteristics of tools which may support the learning process in organizations:

- 1) Tools must enable communication and interaction between employees and within groups or teams;
- 2) Tools must support the organizational processes that embodies knowledge creating processes (SECI);
- 3) Tools must enable employees to collaborate in a defined setting or project;
- 4) Tools must provide a shared platform to share and generate knowledge among employees and teams or groups;
- 5) Tools must be able to distribute and diffuse knowledge at individual and collective level;
- 6) Tools must be able to integrate knowledge from various sources (internal and external); and
- 7) Tools must enable asynchronous learning, from any place at any time.

Further, we relate these characteristics to our organizational learning framework. From the model, we analyzed that organizational learning occurs when knowledge is made more accessible within an organization. Now, we propose how organizations can use Web 2.0 tools to make knowledge accessible and thereby facilitate organizational learning (Figure 3).

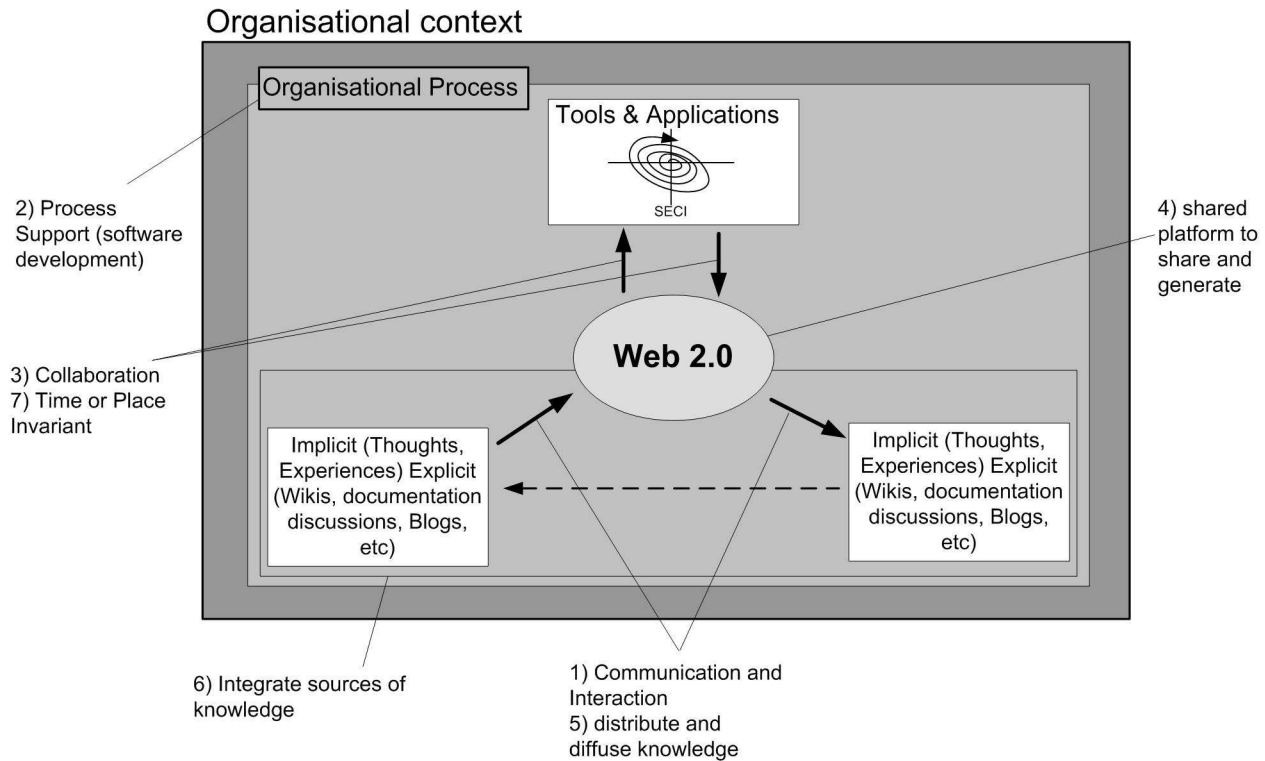


Figure 3. Tool-driven Factors for OL



### Organizational Context of Web 2.0

Recalling, ‘Ba’ – the shared context in which knowledge is shared, created and utilized (Nonaka et al., 2001), learning is enabled through the learning tools that support this context. Organizations usually control the levels of knowledge transfer within their boundaries, which is the fundamental issue of organizational knowledge security. Therefore in early days of Web 2.0, it was seen as a menace to organizational resources such as information, both from technical aspects (Lawton, 2007) and non-technical as well (Davenport, 2007).

Research reveals that “...misunderstanding and misperception amongst both senior managers and IT personnel has deterred investment” in Web 2.0 applications (BCS, 2007). In the same research, only one third of businesses have made any investment in Web 2.0 and the majority of these have did so to attain tangible benefits from enhanced content management, rather than to gain the benefits of collaborative working that Web 2.0 can deliver. Web 2.0 should be treated as an enabler that helps OL to reach its end goal. While Web 2.0 can deal in part with organizational contextual factors linked directly with tools for learning, it cannot provide a solution to outer OL issues completely. Such issues include the lack of infrastructural capabilities (Nielson, 2006), the fear of technology (Davenport, 2007), and the organization’s learning attitude (Dixon, 2000). If misusing of the tools is at one extreme, an employee not wanting to use them is at the other. Having the tools does not mean everyone would use them.

The objective of Web 2.0 in the organization is to provide a stepping stone, rather than be a complete solution to all challenges associated with learning in organizations (Ebner, Holzinger and Maurer, 2007). The OL perspective for the tools that are adapted for learning is that they should make knowledge more accessible, considering the influences of the organizational context and other factors surrounding that context. We capture the organizational factors for organizational learning through Web 2.0 in Figure 4.

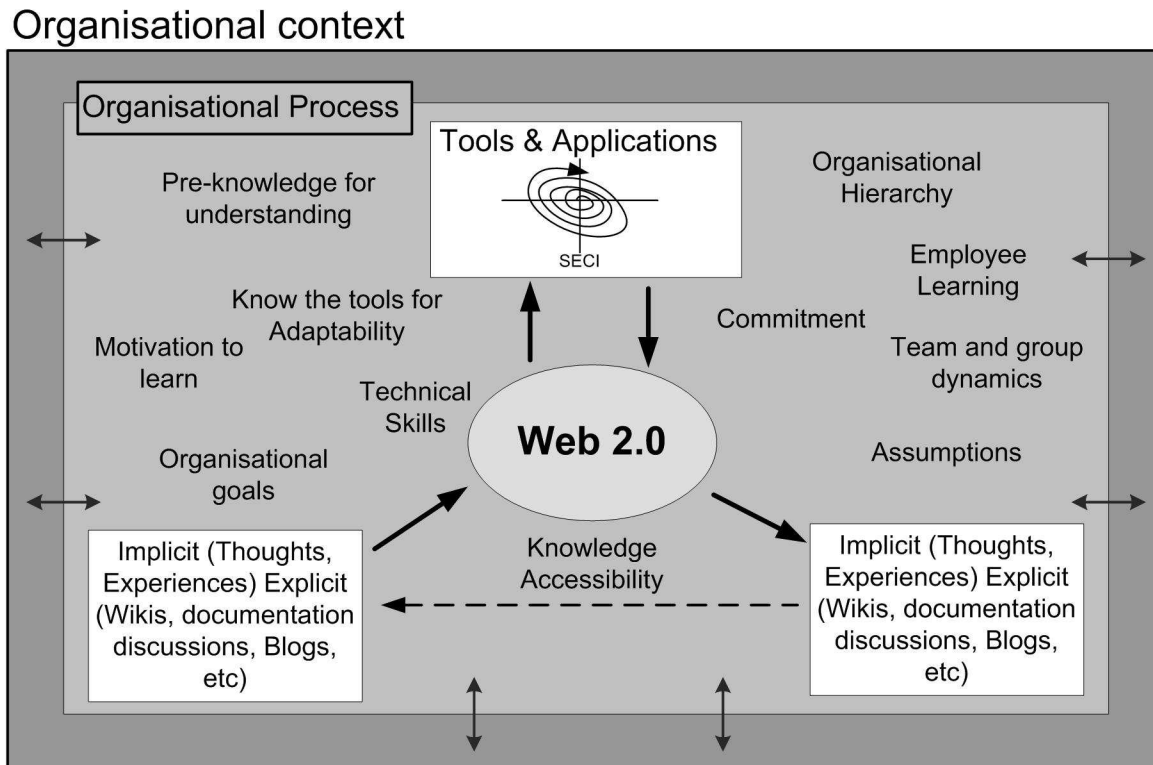


Figure 4. Organizational Factors for OL through Web 2.0

As organizations differ these factors may be just a few among other critical success factors. There may have factors in environmental aspects, like country regulations, cultural issues that may influence the organizational context.

## CONCLUSION

In this paper we have conceptualized 'Web 2.0 as a learning enabler', and proposed how Web 2.0 can enable OL. However, organizations cannot simply assume that more interaction is always better, nor can they just hope that collaboration will spontaneously occur in the right places at the right times in their organizations. They need to develop a strategic, comprehensive view of collaboration, and take steps to establish the types of social networks that best fit learning for them. The framework presented here (Figure 3) gives organizations an instrument that can aid in determining which tools will deliver the better learning outcomes in organizations.

We propose three recommendations to make our framework (Figure 3) applicable in practice in an organizational context. First, there is a need to understand functions, tools and applications associated with Web 2.0. Table 1 is a good reference point for this. Second, there is a need to understand how learning occurs or knowledge is made accessible in organizations and to evaluate which Web 2.0 tools and applications can support the learning process. Table 2 is good reference point for this. Third, these learning processes may differ across organizations; hence organizations need to understand how to adapt the applications to their context. This adaptation process may require an understanding of the organizational factors which influence the learning interventions – both processes and tools. Figure 4, though not exhaustive, outlines some of these factors that can be used as guidelines for adapting learning tools and redefining the knowledge creating processes to suit their context.

Nonetheless, more research is required to be able to understand the precise nature of the relationships between different levels of learning and organizational outcomes, and we encourage others to address these important research questions. Another avenue for future research is to examine the constructs of this study across multi-industrial organizations and different organizational projects to determine whether they mediate the knowledge conversion processes. Further research is also required to explore the effectiveness of Web 2.0 at other levels and domains; as some have initiated in cultural and societal environments (Child and Heavens, 2001).

In conclusion, the answers attained from this paper are stepping stones towards a complete learning organization. The reality in practice may require more effort and further research.

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