

Web2.0 under the Actor-Network Theory point-of-view: conceptualization and definition analysis

Abstract

Actor-Network Theory (ANT) has been used, amongst others, to support research related to Community of Practices (COP) theory, considering such groups as outcomes of the relations between each of their networks and agents, human, material or whatever (Fox 2000). The evolutionary trends observed on the Internet, and especially the emergence of User Generated Content (UGC), is profoundly influenced by the rise of new types of relations between actors on the World Wide Web. Existing theories and concepts do not adequately frame these trends where one may notice a lack of stable definitions and literature related to the so-called “Web2.0” (Kolbitsch and Maurer 2006).

This paper aims to apply the ANT approach to the Web 2.0 trends. It is argued that new formats of online sources (weblogs, wikis, podcasts, social networks and file sharing platforms) have lately reached a critical mass in term of usage and have impacted the informational landscape by stressing the blurring boundaries between information producers and consumers (Picone, 2006). Our methodology consists of a collection of Web2.0 related definitions found both in academic and professional literature. The collected definitions are then discursively deconstructed according to their dimensions and components (Quivy and Van Campenhoudt, 2002). The assumption of this method is that definitions or descriptions of Web2.0 as a concept focus mainly on the effects and consequences on the informational landscape. By considering the “simplification” and “punctualization” processes described by Law (Law 1992), this paper intends to formalize the heterogeneous networks lying behind the effects studied.

Our research supports that Web2.0 formats may be considered as the effect of different types of networks (from the ANT point of view). This paper illustrates that amongst all factors leading to the “web 2.0 effect”, improving the ‘ease of use’ through content creation software and accessibility are fundamental in the emergence of the Web2.0 trend, in addition to the interpersonal facilities that they offer, so often emphasized by its evangelists.

Jeremy Depauw - PhD Student	Contact details:
Information & Communication Sciences	▶ @: jdepauw@ulb.ac.be
Université Libre de Bruxelles	▶ Phone: 003226504454

Yet-another definition?

Web 2.0 is phrase that raises a lot of challenges and opportunities for a wide range of stakeholders such as users, marketers, scholars, etc. Plenty of authors, academic or not, have taken the initiative to describe and define that phrase. From a marketing buzzword, it has gained some critical mass and has proved very useful to describe some kind of evolution trend on the Internet. Almost three years after O'Reilly's "coming-out" about Web2.0 (O'Reilly, 2005), few would doubt that there is large-scale shift on the informational landscape, and especially on the internet (Hofkirchner et al., 2007). The concern of Academia has grown. Many creative and path breaking works - papers, books, PhD projects, etc. - focus on Web 2.0, either as subject or as context. It is then surprising that any of them can rely on a common, stable, accepted and effective theoretical frame (Safran, Guetl, & Helic). The phrase Web 2.0 refers to an object widely accepted and understood as a *useful, if imperfect, conceptual umbrella under which analysts, marketers and other stakeholders in the tech field could buddle the new generation of internet applications and businesses that were emerging from the participatory web as we know it today* (Madden & Fox, 2006).

Part of a broader theoretical investigation, this paper aims to highlight the key elements that are usually pointed out to define and to describe Web 2.0. More than yet-another definition, it reports an analytical reading of a definitions corpus found in both academic literature and on the web, and intends to conceptualize the dimensions and components of what it is supposed to be. It is not necessary to reinvent the wheel because most of the work has already been done, whereas few sustainable sociological investigations are available (Beer & Burrows, 2007). By centralizing their work on a single review and analysis, this paper tries to take the best of authors from disparate fields with diverse, if not divergent, purposes. This is an attempt to take part in the effort. To achieve this goal, Actor-Network Theory has been chosen as theoretical framework, providing a useful approach and analytical tools.

Actor-Network Theory as a useful theoretical frame

Elements of definitions and descriptions of Web 2.0 are considered here as indicators of the components and dimensions of the conceptualization in progress. Such an approach has been inspired and hopefully justified by the choice of Actor-Network Theory (ANT) as theoretical framework. ANT has been proven as a reliable and appropriate frame to understand and analyze complex phenomena and objects (Tuomi, 2000).

Back to the basics

In the Actor-Network Theory's analytical frame, also known as *Sociology of Translation*, reality is observed through interactions. Reality is all that there is, and is considered as the effects of heterogeneous networks, made up of society, organizations, groups, machines, etc. Indeed, ANT

theorists consider these items as the effects of patterned networks (Law, 1992). In order to cope with the complexity of reality, ANT authors have built two major processes: *simplification* and *punctualization*. They consist of reducing the network to a limited number of elements. The most complex objects may be analyzed as black boxes. This helps to deal with the complexity of their interactions that constitute the observed reality.

On the one hand, *simplification* consists of the fact of reducing the network to one or two of its effects, which allow to not considering it a set of interacting material, agents, etc. Law gives the example of a television set. As long as it works properly, it appears as a device for watching TV shows. But if it breaks down and need to be repaired, it becomes a very complicated network of wires, chips etc. On the other hand, *punctualization* comes from the fact of taking usual and working networks for granted. Law explains that *punctualized resources are such because they are usual, easily performed and managed. They are then put under the simplification process, taking them only for their effect as granted.* (Law, 1992)

More than a generic framework for understanding social phenomena, the use of ANT offers views and shapes that will guide and support the analysis of such a complex and multidimensional object as Web 2.0.

Inside the black-box

Callon (1991) proposes a set of three elements that constitutes what is referred to as a *network*: the intermediary and the actor that shapes the network. I argue that the key of my analysis resides in this triptych.

An intermediary is *anything passing between actors, which defines the relationship between them*. (Callon, 1991, p. 134). Callon gives examples such as computer software as well as scientific papers or human bodies. From this point of view, a major problem in understanding Web2.0 is resolved. The notion of intermediary may be used here to identify any technical and material forms of content. Depending on the background, the point of view or the beliefs of authors, Web 2.0 is sometimes defined as a trend, as a practice or as a technical artifact with different level of abstraction. The notion of intermediaries avoids the incompatibility of views and supports joint analysis. As Callon writes, *intermediaries both order and form the medium of the networks they describe* (Callon, 1991, p. 135). Furthermore, the relevance is even greater when he proposes a typology of intermediaries that shape most of the networks.ⁱ *Text* is the first one that may be seen as an object that makes connections with other texts. Applied to Web 2.0, the statement of texts as intermediaries is valuable. *Technical artifacts* are a second kind of networks and complement conveniently this first type. Callon explains that a technical artifact may be treated as *a program of actions coordinating network of roles, played by human or non-human* (1991, p. 136). Indeed, if the approach of intermediaries had been limited to texts, the use of ANT would have forced me to

ⁱ i.e.: Literary inscription (texts), technical objects, skills and money. Interested readers will find a full and comprehensive description of them and nuanced element on intermediaries in (Callon, 1991, pp. 135 - 140)

ignore all the descriptions of Web 2.0 that do not highlight the content as a primary dimension. By including technical artifacts as part of shaping elements of networks, the use of ANT's analytical framework is confirmed as relevant

Actors define one another by means of the intermediaries they put into circulation. (Callon, 1991). They have to be treated carefully regarding their relationship with intermediaries. Callon adds that they are any entity able to associate texts, human beings, non-humans objects and money. They may be collective or individual sets of entities that assume some authority in enacting intermediaries. Callon explains that the limit between intermediaries and actors is blurring and suggests that their division is purely practical. Actors are entities, which take the last generation of intermediaries and transform them by creating the next generation. This view, applied to Web 2.0 analysis, invites us to stress the importance of decoding what elements are intermediaries and what others are actors. The growing role of users in the content production process raises questions about the place they have to take in the descriptions and definitions.

ANT's theoretical position considers reality as made up of the effects of patterned networks that take a material form, thanks to intermediaries and actors (Law, 1992). Then, *all groups, actors and intermediaries describe networks and define other groups, actors and intermediaries, together with the relationships that bring these together.* (Callon, 1991, p. 142). Latour suggests tracing the associations when he claims for a redefinition of Sociology. He promotes it as a Science that studies the type of connections between things that are not social rather than a Science that studies things among other things (Latour, 2005, p. 4). He argues that the observation of the social can only be achieved by *tracking the traces* it leaves when an association is being produced between elements (Latour 2005, p. 8). This suggests considering the conceptualization of Web 2.0 as a *track for the traces its leaves* in definitions. This track is the methodological basis of this paper.

Web 2.0 and ANT: making the step

This short introduction to the Actor-Network Theory has highlighted the tools of my analysisⁱⁱ of Web 2.0 definitions and descriptions. On the one hand, I argue that combining the notions of simplification and punctualization, provides a relevant framework to tackle Web 2.0. The term covers a too complex and too diverse phenomenon (formats, tools, usages, look and feel, etc.) The black-box effect of ANT frame appears to be a crucial analytical tool. On the other hand, for the purpose of this analysis, it will be necessary to deconstruct the components and dimensions of Web 2.0. This is where the ANT's triptych - actors, intermediaries and networks - comes in handy. This paper takes then the opportunity to propose an analysis of a collection of descriptions and definitions of Web 2.0, based on the alternative call of these theoretical tools.

ⁱⁱ I follow Callon's description of its elements as a set of analytical tools for exploring the mechanisms by which heterogeneous activities are brought into a relationship with one another (1991, p. 133).

Toward a conceptual analysis of Web 2.0

A concept is a theoretical construct that aims to rely on an observed reality (Quivy & Van Campenhout, 2006). When faced with complexity, concepts need to be decomposed as a set of dimensions. Each dimension is formed by components, which themselves, need to be observed through indicators (2006, p. 115). This approach is crucial, as it supports the use of the analytical tools of ANT.

The analysis of Web 2.0 definitions and descriptions has been achieved through a funnel-shaped methodology. Starting from a collection as large as possible of any details, indicators, traces of what authors, academic or not, have used to describe their understanding of Web 2.0. Step by step, this analysis proposes extracting the core ideas. First, a set of definitions has been collected from both the academic literature and popular discourses on the Internet. Websites, blogs, papers, books, any type of material has been considered. Regarding the huge number of results given by search engines to the request “Web 2.0 definition”, the corpus of definitions does not seek exhaustiveness. Secondly, the definitions and descriptions have been gathered in a single document.ⁱⁱⁱ For each author, the key elements of their content have been identified and decomposed. The third step consisted of organizing and linking these elements of definition and highlighting components and dimensions, according to the frame, usual typologies and structure of descriptions of ANT. A new document has been created for that purpose that aggregates definition and leads to a final conceptualization. One of the benefits of ANT’s analytical frame comes from the fact that “elements” of definitions may be use as indicators to highlight intermediaries, actors and effects following the *traces* they leave in authors’ descriptions of Web 2.0.

Uncovering the dimensions of Web 2.0

Discourse about Web 2.0 often refers to two core sources: O’Reilly (O’Reilly, 2005) and Wikipedia (see Web 2.0 entry in:Wikipedia). Who could propose a better definition of Web 2.0 than the initial creator of the phrase on the one hand and a wide community of users on the Internet on the other? The former has posted a long entry on O’Reilly Media’s website, describing what was initially meant by the phrase Web 2.0. The main interests of that initiative do not come, in my opinion, from its details as such. Personally, I think that if O’Reilly and his colleagues have pointed out lots of interesting points, it was, at that time, too early to rely on them exclusively. However, this work brings one important structuring aspect. O’Reilly explained that the concept of *web 2.0 was intended to function as a core set of principles and practices that applied to common threads and tendencies observed across many technologies* (pointed out in: Madden & Fox, 2006). It suggests a structure of Web 2.0 in three sets: *principles and practices, threads and tendencies* and

ⁱⁱⁱ Each author is identified as a single subject. The elements of the definition are then organized in levels and sub-levels of a mind map in order to structure and guide the analysis of definitions

technologies (tools)^{iv}. Described as such, O'Reilly posed them as main dimensions of Web 2.0. This may be illustrated by applying this reading grid to the Wikipedia definition:

Web 2.0 is a trend in the use of World Wide Web technology and web design that aims to facilitate creativity, information sharing, and, most notably, collaboration among users. These concepts have led to the development and evolution of web-based communities and hosted services, such as social-networking sites, wikis, blogs, and folksonomies.



Figure 1: Wikipedia entry of Web 2.0

The main observation is that every sense-making element of the formulation fit in one, and only one, dimension. Without losing the initial meaning, the typology of sets, taken from O'Reilly's work happened to be a promising analytical structure. The sets are potential dimensions for this conceptualization. This process was then applied to every definition and description collected, regardless of the background and the position of the source.

Following this approach, the initial document that gathered all elements of Web 2.0 descriptions was taken as starting point and ordered according to the dimensions. Again, most of them fit in one of the sets. The redundant elements were merged or splited carefully, and a brand new map was generated, presenting all the indicators of Web 2.0 in the dimensions. However, as such, it was not structured enough to usefully conceptualize Web2.0.

Discovering Web 2.0 components

Following Quivy and Van Campenhoudt's guidelines, the missing step of the analysis was the identification of "components". Creating additional categories of indicators in every set on the basis of traces of Web 2.0 in the corpus fulfilled this need^v. Peter Mechant has proposed a very interesting contribution to the debate about the Web 2.0 and Social Software definition, achieved through a qualitative research with international experts in the fields of e-learning, social software and Web 2.0 (Mechant, 2007). Although Mechant's approach rejects the use of the phrase *Web 2.0*, preferring *Social Software*, he proposes a conceptualization that helps the purpose of this analysis. He suggests that distinguishing different dimensions of social software is one of

^{iv} The word tools will be used rather than technologies. It is argued that the former will fit better to the typology. Its broader meaning could avoid any epistemological questions, especially related to technological determinism.

^v Some references are given as illustration of authors who have treated Web 2.0 as on particular dimension and components.

the keys *providing a framework that allows a more subtle approach* to them. His work points out to four dimensions shared, to some extent, by most social applications:

- ▶ Content management
- ▶ Communication
- ▶ Collaboration
- ▶ Community.

Whereas this typology of dimensions is relevant, I argue that the complexity of the reality covered by Web 2.0 needs dimensions on a broader level of abstraction. The references to sets, suggested earlier, intends to define a broader level of details in the collection of definitions. Therefore, Mechant's dimensions may enrich the analysis, in leading to components discovery, and should be adapted to the ongoing conceptualization. When analyzing the indicators in each dimension, three components appeared to be applied: *content management and communication*, *collaboration*, and *technology*. Here, content management and communication have been merged because they are too closely linked in indicators.

Components of the dimension "a set of tools"

- ▶ ***Content Management and Communication***: Mechant defines *content management* as the functions in social software that enable users to create and manage content for personal use or gain. In addition, I suggest adding the *Communication* dimension that he describes as the role of assistance in the exchange of information between people. I argue that according to the definitions analyzed here, splitting those components is not necessary, in regard to their close links. In this dimension, it is probably the most obvious group of indicators. It gathers all the references to online formats that are usually used to describe Web 2.0. The main formats cited by authors are weblogs, wikis, podcast (M. Boulos, Maramba, & Wheeler, 2006; K. Boulos, Maged, Wheeler, & Steve, 2007; Peek, 2005; Thomas, 2006; Beer & Burrows, 2007), file sharing and social networking platforms (Kolbitsch & Maurer, 2006; Wikipedia). Gilchrist also cites weblogs and wikis and suggest RSS as well (Gilchrist, 2007; Notess, 2005). To some extent, some authors consider instant messaging as another format (Thomas, 2006). Compared to Mechant's understanding of content management, the use of this dimension emphasizes more the creation than the management of content, which is addressed below.
- ▶ ***Collaboration***: In this set, the collaboration component is still technology driven. Anyway, its indicators have been differentiated because they cannot be considered as content publication tools. It is their *potential function of enablers of cooperation with a person or agency* that motivates their classification following Mechant's typology. The major elements here are collaborative filtering (M. Boulos et al., 2006), social bookmarking (M. Boulos et al., 2006; Gilchrist, 2007), folksonomies and tagging (M. Boulos et al., 2006; Gilchrist, 2007; Thomas, 2006; Wikipedia; Allen, Rosenbaum, & Shachaf, 2007; Beer & Burrows, 2007), mashups, social search engines and multimedia content (Picone, 2007; K. Boulos et al., 2007).
- ▶ ***Technology***: This group of indicators in definitions does not cope with any of the four dimensions in Mechant's work. This happens to be a broader component in the sense that

it brings together indicators that do not describe a unique feature but refer to more general technical settings. However they cannot be ignored or classified in another dimension. I propose *Technology* as the component that reflects the roots of Web 2.0 tools. It gathers traces in definitions that describe Web 2.0 as Internet based (Skiba, Tamas, & Robinson, 2006) (O'Reilly said *the web as platform*), transparent technology (M. Boulos et al., 2006), a next generation of web-based software and service or platform (Economist Intelligence Unit, 2007).

Components of the dimension “a set of principles and practices”

This dimension differs from the previous one as it takes a step back from the concrete aspect of indicators. Although it is widely accepted that Web 2.0 is “technology driven”, there has been rapidly a wide agreement on the fact its benefit come from the use made of these tools. Tools, as such, do not shape Web 2.0. In definitions and description of Web 2.0, authors often refer to a set of uses. It aims to highlight what are the benefits and the major applications that are made of the set of tools. This is probably where Mechant's dimensions help more the analysis: *Content Management*, coupled with *Communication*, *Collaboration* and *Community*.

- ▶ ***Content management and Communication***: Again, *content management and Communication* appears to be a useful and effective component. It brings together indicators related to practices and principles on content generation and its transformation. The major type of traces in Web 2.0 definitions refers to *User Generated Content* (see for example: Musser & O'Reilly 2006; Peek 2005; Anderson 2007; Heath & Motta 2008). Content produced under the label Web 2.0 is mainly considered as “user generated”. This indicator is often linked or referred to by phrases such as *anyone can publish* or *anytime-anywhere* (Holtz, 2006; Gilchrist, 2007). In addition, the principles of *read-write* web fits in this group (Musser & O'Reilly, 2006; MacManus, 2005). Those elements reflect either the communication or the content management aspect of the component. On a more content-oriented side, other indicators in definitions highlight an increased ability to create, manage and control information. Typically, examples of cited practices are monitoring, remixing, sharing, reusing, retargeting, structuring, etc. (Kolbitsch & Maurer, 2006; M. Boulos et al., 2006; Govekar, 2006). This component is then very important because it covers most of the major users' practices.
- ▶ ***Collaboration***: This component aims to bring together elements referring to the creation of knowledge or added value when applying Web 2.0 practices. Whereas it is still relevant at the user level, it does not fit in the dimension of trends. In the first dimension, this component gathers technical elements of collaboration. Here, collaborative practices are observed and identified as specific to Web 2.0. It is an important axis of differentiation that builds Web 2.0's specificity. Examples of such indicators are direct references to collaboration (Angrignon, Kellet, & Ralston, 2006; Beer & Burrows, 2007; Dybwad, 2005; Holtz, 2006, etc.; Maness, 2006), participation in the structure and the content (Musser & O'Reilly, 2006; Birdsall, 2007; Heath & Motta, 2008), conversation (Holtz, 2006; Angrignon et al., 2006), etc.
- ▶ ***Community***: When they focus on the interaction itself instead of the common building process of content, the indicators seem best suited in the *Community* dimension. Mechant

Jeremy Depauw - PhD Student - ULB (Belgium)

suggests a very broad understanding of community, indicating the creation and maintenance of online communities and networks. Indicators in definitions and description cover a wide scope in that component. Direct references to communities are numerous (Kolbitsch & Maurer, 2006; Angrignon et al., 2006). They are often defined by traces such as connection, interactivity (M. Boulos et al., 2006; Gilchrist, 2007 etc.), passion, or self-regulation. As direct corollaries of the Community, crowd sourcing (P. Anderson, 2007; Wikipedia), informed leadership, cumulative learning and collective intelligence are highlighted (Angrignon et al., 2006).

Components of the dimension “a set of threads and tendencies”

This dimension is quite important but also not easy to handle. It gives Web 2.0 its importance as a trend and confirms the need for a theoretically grounded concept. Authors do not hesitate to pose Web 2.0 on an even broader scale than tools and practices. Some describe it as an online trend or as a state of mind, an attitude (Birdsall, 2007) or even as a philosophy (Hoegg, Martignoni, Meckel, & Stanoevska-Slabeva). It is considered as powerful, cheap, fast and developing at an incredible change of scale (Angrignon et al., 2006). Others see it as the main engine of a major shift in the informational landscape (Kolbitsch & Maurer, 2006; McAfee, 2008; Thomas, 2006) or even as a social movement (Birdsall, 2007; Le Deuff), able to realize a logic that was not achieved during the previous ages of the Internet. No matter the exaggerated enthusiasm that sometimes appears, Web 2.0 as a trend has to be taken into account. Again, applying the same typology of components is helpful for the understanding and analysis of indicators.

- ▶ **Content Management and Communication:** This component is made up of indicators that highlight further its consequences on a wide level of abstraction. It offers the opportunity to reveal important indicators. When discussing its impact on content and communication, authors describe Web 2.0 as open (Safran et al.), dynamic (Maness, 2006), easy to use (McAfee, 2008) and media intensive (Skiba et al., 2006). It is assumed to require a low level of technical skills; anyone can publish and access content anytime anywhere (K. Boulos et al., 2007; Holtz, 2006). In doing so, it offers opportunities such as bottom-up communication (Kolbitsch & Maurer, 2006), allowed by a drastic reduction of the boundaries between consumer and producer of information (Picone, 2007). Content publishing logic overcomes webpage creation and the quantity of data increases drastically (T. Anderson, 2006; Peek, 2005), which implies major shifts in practices and requirement for all kind of stakeholders.
- ▶ **Collaboration:** When describing Web 2.0 as a trend, definitions highlight collaboration as a major outcome. More than a set of practices or principles, it is pointed out in order to explain and support important attributes. Even if sometimes users compete (Allen et al., 2007), Web 2.0 is described as easily (M. Boulos et al., 2006) collaborative (Angrignon et al., 2006; Govekar, 2006; Holtz, 2006; Maness, 2006; etc.) and profitable (Skiba et al., 2006). Knowledge created by the community is larger and stronger than the sum of the individuals' knowledge because they cooperate.
- ▶ **Community:** Linked to the previous components, *Community* is a useful vantage point to gather indicators that highlight the social aspect that Web 2.0 may involve when it is

described on the tendency level. Sometimes compared to an ant colony (Kolbitsch & Maurer, 2006), it takes its legitimacy and regulation from the wisdom (Gilchrist, 2007) and power of crowds (P. Anderson, 2007). In addition, traces in definition indicate that the Web 2.0 is user centric (Birdsall, 2007; Musser & O'Reilly, 2006) and may be easily personalized so it makes computing social (Holtz, 2006; MacManus, 2005; Musser & O'Reilly, 2006; Skiba et al., 2006).

Designing Web 2.0 as a concept

The funnel-shaped analysis achieved so far provides a analytical vision of what definitions and descriptions may cover. However it has to be considered as more than just a compilation. Back to the toolbox identified earlier by Actor-Network Theory's framework^{vi}, I see an opportunity to strengthen the theoretical value of this attempt. As a reminder, the simplification process consists of the fact of reducing a complex network to some of its effects. It is according to this that Web 2.0 was posed as a "black box" concept that needed to be analyzed. It justified the collection of definitions as raw material. In the analysis process, punctualization has revealed itself to be very useful for handling the wide scope of inputs brought by indicators. Again, the complexity of the reality covered by Web 2.0 as a concept is so large that it could not have been possible to deconstruct every element of the definitions. This prevented me from defining every single indicator. A closer look at the compilation of indicators laid out in this paper highlights the dimensions of Web 2.0, from a low to a high level of abstraction. Again, this has been influenced by the use of ANT's toolbox. The first two sets are based on relatively non-problematic elements. Either the set of tools or the set of practices have been analyzed thanks to the simplification process. The large amount of indicators has been reduced to a minimal amount of their effects, allowing them to be analyzed. In addition, the third set has also been enriched by the benefits of punctualization. Here, this process allowed me to take the effects of the first dimensions for granted and effectively analyze this meta-level.

Yet, a major aspect of the conceptualization is still missing. What are the actual relations between the dimensions? The triptych elaborated briefly in this paper might fill in the gap (Callon, 1991). To sum up, this theoretical tool, as Callon presented it, allows me to define *networks* (observed object) as effects initiated by interacting *actors*, mobilizing *intermediaries*. By the time Web 2.0 concept is considered as the analyzed network (Techno-economic network would have said Callon), its definition could be structured as such: *a black box, a network, that shapes the effects of interacting actors and intermediaries*. O'Reilly's typology of "sets" has the merit of proposing an analytical view of the concept that distinguishes the level of detail and the vantage point from which it will be addressed^{vii}. I argue that the conceptualization of Web 2.0 may be finalized by applying explicitly the ANT's triptych.

vi Simplification (black box) and punctualization processes to cope with the complexity of the observed reality. ANT's triptych: intermediaries, agents and networks.

vii Whereas Peter Mechant built a very complete insight to the concept, the dimensions he proposed were too transversal to structure completely the concept. Nevertheless, as components, they appeared as useful and valuable.

The *set of tools* dimension is the more concrete and refers to actual technologies, formats, tools, gadgets, etc. The indicators here are intended to explain the technical architecture and content production process in general, regardless of the implication for the users or the field. I suggest then that this set of tools is also *a set of intermediaries*. Indeed, they *order and form the medium of the network they describe*. As elaborated earlier in this paper, either text or technical artifacts may be considered as intermediaries and this is precisely the central focus of indicators in this dimension.

The *set of principles and practices* dimension takes some steps back and considers less tangible aspects, according to the indicators identified in it. By pointing to actual practices on content (transformation, sharing, etc.) and interaction either on collaboration or on community driven intentions, this dimension put the user at the centre of attention. From user to actor there is a small step that I propose to take. Therefore this set is also *the realm of actors*. Actors *define one another by means of the intermediaries they put into circulation*, this dimension gather elements of definition that precisely overtakes the description of intermediaries and poses entities, human or not, that assume authority in activating intermediaries. Again, it is important to bear in mind that the boundary between intermediaries and actors is thin. In the set of principles and practices, the indicators point out precisely to entities that create new generations of intermediaries from the previous ones. However, any indicator of that dimension has not to be considered as an *actor*. As Callon explains, the difference is blurred and differentiating them has only practical incidence.

The *set of threads and tendencies* dimension poses Web 2.0 as more than a technical or practical phenomenon. Indicators emphasize the impact of the previous dimension on a broader scale and refer to Web 2.0 explicitly as an object. It is then characterized and qualified in such definitions. The black box-like approach invites me to suggest that the third dimension describes Web 2.0 as *a set of effects*. This proposition is supported by the fact that, in order to cover those aspects and characteristics, authors take most of the other dimensions for granted. It is also when defining the concept at that level of abstraction that the discussions are more challenging, and sometimes divergent.

By the time the three dimensions may be considered as an element of the triptych, I suggest that its structure from the ANT point of view may be applied too, copying the links of the triptych to each dimension. Note that contrary to the order I choose to change in the methodic presentation of dimensions in this analysis, the initial order, used by O'Reilly, has been restored as it fit perfectly with the conceptualization proposed.

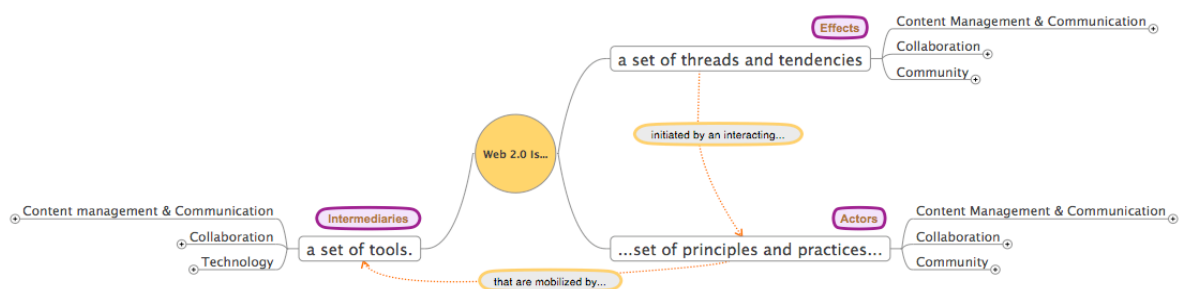


Figure 2: Web 2.0 - concept applying links between dimensions
 Jeremy Depauw - PhD Student - ULB (Belgium)

Providing an innovative vantage point

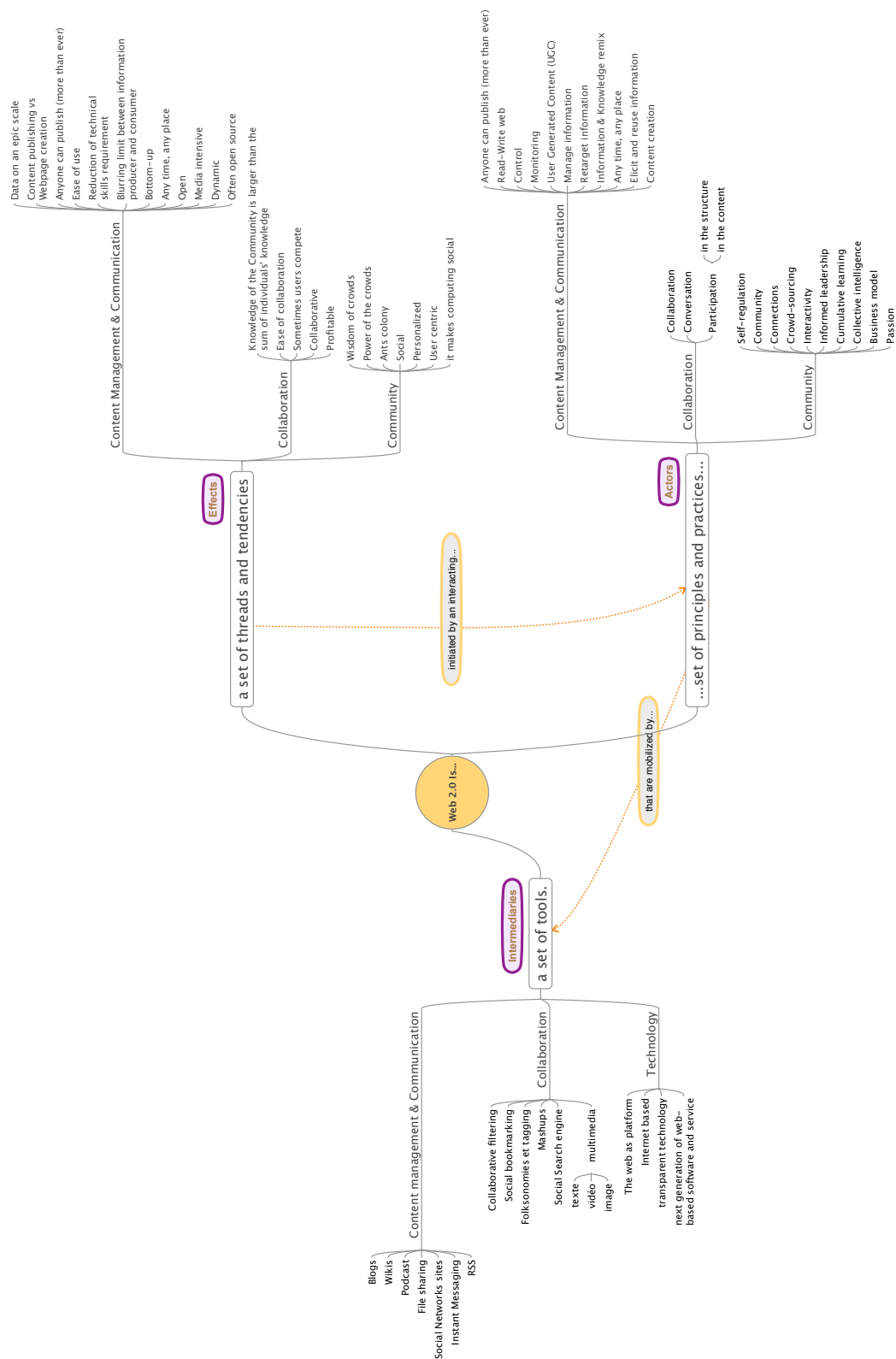


Figure 3: Web 2.0 - Full concept.
Jeremy Depauw - PhD Student - ULB (Belgium)

Web 2.0 is a set of threads and tendencies, initiated by a set of principles and practices that are mobilized through a set of tools.

Short of providing a waterproof definition of Web 2.0, this analysis offers a framework to guide and structure consideration about Web 2.0, user generated content, and related topics. I think that not all the dimensions and the components of Web 2.0 always need to be addressed. The extent to which it will be investigated depends on the field, the subject, the research question, the challenges, methodologies, etc. nowadays, most of the researchers are compelled to build their own framework, model and definition.

Usually this is achieved by analytical literature reviews similar to this one. I argue that by using the full model of web 2.0 (see figure 4) any subject could be positioned in the framework. The intended purpose of this approach is that the components and dimension involved can be easily highlighted and these that would not could be easily ignored. Regarding the complexity of Web 2.0 phenomenon and the wide scope of potential fields to mobilize, this seems to be quite useful to guide the literature exploration. The need for theoretical references and the level of understanding (authors, models, paradigms, etc.) is not the same when a project deals with subjects such as: *Dynamic of UGC: Case Study Lommel TV* and *Dealing with UGC: Adjusting Information managers' source selection and information quality assessment*, whereas they are, a priori, framed by the same changing context.^{viii} Once it is positioned within the framework, a researcher enjoys an overview of the main elements involved in the subject, thanks to the indicators.

This framework could also be used in mapping and positioning a set of research projects into a synthetic table. Whatever the scale (team, department, regional or international research community) this proposition could contribute to understand the complex aggregate of research dealing with Web 2.0 and its impact on society.

Finally, this framework is not accomplished and frozen in its proposed form. Its design allows elements to be added and removed if needed to cope better with the reality that the concept of Web 2.0 covers. Inspired by ANT theorists, this contribution does not neglect that there is no fixed object in the social but only object formation (Latour, 2005).

Bibliography

- Allen, J., Rosenbaum, H., & Shachaf, P. (2007). Web 2.0: A Social Informatics Perspective. Dans *Proceedings of 13th Americas Conference on Information Systems*. Keystone, CO, USA. Retrouvé Mars 12, 2008, de <http://eprints.rclis.org/archive/00012238/>.
- Anderson, P. (2007). *What is Web 2.0? Ideas, technologies and implications for education*.. , 60. JISC.
- Anderson, T. (2006). Uncertainty in action: observing information seeking within the creative processes of scholarly research. *Information Research*, 12(1), paper 283.
- Angrignon, T., Kellet, N., & Ralston, G. (2006, Août 23). Web 2.0: Stratégies and lessons for business Leaders. , 27 p. Retrouvé de <http://changethis.com/25.05.Web2.0#>.

viii Title taken from Cost 298 conference The Good, the Bad and the Unexpected, held in Moscow in May 2007

- Beer, D., & Burrows, R. (2007). Sociology and, of and in Web 2.0: Some Initial Considerations. *Sociological Research Online*, 12(5). Retrouvé Avril 2, 2008, de <http://www.socresonline.org.uk/12/5/17.html>.
- Birdsall, W. (2007). Web 2.0 as a Social Movement. *Webology*, 4(2). Retrouvé Novembre 15, 2007, de <http://www.webology.ir/2007/v4n2/a40.html>.
- Boulos, K., Maged, N., Wheeler, & Steve. (2007). The emerging Web 2.0 social software: an enabling suite of sociable technologies in health and health care education. *Health Information and Libraries Journal*, 24(1), 2-23.
- Boulos, M., Maramba, I., & Wheeler, S. (2006). Wikis, blogs and podcasts: a new generation of Web-based tools for virtual collaborative clinical practice and education. *BMC Medical Education*, 6(1), 41. doi: 10.1186/1472-6920-6-41.
- Callon, M. (1991). Techno-economic networks and irreversibility. Dans *A Sociology of Monsters: Essays on Power, Technology, and Domination*. (Routledge) (pp. 132-161). John Law.
- Dybwad, B. (2005, Septembre 29). Approaching a definition of Web 2.0. *The Social Software Blog*. Retrouvé Mars 12, 2008, de <http://socialsoftware.weblogsinc.com/2005/09/29/approaching-a-definition-of-web-2-0/>.
- Economist Intelligence Unit. (2007). *Serious Business: Web 2.0 goes corporate*. , 19 p. FAST.
- Gilchrist, A. (2007). Can Web 2.0 be Used Effectively Inside Organisations? *Bilgi Dünyası*, 8(1), 123-139.
- Govekar, J. (2006, Octobre 18). Web 2.0, retour sur une définition. *Le WebObserver*. Retrouvé Mars 12, 2008, de <http://www.zdnet.fr/blogs/2006/10/18/web-2-0-retour-sur-une-definition/>.
- Heath, T., & Motta, E. (2008). Ease of interaction plus ease of integration: Combining Web2.0 and the Semantic Web in a reviewing site. *Web Semantics: Science, Services and Agents on the World Wide Web*, 6(1), 76-83. doi: 10.1016/j.websem.2007.11.009.
- Hoegg, R., Martignoni, R., Meckel, M., & Stanoevska-Slabeva, K. Overview of business models for Web 2.0 communities. .
- Hofkirchner, W., Fuchs, C., Raffl, C., Schafranek, M., Sandoval, M., & Bichler, R. (2007). ICTs and Society: The Salzburg Approach. Towards a Theory for, about, and my means of the Information Society. *ICT&S Center Research Paper*, 3, 57 p.
- Holtz, S. (2006). Communicating in the world of Web 2.0. *Communication World*, 23(3), 24-27.
- Kolbitsch, J., & Maurer, H. (2006). The Transformation of the Web: How Emerging Communities Shape the Information we Consume. *Journal of Universal Computer Science*, 12(2), 187-213.
- Latour, B. (2005). *Reassembling the Social: An Introduction to Actor-network-theory*. , Clarendon lectures in management studies., 301. Oxford: Oxford University Press.
- Law, (1992). Notes on the theory of the actor-network: Ordering, strategy, and heterogeneity. *Systemic Practice and Action Research*, 5(4), 379-393. doi: 10.1007/BF01059830.
- Le Deuff, O. Le succès du web 2.0: histoire, techniques et controverse. .
- MacManus, R. (2005, Février 1). Web 2.0 Definition and Tagging. *ReadWriteWeb*. Retrouvé Mars 12, 2008, de http://www.readwriteweb.com/archives/web_20_definiti.php.
- Madden, M., & Fox, S. (2006). *Riding the Waves of "Web 2.0"*. , Internet Révolution., 6. Pew Internet Life Project. Retrouvé Avril 1, 2008, .
- Maness, J. M. (2006). Library 2.0 Theory: Web 2.0 and Its Implications for Libraries. *Webology*, 3(2).

- McAfee, A. (2008). Enterprise 2.0: the dawn of emergent collaboration. *MIT Sloan Management Review*, 47(3), 21-28.
- Mechant, P. (2007). A patchwork of online community-based systems: can social software be used to augment online individual social capital? Dans *Proceedings of the Good, the Bad and the Unexpected*. Moscow: Cost 298.
- Musser, J., & O'Reilly, T. (2006). *Web 2.0: Principles and best practices*. , 101. O'Reilly Radar.
- Notess, G. R. (2005). Casting the Net: Podcasting and Screencasting. *Online*, 29(6), 43.
- O'Reilly, T. (2005, Septembre 30). What Is Web 2.0: Design Patterns and Business Models for the Next Generation of Software. *O'Reilly.com*. Retrouvé Mars 6, 2008, de <http://oreillynet.com/pub/a/oreilly/tim/news/2005/09/30/what-is-web-20.html>.
- Peek, R. (2005). Web publishing 2.0. *Information Today*, 22(10), 17-18.
- Picone, I. (2007). Conceptualising Online News. Dans *Proceedings of the Good, the Bad and the Unexpected*. Moscow: Cost 298.
- Quivy, R., & Van Campenhoudt, L. (2006). *Manuel de recherche en sciences sociales*. , Psycho Sup. (3ème éd), 256. Paris: Dunod.
- Safran, C., Guetl, C., & Helic, D. The Impact of Web 2.0 on Learning at a Technical University-A usage survey. . Retrouvé Avril 7, 2008, de http://www.iicm.tugraz.at/iicm_papers/e-learn2007_csafran.pdf.
- Skiba, B., Tamas, A., & Robinson, K. (2006). Web 2.0: Hype or Reality and how will it play out? .
- Thomas, S. (2006, Août 22). Web 2.0, Library 2.0, and the future of library systems. . Adelaide. Retrouvé Décembre 17, 2007, de <http://hdl.handle.net/2440/14789>.
- Tuomi, I. (2000). Internet, Innovation, and Open Source: Actors in the Network. Dans *Proceedings of the AIR conference*. Lawrence, Kansas.
- Wikipedia. Web 2.0 - Wikipédia. *Wikipedia*. Retrouvé Mars 12, 2008, de http://fr.wikipedia.org/wiki/Web_2.0.