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A Conceptual Introduction to the Concept of Crowdsourcing in Libraries: A New Paradigm?

1.1. A rapidly growing economic model

1.1.1. *What made this new economic model possible*

Internet users are growing more and more numerous and the time that they spend surfing the Internet is growing. The online encyclopedia Wikipedia required 100 million cumulative hours to be constructed. As Clay Shirky stated on August 28, 2008 at the *Wiki-Conference NYC*, if Americans, who watch 200 billion hours of television every year, used that time for creative activities instead, they could create 2,000 projects such as Wikipedia each year instead of watching television.

During a 2011 TED conference, Luis Von Ahn[1] claimed that using only 100,000 people, humanity succeeded in building pyramids and digging the Panama Canal, and that because of the Internet and social networks, it is now possible to assemble 750 million people, for example, for a project correcting the Optical Character Recognition (OCR) such as reCAPTCHA. An amazing "reservoir of goodwill" is therefore potentially available for cultural institutions if they know how to benefit from it.

1 See: https://www.ted.com/talks/luis_von_ahn_massive_scale_online_collaboration (consulted June 23, 2016).

Participatory models came about with the development of the Web 2.0. The term was invented by DiNucci in 1999 [NGU 12] or by Dale Dougherty in 2004 [SAR 14] and popularized by Tim O'Reilly in 2005 [TRA 08]. Crowdsourcing now means that Internet users no longer have to be content with passively consuming Web content within a hierarchical, unilateral and static diffusion model (Web 1.0), but can actively participate in its development. The diffusion of information has become reciprocal, interactive and dynamic. The Internet user therefore ceases to be a consumer, a reader and a passive receptor who is content to browse, and becomes a producer, an author, an active emitter of information, a contributor who can participate in the writing and modification of content on the Web (comments, tags, wikis, social networks, etc.) and in the production of data and metadata. The authority of data has thus been moved from the server to the customer [BAI 12]. As telecommunications expert Benjamin Bayart emphasizes, if printing taught people to read, the Internet is now teaching them to write[2].

Well before Web 2.0, the invention of "self-service" which granted the consumer direct access to merchandise without the intermediary of a vendor and which was applied to libraries in the form of open access collections, was an early form of the integration of the consumer into the production process. This economic model was invented by Aristide Boucicaut in his department store "Le Bon Marché" whose slogan was "self-service, free to touch" giving customers, as described in Zola's *Au bonheur des dames* (translated into English as *The Ladies' Delight* or *The Ladies' Paradise*), the opportunity to access the merchandise actively and freely, without a shopkeeper as an intermediary, and, *in fine*, to take over part of the merchants' and store owners' jobs. Broadly speaking, production seems to have thus progressively lost the central place that it occupied in favor of consumption and the consumer society that developed after the Second World War.

Later, the "just in time" model, developed at Toyota, consisted of producing products "on demand" for the customer in order to avoid unsold stock by producing just-in-time supply in a way that is synchronized with and driven by demand. This model of "manufacturing without waste", "lean manufacturing" or "fat-free manufacturing" consists of producing only what you strictly need, with the necessary correct means, at the time when it is needed and at the least possible cost to the producer to externalize the

2 See: http://www.gameblog.fr/blogs/poufy/p_58428_l-imprimerie-aura-permis-au-peuple-de-lire-internet-lui-a-pe (consulted June 23, 2016).

decision to begin production with the consumer. This model was born from the difficulty Japanese stores had in stocking merchandise due to insufficient space and the necessity of resupplying only when stock ran out. It was also significantly inspired by the way in which supermarkets operate. In the same way, the clothing chain Zara keeps only a single month worth of inventory and thus better adapts its production to trends in the market, producing models depending on sales [SUR 04]. Advertising itself participates in the integration of the consumer into the production process. Indeed, when we view a television program or website, we produce statistics and data, or when we view advertisements, we also produce value. We can therefore talk about an economy of attention [CIT 14]. The decision to visit this or that site could therefore be likened to a vote, a vote that participates in production and revenues of the producers. This model has found its application in libraries, in on-demand digitization by participatory financing (crowdfunding) and in printing on demand, which will be addressed in this book.

Today, crowdsourcing continues the relatively old movement of integrating the consumer into the production process. It was made possible by the development of the technologies of Web 2.0. Born from a cultural evolution toward more participative and collaborative approaches, crowdsourcing was made technologically possible by Web 2.0, that is to say, the possibility of having a large number of people, who have free time available on the Web, work remotely on collective projects. It is especially inspired by the way communities of freeware developers work. By calling on a crowd of Internet users, it is possible to carry out, in very little time, tasks that previously would have been impossible to complete or even imagine, or that would have required huge amounts of time. In short, crowdsourcing "is a way to find a needle in a haystack", as Lebraty and Lobre [LEB 15] state. Sagot *et al*. [SAG 11] talk about "myriadization of divided work" and microworking. We could also talk about the "taskification" of work. Crowdsourcing has some similarities to the construction of medieval cathedrals, which required the capacity to "think big", to delegate, to organize every task and above all to mobilize a large number of people around a common vision and goal, as Levi [LEV 14] recalls. It is also, to take a more recent example, what Alfred Sloan of General Motors described as "group management", which consists of the solicitation of numerous collaborators to make the most important decisions.

We illustrate this idea with contemporary works of art in Figures 1.1 and 1.2.

Figure 1.1. *The artwork Ten Thousand Cents*[3]*. For a color version of the figure, see www.iste.co.uk/andro/libraries.zip*

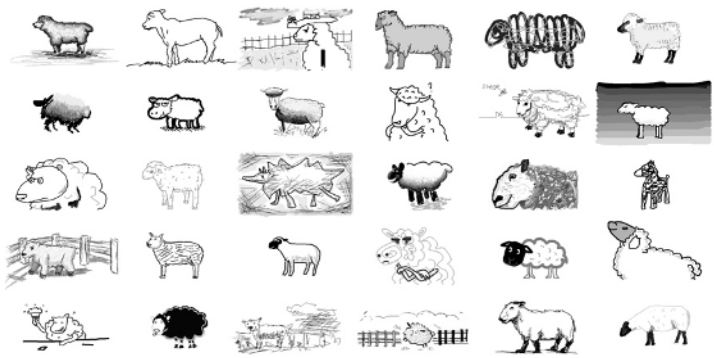

Figure 1.2. *An artwork juxtaposing sheep*[4]

In addition to art, crowdsourcing has already found applications in many areas. For example, in the field of video, YouTube and DailyMotion could not function without content posted online by Internet users. Crowdsourcing has also found applications in music, politics, fashion, banking, tourism, innovation, cartography, the search for missing planes, medicine, scientific research, publishing, translation and journalism. Using crowdsourcing is also topical in the field of GLAM (galleries, libraries, archives and museums) and digital libraries in particular, which is the subject of this book.

3 This work of contemporary art created by Aaron Koblin was produced by 1,000 people working separately, using the Amazon Mechanical Turk Marketplace (AMT), on creating a milli-inch of a $100 bill without being aware of the purpose.

4 These sheep were drawn by paid Internet users on the same AMT platform and were assembled by the artist Aaron Koblin (http://www.thesheepmarket.com).

1.1.2. *Application to digital libraries*

For libraries, digitizing and diffusing their collections on the Web means that they find themselves in the same space as their users. This situation makes possible multiple synergies and collaborations. Among cultural institutions, the amount of content that they make available on the Web has grown exponentially and there is no lack of painstaking work in indexing, describing and correcting this content. However, their budgets and their workforce have experienced an opposite trend which often leaves them sorely lacking. This state of affairs makes many goals impossible and the carrying out of other projects unimaginable without external aid. In addition, the real or virtual publics of these institutions are less and less content with the role of passive consumer of cultural information and would increasingly like to get involved in service to heritage and culture. In cultural institutions, the idea of being receptive to interaction with a participating public and volunteers largely preceded the emergence of the Web 2.0. However, the Relational Web has fostered the emergence of a participative culture on which the model of crowdsourcing in libraries feeds.

In digital libraries, crowdsourcing thus makes it possible to complete tasks that would be impossible to undertake without the help of volunteer Internet users, in the absence of financial and human means. This means, for example, to improve the quality of metadata or to enrich it (comments, tags, analyses, etc.), to benefit from the knowledge and skills of scholars, to develop communities around projects, to increase visits to the resources produced, to make the general public more aware of the conservation of common cultural heritage, to generate more interactions, innovative ideas and collaboration. For example, within the online public, there might be someone who would know how to identify a church in a photograph, a scholar could provide information about its construction and its history, an elderly villager able to identify a person in the photo, etc. The knowledge that teams of librarians have access to is much too limited to be able to respond to all of these questions. The knowledge present in the crowd of Internet users is limitless.

The British Museum understood this well when, on August 3, 2015, it published a call to Internet users on britishlibrary.typepad.co.uk with the title, “Help Us Decipher this Inscription”. Between August 3 and 18, 2015, the post had been shared almost 32, 000 times and had generated more than 11, 000 shares on Facebook and 9,000 tweets, as well as 115 comments directly on the blog between August 3 and 10.

Figure 1.3. *13th Century sword whose photograph was published by the British Library[5]. For a color version of the figure, see www.iste.co.uk/andro/libraries.zip*

In order to mobilize Internet users, cultural institutions possess solid advantages. They often already have solid experience in mobilizing volunteers and organizing contests, reading groups and events and even in the "adoption" of books whose purchase is financed by readers or patrons. Furthermore, these institutions enjoy a positive image among the public and are considered to be trustworthy to work for the general interest and whose goals are cultural, not financial. These goals are therefore likely to attract volunteers and elicit contributions.

Crowdsourcing in the service of digital libraries is also the means of turning the sometimes thankless work required of a single employee into a worthwhile activity offered to an indefinite group of volunteer Internet users and "worker bees" who would like to actively contribute to the development of the cultural Web. The documents digitized and put online are thus the object of a participative redocumentarization, a remediation making it possible for new and collaborative processing of collections of documents by calling and sometimes on testimony and memory, and sometimes on the expertise and knowledge of Internet users. The collections are thus revisited, reinvented and reimagined.

5 See: http://britishlibrary.typepad.co.uk/digitisedmanuscripts/2015/08/help-us-decipherthis-inscription.html (consulted June 23, 2016).

1.1.3. *Growing interest from politicians, Internet users and academics*

The success of crowdsourcing projects and the interest in these projects from Internet users, politicians and academic researchers, is increasing. As Sarrouy [SAR 14] reports, a 2011 study by massolutions.com estimated the crowdsourcing market at more than 300 million dollars with a growth rate of more than 75% between 2010 and 2011. In 2012, another study by [MCK 14] evaluated the gains in productivity, calculating social media and crowdsourcing platforms in consumer goods, financial services, advanced production and professional services at 25%. Finally, at the end of 2013, the Gartner firm anticipated that by 2017, more than half of producers of consumer goods will base more than 75% of their research and development on crowdsourcing. In the area of citizen science involving biodiversity alone, researchers at the University of Washington estimate that the in-kind contributions of the 1.3–2.3 million volunteers would have an economic value of more than 2.5 billion dollars.

Crowdfunding, in particular, would have been able to finance a million projects in 2012 and raise 2 billion euros [ONN 13]. Although the financing of projects by private individuals in itself is nothing new, the Internet makes it easier to do and to gives a new scope to participatory financing that already represents a market of three billion dollars worldwide in 2012 and whose growth is exponential.

By using the service Google Trends, which is to say the traces left involuntarily[6] by Internet users who perform Google searches, we also observe that, beyond politics, more and more Internet users entered the word "crowdsourcing", which has very few translations into modern languages, into the Google search engine starting in 2006, when the term was popularized by Jeff Howe. In a base 100 system, the countries whose Internet users carried out the most searches containing the word crowdsourcing are in order as follows: the Netherlands (100), Portugal (60), Germany (60), Spain (56), Singapore (55), Austria (54), Switzerland (54), the United States (48), Brazil (43) Denmark (38) and the United Kingdom (31).

6 In this case, we can talk about "implicit crowdsourcing", which means involuntary contribution, as we will see later.

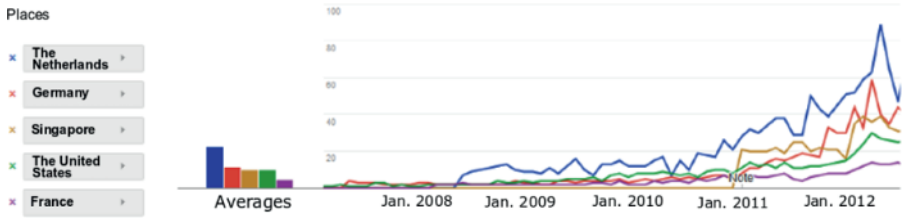

Figure 1.4. *Change in the number or searches for the word "crowdsourcing" on Google for each country, according to Google Trends. For a color version of the figure, see www.iste.co.uk/andro/libraries.zip*

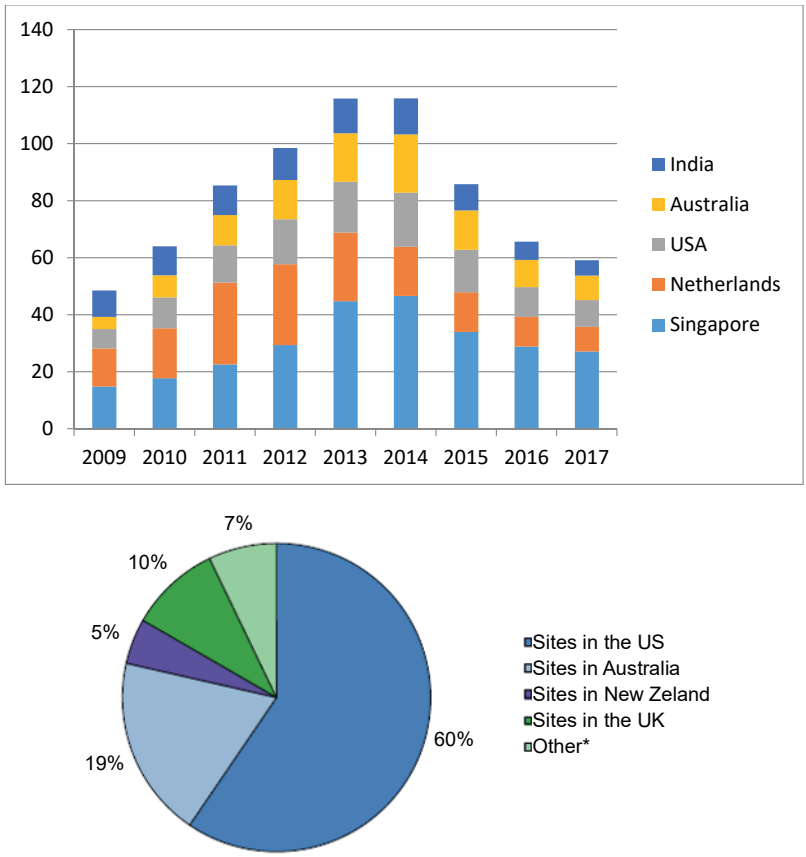

Figure 1.5. *Countries represented in the survey conducted by OCLC about social metadata, from [SMI 11]. For a color version of the figure, see www.iste.co.uk/andro/libraries.zip*

An investigation of crowdsourcing projects applied to libraries was carried out by the OCLC [SMI 11]; it showed that, among the projects studied whose leaders were sought for the investigation, 60% were American, 19% Australian, 10% English and 5% New Zealander, and only 7% were from other countries of the world.

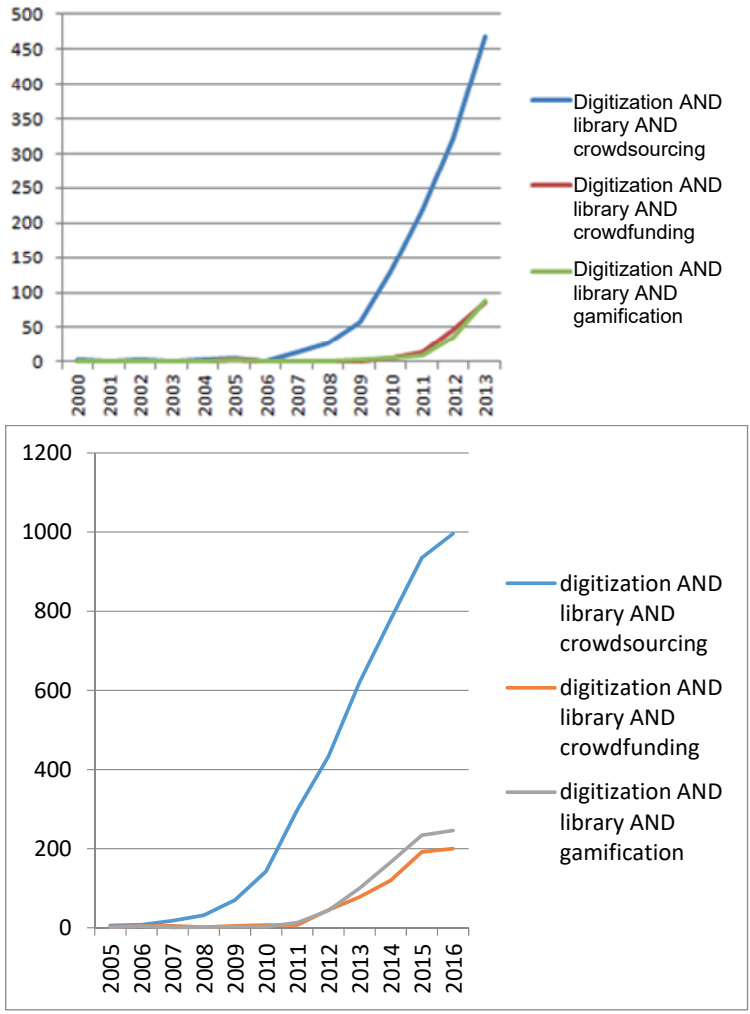

Figure 1.6. *Change in the number of publications on crowdsourcing indexed by Google Scholar applied to the digitization of libraries. For a color version of the figure, see www.iste.co.uk/andro/libraries.zip*

Crowdsourcing applied to digitization projects therefore should not be considered a purely Anglo-Saxon phenomenon.

The interest of scientific research worldwide in the phenomenon of crowdsourcing is growing, especially with regard to its applications to digitization of the heritage preserved in libraries. This statement can be supported by observing, for example, the number of articles indexed in Google Scholar about this specific subject.

1.2. Origin, definition and scope of crowdsourcing

Crowdsourcing has long been a pragmatic professional practice well before it was conceptualized and became a subject of academic research. Under these conditions, its origin, definition and scope can be difficult to establish. Before becoming a buzzword, the term "crowdsourcing" was first used by Jeff Howe in the title of an article published in *Wired Magazine* in June 2006, which was entitled "The Rise of Crowdsourcing". According to [SCH 10], the term had, however, been used by an anonymous Internet user in a forum. Other authors prefer to talk about "open work" or "fair-trade work".

In the case of digital library projects whose actual contributors are only an active minority of volunteers and cannot, in any case, be assimilated into a crowd, certain authors prefer to use the term niche sourcing or community sourcing, preferring the more specific word "community" to that of a more indeterminate "crowd". It involves not so much using the public than recruiting volunteers motivated by a spirit of collaboration, cocreation and co-construction. This idea is related to the one laid out by Jakob Nielsen[7], according to whom 80% of Internet users are passive consumers and 20% are active contributors and producers of content on the Web. According to Holly Goodier[8], these proportions would have changed since then and would now more likely be 25% of Internet users who are inactive, 45% who comment and enrich and 30% who produce content. When it comes to digital libraries, the term *community sourcing* seems the most judicious to us. We nevertheless will use the term crowdsourcing, which is more common, will make our

7 See: https://www.nngroup.com/articles/community-is-dead-long-live-mega-collaboration (consulted June 23, 2016).

8 See: www.bbc.co.uk/blogs/bbcinternet/2012/05/bbc_online_briefing_spring_2011.html (consulted June 23, 2016).

writing more intelligible and will allow us to avoid resorting to complex jargon.

The authors of [EST 12], whose work is authoritative, have sought to work specifically on the question of the definition of crowdsourcing by collecting, in the literature, the diversity of definitions that are found there. No less than 40 citations in 32 articles published between 2006 and 2011 were collected in this study that has categorized the different elements necessary for the construction of a summary definition.

Who makes up the crowd?	Amateurs.
What does the crowd do?	It voluntarily and consciously accomplishes tasks and microtasks in order to solve problems.
What does the crowd get in return?	Distraction, pleasure, the development of skills, experiences, knowledge, the sharing of knowledge, the love of a community, economic compensation, social recognition or better self-esteem.
Who initiates it?	Public or private companies.
What type of process is involved?	A production process, an economic model, participative outsourcing of a task after a request that is open to everyone.
What medium is used?	The Internet.

Table 1.1. *Multicriteria definitions of crowdsourcing*

Based on these elements, here is the definition which these authors have come up with:

> "Is a type of participative online activity in which an individual, an institution, a non-profit organization, or company proposes to a group of individuals of varying knowledge, heterogeneity, and number, via a flexible open call, the voluntary undertaking of a task. The undertaking of the task, of variable complexity and modularity, and in which the crowd should participate bringing their work, money, knowledge and/or experience, always entails mutual benefit. The user will receive the satisfaction of a given type of need, be it economic, social recognition, self-esteem, or the development of individual skills, while the crowdsourcer will obtain and utilize to their advantage

> that what the user has brought to the venture, whose form will depend on the type of activity undertaken". [EST 12]

The question of the voluntary or involuntary nature of the participation of Internet users can nevertheless be discussed. Indeed, if we believe that the contribution is necessarily voluntary as this definition asserts, we exclude the field of crowdsourcing on sites such as YouTube, OCR correction resulting from reCAPTCHA and a large part of the projects that collect contributions of Internet users in the form of games (gamification). If we recognize that this contribution is not necessarily voluntary, the scope definitely expands considerably. In every case, excluding not fully conscious forms of participation from the field would at least deserve justification, which seems difficult. Maybe it is therefore preferable, from our point of view, to speak rather of explicit crowdsourcing when the contribution of Internet users is voluntary and implicit crowdsourcing (or involuntary crowdsourcing or passive crowdsourcing) when it is not [HAR 13]. Renault [REN 14b] also considers this definition to be somewhat naive, since there are many contributors to crowdsourcing who are not aware of their contribution. Nevertheless, one could consider implicit crowdsourcing as a sort of betrayal of crowdsourcing, which was initially conceived as a means of rehumanizing the Web, and see it as revenge of the commercial Web on the power of Internet users. Indeed, with implicit crowdsourcing there is a large risk of taking advantage of citizens for the benefit of lobbies, to consider Internet users and the traces that they leave on the Web, especially with their connected devices, as simple means without connecting them to projects [LEC 13].

Schenk and Guittard [SCH 12] has also made the choice to place this form of crowdsourcing in its typology by describing it as "non-voluntary" and by establishing a parallel with the concept of positive externality. Implicit crowdsourcing could, in fact, be considered in light of the concept of positive externality (or external economy). In this way, by the traces that they leave or by their unconscious work, Internet users, as economic agents, provide an economic service that can be exploited for other agents without being compensated. Thus, Google benefits from the work of Internet users who unknowingly correct its OCRized texts by reentering reCAPTCHAs in order to prove that they are not robots so that they can create accounts on websites: just as a beekeeper benefits implicitly from the work of an arborist since the

former's bees can gather pollen from the flowers on the trees that the latter cultivates, without financial compensation, in return, the bees will also support the fertilization of the trees [MEA 52]. In the case of Google Books, the company could indeed thank its involuntary contributors or be taxed for this hidden work. However, one could equally estimate that the improvement by Internet users of the quality of the texts accessible to those Internet users for free, benefits them directly in return.

Taking all of these considerations into account, crowdsourcing can therefore be defined, after reading a representative group of publications and according to the definition that we present in Box 1.1.

Crowdsourcing is a form of outsourcing that allows the contribution of work, money (crowdfunding), skills, knowledge, intelligence, creativity or experience, through voluntary (explicit crowdsourcing) or involuntary (implicit crowdsourcing) engagement of Internet users. This outsourcing is carried out following an appeal to an individual, an institution or an organization. Internet users will gain, in exchange for their contribution, social recognition, experience, the acquisition of skills, compensation or remuneration (paid crowdsourcing). They can also act to improve self-esteem through distraction, pleasure, love for a community or disinterested altruism.

Box 1.1. *Definition of crowdsourcing*

Now that this definition has been introduced, in order to fully understand what crowdsourcing is, it seems necessary to define its scope by laying out what crowdsourcing is not. Indeed, the concept of crowdsourcing is somewhat close, for example, to that of *human computation* that evokes the possibility of having humans and their collective intelligence do tasks that computer programs are still incapable of carrying out automatically. Nevertheless, crowdsourcing is distinguished by its simpler and less sophisticated tools and tasks and by contribution rules constructed in a more collaborative way.

With crowdsourcing, the strength of the crowd resides more in the aggregate of independent ideas than in their collaboration [SZO 12]. It is therefore also distinct from collective intelligence.

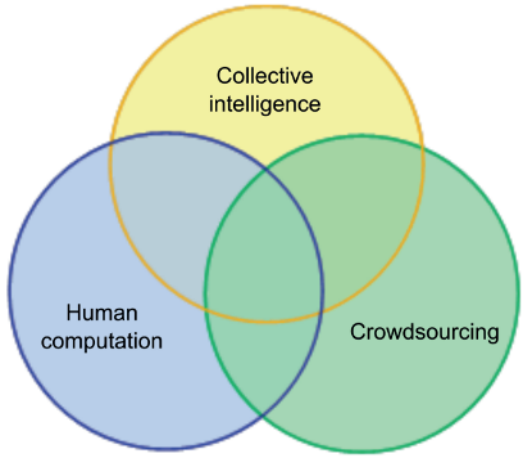

Figure 1.7. *Relationships between human computation, collective intelligence and crowdsourcing, according to [HAR 13]. For a color version of the figure, see www.iste.co.uk/andro/libraries.zip*

User innovation is a form of opening up research to Internet users. It is much more open than crowdsourcing, which is finally very circumscribed by the contribution process. It consists of collecting research ideas and innovations of Internet users, most of the time in the form of contests and calls for contributions that generally lead to compensation. The history of science is, in fact, full of innovations coming from amateurs outside the profession who are hobbyists and who, not seeking to reproduce established models with which professionals were trained, are sometimes likely to lead to innovative ruptures. MIT researcher Von Hippel, who talks about innovations through use or bottom-up innovations, estimates that 46% of companies in the United States in innovative sectors have their origins in a user. Innovation has become, because of their contribution, the result of a direct collaboration between the producers and consumers who become coproducers. In science, the phenomenon of "unexpected readers", accidental discoveries and happy coincidences (serendipity) are well known and are a good example of this phenomenon. However, crowdsourcing is also distinct from the logic of user innovations since in the latter case, the business is not always the initiator and origin of the projects and ideas from which it benefits via the suggestions of consumers. With crowdsourcing, the business remains the initiator of the projects.

Crowdsourcing is also different from *open innovation*, since unlike the latter, it is a form of outsourcing to the crowd of Internet users via Web 2.0 and not the outsourcing of innovation to other companies.

The concept of outsourcing nevertheless corresponds to that of crowdsourcing, since the approach resembles the one used within the framework of an open tender with the publicity that the request is given. It involves outsourcing certain missions not to a specific service provider, but to an undefined community of volunteer Internet users in order to be able to carry out projects or innovations that would have been impossible without them. Crowdsourcing could thus be considered simultaneously as a revised form of outsourcing, an innovative economic model and an alternative to subcontracting. However, unlike outsourcing, crowdsourcing does not require a contract between the sponsor and the service provided, as much as it involves a large and undefined number of collaborators.

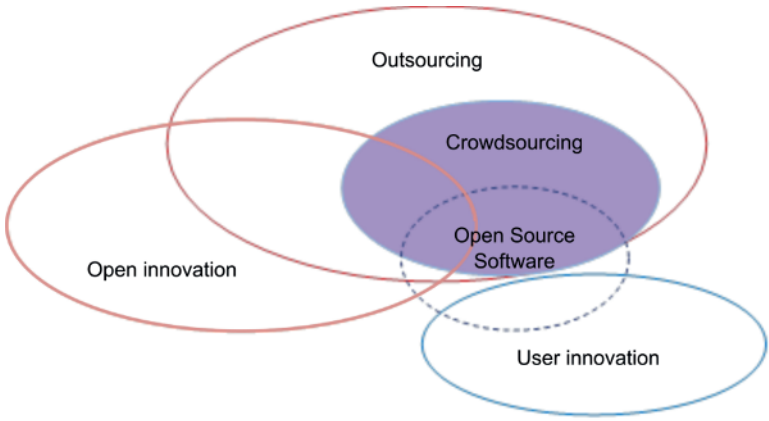

Figure 1.8. *Position of crowdsourcing among neighboring areas, according to [SCH 10]. For a color version of the figure, see www.iste.co.uk/andro/libraries.zip*

Finally, crowdsourcing could be considered the application of Open Source methods from other industries outside of software. Nevertheless, developments are not always made in an exclusively collaborative way and can also be fed by the spirit of competition. Moreover, while Open Source is based on several contributors working to satisfy the needs of several users, crowdsourcing is based on the idea that several contributors will work in the service of a single entity.

We have distinguished five large families of crowdsourcing projects applied to digital libraries and we have offered an original taxonomy containing explicit crowdsourcing, implicit crowdsourcing, gamification, paid crowdsourcing and crowdfunding.

1.2.1. *Explicit crowdsourcing: using volunteers*

If traditional explicit crowdsourcing shows the interest in collaborating with the general public and the company and in the source of opportunities through the disruptive innovations that the public can sometimes create, the market still available for this revisited use of volunteering is, nevertheless, beginning to tighten because of the multiplication of projects and the appearance of new forms of crowdsourcing. Furthermore, the benefits drawn from these projects do not always compensate for the significant investments necessary for the development of platforms, communication, recruiting, training and management of communities of volunteers.

1.2.2. *Implicit crowdsourcing: using involuntary and unconscious work*

Implicit crowdsourcing consists of having Internet users work without their being aware of it. This form of crowdsourcing has made it possible to obtain excellent results, but can pose ethical questions.

1.2.3. *Gamification: using players*

These projects, which consist of obtaining work from Internet users by having them play, can be expensive to develop and can also obtain excellent results, but the collaboration is essentially smaller with Internet users, who sometimes benefit less when it comes to personal development.

1.2.4. *Paid crowdsourcing: using microemployees*

This form of crowdsourcing popularized by the Amazon Mechanical Turk Marketplace and widely used in the United States has sometimes been criticized as a form of exploitation of work outside of any regulatory framework. However, by using this type of crowdsourcing, libraries are also

making the choice to use their budgets to benefit contributors rather than development of platforms and communications campaigns for recruiting. The Amazon marketplace has already been developed and connects public or private businesses that offer microtasks (classification, indexing, identification, transcription, correction, editing) with more than 700,000 workers already recruited from around the world and at a price that they fix voluntarily.

1.2.5. *Crowdfunding: institutional "begging"*

This form of crowdsourcing does not employ the work of volunteers, but instead uses their money. It has already been used successfully to finance projects. Participatory financing (or micropatronage or patronage on demand) is a specific form of crowdsourcing to which the contribution of Internet users is exclusively financial.

Beyond this introductory section meant to define crowdsourcing in order to better define the boundaries of this book, we will revisit the definition of crowdsourcing more thoroughly by applying it specifically to the domain of digital libraries which interests us and by producing a more detailed original taxonomy of crowdsourcing in digital libraries. These developments will find their place in Chapter 3, which is dedicated to analyses from the perspective of information and communication sciences.

1.3. Historical chronology of crowdsourcing

Crowdsourcing could be said to date back to Hugues de Saint-Cher, a Dominican in the 13th Century who coordinated numerous monks in order to index the content of holy texts [LED 15].

However, the majority of authors date the beginning of the history of crowdsourcing to the "Longitude Act" of 1714. After the accident of the English admiral Cloudesley Shovell in 1707 in the Isles of Scilly, the government decided to offer 20,000 pounds to anyone capable of determining the longitude of a ship on the open sea and avoid more accidents [DAW 11]. The famous scientists Cassini, Huygens, Halley and Newton were unable to find a solution and it was John Harrison, a carpenter and watchmaker, who won the prize from among more than a hundred competitors [LAK 13].

In 1726, an order from Louis XV required ship's captains to bring back plants and seeds from the foreign countries that they visited [BOE 12] and thus contribute to botanical research.

Several decades later, in 1758, mathematician Alexis Clairaut was able to calculate the orbit of Halley's comet by dividing the calculations tasks between three astronomers. For his part, British astronomer Nevil Maskelyne calculated, in 1750, the position of the moon for navigation at sea because of the comparison of the calculations of two astronomers who carried out the calculations two times each, which were then verified by a third party.

In 1775, Louis XVI offered a reward to whomever would make it possible to optimize the production of alkali, a chemical product. The competition was won by Nicolas Leblanc [CHA 15].

In 1794, French engineer Gaspard de Prony organized microtasks of addition and subtraction for 80 unemployed hairdressers in order to develop detailed logarithmic and trigonometric tables.

In 1850, 600 volunteers in North and South America sent meteorological data to scientists at the Smithsonian Institution using telegraphs [STE 14].

In 1852, the deparment store "Le Bon Marché", founded by Aristide Boucicaut, offered a self-service store for the first time, ancestor of today's supermarkets. Part of the producer's work is thus externalized to the consumer. The self-service model would find other applications in commerce (automatic cashiers, for example) and applications in banks (cash dispensers), hospitality (in fast food restaurants, for example, consumers are the ones who provide the service and clear the table), interior furnishings (consumers are the ones who assemble the pieces of IKEA furniture, for example), transportation, laundromats for clothing or vehicles and libraries (open access collections).

In 1857, the *Oxford English Dictionary* benefitted, following a call for volunteer contributions, from more than 6 million documents containing proposals for words and citations of use.

In 1884, the Statue of Liberty was financed following a public subscription of 125,000 people which had been started in France in 1875.

In 1893, Francis Galton, an English statistician and the father of eugenics, observed, during a competition launched at a livestock market which

involved guessing the weight of a steer, that the average estimate of the crowd was closer to the truth than the estimate of experts, implying the existence of a wisdom of crowds.

In 1894, librarian James Duff Brown allowed readers at the Clerkenwell Public Library direct access to part of its collections. Open access in libraries was born; it is the adaptation of the self-service model to libraries.

In 19th-Century France, the government sent out calls for contributions. One of them, won by Nicolas Appert, allowed for the discovery of new methods for conserving food in the form of canning.

In the 19th Century, in the field of publishing, the public subscription system was developed to finance the publication of books.

In 1900, the National Audubon Society (United States and Canada) organized an annual bird count, the "Christmas Bird Count".

In 1936, Toyota assembled 27,000 people and selected one design to become the brand's logo. Much later, the logos of Nike and Twitter, for example, would be directly inspired by consumers.

In 1938, in the United States, the Mathematical Tables Project mobilized 450 unemployed people, victims of the Great Depression led by a group of mathematicians and physicians, in order to calculate tables of mathematical functions, well before the invention of the computer.

In the 1950s, an industrial engineer at Toyota, Taiichi Ōno, invented the "just-in-time" model, ancestor of the "on-demand" model, which made it possible to produce, without stock or unsold goods, with a lean supply chain according to demand. It involved, in a sense, outsourcing the decision to produce to the consumer. This model is, in the field of libraries, the origin of digitization on demand by crowdfunding and of printing on demand.

In 1954, the first telethon in the United States was able to collect funds to fight against cerebral palsy.

In 1955, the Sydney Opera House was designed and built following a public competition that encouraged ordinary people in 32 countries to contribute to the design project.

In 1979, the Zagat Survey, a restaurant guide, based its reviews on a large group of testers. The project was bought by Google in September 2011.

In 1981, the travel guide *Lonely Planet* was written, for its third edition, in a participatory way by independent travelers.

In 1997, the rock group Marillion financed a tour in the United States using donations from its fans totaling $60,000.

In 1998, the directory Dmoz offered content generated by its users. The Web 2.0 was born.

Figure 1.9. The first form of crowdfunding.
From http://gallica.bnf.fr/ark:/12148/btv1b8509563b (consulted June 23, 2016).
For a color version of the figure, see www.iste.co.uk/andro/libraries.zip

In 2000, the philanthropic crowdfunding platform justgiving.com appeared, along with the participative financing platform artistshare.com which would be followed by multiple initiatives to this day.

On November 23, 2013, the video game *Star Citizen* collected an amount of $30,044,586.

At the end of 2005, Amazon launched the crowdsourcing platform Amazon Mechanical Turk Marketplace, making it possible to connect businesses and institutions searching for workers on the Web around microtasks.

1.4. Philosophical and political controversies

Crowdsourcing is a subject that can be the source of strong ideological divides. In the sections that follow, we have confined ourselves to reporting, in the most balanced way possible, the analyses and advantages and disadvantages pushed to the fore by this or that theorist or by this or that ideology.

The philosophical and political origin of crowdsourcing can seem very confused at first glance. This economic model seems, in fact, to be able to echo ideologies as diametrically opposed as Marxism and liberalism. However, at the end of this chapter we will see that a certain coherent synthesis between these opposites can be delineated by means of "Californian ideology".

There seems to be a relationship between crowdsourcing and socialist ideologies. Is not it for this reason, accused citizen science of Lysenkoism[9], of being affiliated with "proletarian science" and of representing a desire for popular control of science, of representing an "attempt at ideological intrusion and the taking over of part of scientific output by ideological lobbies"[10]?

The Internet users who participate in crowdsourcing projects seem, in fact, to embody the socialist motto "from each according to his or her ability,

9 Named after Trofim Lyssenko, a Russian agronomist of the 1930s who tried to apply Marxism to the natural sciences, the concept of "Lysenkoism" is usually used to refer to the intrusion of ideology into scientific research.

10 Blog post "la faucille et le labo", reported by Lipinski (2014).

to each according to his needs". Indeed, each one does his or her best to contribute to producing content according to the time, strengths and skills available to them. And the content produced will benefit everyone, those who really need it, the same as the others, and those who have contributed greatly, the same as the others. There is no proportion between what has been produced and what will be consumed. The law of value is bypassed.

Among the motivations of contributors to many crowdsourcing projects, we see the desire to sacrifice their time for the common good, the need to feel useful to a community, acting from altruism and accountability to protect cultural heritage, etc.

Certain authors, such as Jean-Pierre Gaudard in his book *La fin du salariat*, herald the disappearance of the wage-earning class. With Generation Y's arrival in the job market and in particular the development of freelance or miroentrepreneurial work, the relationship with work appears to be evolving. Engagement with the business seems to be weakening with the emergence of more workers who are more autonomous, individualist and more centered on the ego. The tension between the individual employee and the collective business seems to be increasing with the arrival of Generation Y on the job market. Digital natives are no longer invested in this collective framework; they are without attachments and no longer settle down. Often considered lawless mercenaries, they are sometimes also homeless, searching for a lost identity and suffering from a lack of recognition and difficulty finding fulfillment within the confines of a traditional business. At the same time, a "creative class" seems to be emerging. Therefore, we talk about jobcrafting, i.e. the process in which employees actively and gradually revise their job descriptions and their relationships with others [DEN 13]. The concept of work tends to disappear to the benefit of the concept of activity.

With crowdsourcing, if consumption becomes a producer of value and leisure becomes a creator of wealth, then work becomes a leisure activity. Money seems to no longer be the principal motivation of a significant crowd of amateurs who, in the positive sense, gravitate toward the domain of freeware to the detriment of motivation, self-investment and passion. On the Web, economic models based on being free also appear to predominate, suggesting the emergence of "collaborative commons" [RIF 14], of a "contributory economy" [STI 15], a sharing economy, a "participatory economy" or a "collaborative economy". According to [STI 15], with

automatization making work less and less necessary, employees, like consumers, will become contributors to the business, in other words, amateurs motivated more by their centers of interests than by their economic interests. It then becomes a question of paying them according to contributory profit sharing. Already, some businesses no longer have employees, but use external contributors or workers via Amazon Mechanical Turk Marketplace. The Internet therefore seems to be the medium for the abolition of mediation. Therefore, there are numerous websites have contested their place as intermediaries between the producer and the consumer and traditional economic actors who are comfortably established or who enjoy monopolies (taxis, rental agencies, employment agencies, etc.). We even talk about an "uberization" of the economy. More and more businesses are thus risking being supplanted by web companies with access to more competitive self-employed workers. This movement is far from being marginal. Thus, according to a PwC study published in 2014 under the title *The Sharing Economy*, the collaborative economy should go from 15 billion in 2014 to 335 billion euros in 2025.

Some peer-to-peer (P2P) theorists, such as Michel Bauwens, are of the opinion that humans can now contact each other, share data and collaborate without permission or hierarchy, each one filling in the other's gaps and that this will profoundly change our societies. According to them, P2P is therefore the socialism of the 19th Century. Vertical hierarchies were defined by power. With P2P communities, it is reputation that predominates; they function in a more horizontal manner. This reputation is measured depending on web traffic generated by the production of a particular person on the same model as the number of citations in scientific research. We can even talk about the economy of reputation insofar as reputation can be converted into money via advertisements that pay according to the web traffic generated, but also in jobs and in opportunities for partnerships.

In any event, even if it turns out to be less revolutionary than certain theorists claim, crowdsourcing constitutes "a disruptive innovation, which will therefore profoundly and permanently change the business ecosystem" [LEB 15].

By seeking to rehumanize the Internet and by restoring the central place to the human as origin and purpose of a website which must be created by humans and for humans, crowdsourcing is also unquestionably a descendant of humanist philosophers and eudemonists. Crowdsourcing uses human crowds whose capacities and intelligence remain largely superior to those of

algorithms. Faced with artificial intelligence and Big Data, crowdsourcing retains faith in human superiority. Moreover, the paid crowdsourcing project Amazon Mechanical Turk Marketplace mischievously has as its logo a very old automated chess player, which was said to have real artificial intelligence while, in reality, there was a person hidden in the mechanism. In this way, Amazon affirms that human intelligence remains unsurpassable.

Crowdsourcing is also part of the digital humanities movement; we can even talk, justifiably, about "digital humanism" following the example of Milad Doueihi, insofar as new technologies have a universal dimension and that they are the culture, since they set up a new context.

Crowdsourcing can just as well be considered a liberal, new and expansive form of outsourcing and opening of an organization to its outside environment. Indeed, in the first instance, globalization of the economy and heightened competition between businesses led industries, not recognizing any other law than that of supply and demand, to outsource to countries with low-cost labor. However, with the development of the Internet, it has now become possible to employ anyone and simply link them to the network. Crowdsourcing thus remains a form of outsourcing work on the Internet, in areas that are still limited.

On the Internet, links, clicks, comments, ratings, recommendations, visits links, etc., function like votes in a democracy. The sites that are well referenced and showcased by search engines are the sites elected by Internet users. There is a hierarchy between them since the most visible pages are the most cited, most linked to, the most commented on. PageRank could, in a sense, be considered a form of implicit crowdvoting [REN 14]. By adding, on the Web, a link to a website, the Internet user will thus unconsciously vote for the site to be better referenced by the search engine.

Crowdsourcing also extensively relies on the concept of the wisdom of crowds that is, itself, very close to the liberal concept of the invisible hand. Francis Galton, father of eugenics and cousin of Charles Darwin, noted that during a popular contest consisting of guessing the weight of a steer, the average of the participants' estimates was very close to the truth. Today we can observe, in the same way, that if we ask a lecture hall to guess the number of marbles in a bottle or the temperature of a room, the truth is very close to the average of the responses. It is for this same reason that participants in the gameshow *Who Wants to be a Millionaire?* had a much

greater chance of getting the correct answer by soliciting public opinion than by asking a friend. Drawing on this phenomenon, the Intelligence Advanced Research Projects Activity (IARPA), an American intelligence agency was launched the Good Judgement Project in order to draw benefits from the wisdom of crowds, since they are likely to better predict geopolitical events than the experts and analysts traditionally used by intelligence agencies. This project is an echo, in a way, of the adage *vox populi vox dei* and the following quote from Machiavelli, who believed that "there is a good reason that people say that the voice of the people is the voice of God. We see public opinion forecast events in such a marvelous way that we would think that the people are gifted with the occult ability of predicting and fortune and misfortune. As for the manner of judging, we rarely see them be wrong" [MAC 37].

Once again in the area of intelligence, analysis by text mining of the geographical locations co-occurring the most with the name Bin Laden showed that those places were the closest to the place where he was actually found. This does not mean that journalists knew Bin Laden's location, this means that a large amount of data can be transformed into high-quality intelligence and that where there are crowds, there is science.

From this point of view, it would therefore seem clear that there is an "invisible hand" which allows freely associated individuals to find fair and harmonious solutions without the intervention of any kind of authority, and that unimpeded private interests would be naturally beneficial to the common interest. This notion is also close to that of spontaneous order, proposed by Friedrich Hayek, namely a self-generated, self-organized order without a plan or authority, like the one that rules over the markets, but also Holacracy, a fractal organization of organically self-organized teams, or sociocracy. One could consider the participative encyclopedia Wikipedia as another spontaneous order, since it is exhaustive and structured through the autonomous and uncoordinated action of individuals, without a complete plan existing before its development. Jimmy Wales, the founder of Wikipedia, moreover cites Friedrich Hayek, in particular for his conception of the Wikipedia project. In fact, the belief in the spontaneous correction of Wikipedia articles is somewhat similar to the liberal belief in the invisible hand of the market.

Organizations that use crowdsourcing are aware of their limits. They have confidence in the capacity of crowds to spontaneously find the best solutions when they return the freedom of initiative and autonomy to the individuals who make it up.

With the development of the new economy, the difference between public and private life, volunteering and work, seems to become more confused. Employees are working more and more on transportation, at night, during the weekend, on their vacations, etc. Conversely, they also sometimes dedicate working hours to social relationships, or even to leisure with the blessing of businesses that understand that their personal fulfillment will be a source of creativity and innovation. We sometimes talk about *weisure*, using Dalton Conley's expression, a mixture of work and leisure, or *playbor* or *playbour*, a mixture of play and labor, or "intrapreneurs", that is to say people who have the spirit of initiative and enterprise but are still employees, entrepreneurs inside the business. Hierarchies have been overturned, and it is no longer management who decide and employees who act, but often the employees who are directly responsible for projects. Open innovation calls into question the social division of work [VON 05]. With Web 2.0 and particularly with crowdsourcing, the border between producers and consumers is in the process of disappearing, since consumers of information on the Web are also becoming its producers. Millions of people produce data, for pleasure, and as a result work for free for YouTube or Facebook. Others participate in the improvement of software without knowing it when they use it for free. While Facebook announced a total revenue of 2.5 billion dollars in 2013, which equals $6.81 per active user, this revenue remained above all tied to advertising and not to the resale of data. When Internet users type a search request into Google, write a tweet, add content to Facebook, write a comment about a book on Amazon, post an evaluation of an eBay seller, review the quality of a restaurant on the Internet, they produce data that have value, which will be resold by these companies, and work for them for free in exchange for the free service that the company provides for them. Fuchs [FUC 12] estimates that in this way Facebook has benefitted from 60 billion hours of unpaid labor. On the Web, people use many applications that appear to be free. In reality, in exchange for the service being free, users work to produce data without even being aware of it: when they write on Facebook, copy a CAPTCHA and even perform a search. Data production work is free from any regulation or legislation.

Therefore, instead of the participation of Internet users, crowdsourcing could so instead lead to the exploitation of the free work of users sometimes referred to as *servuction*. Thus, Petersen [PET 08] reports, in 1999, seven of the 13,000 AOL volunteers who worked for free to sustain and energize the AOL community finally received payment for their work. Later, two of them

even went so far as to submit a complaint against AOL to a federal court in New York before the inquiry was closed in 2001.

This method of working, which changes the borders between production and consumption, has been conceptualized under the term *digital labor*. It includes the implicit and invisible work of the production of data by Internet users resulting from their activities on the Web and exceeds its limits [CAR 16].

Be that as it may, in the face of the influence of certain sites earning their profits because of the unpaid work of Internet users, governments sometimes show a desire to develop a tax system around data capture. Subjecting data to taxes would make it possible to give the community a portion of the creation that it has provided in the form of "invisible work". But this work is all the more invisible because it is low intensity and difficult to recognize.

Digital labor could also be compensated in the form of individual micropayments, or in exchange for shares, in particular for crowdfunding (equity crowdfunding), or via collective taxation of data. With crowdfunding 2.0, the participants may therefore go from consumers to shareholders and start-ups sell stocks to finance their projects. A text along these lines was passed this way in the United States by the Securities and Exchange Commission (SEC). As explained on the blog InternetActu.net[11] in particular, the user could thus be recognized as a producer of data to regain control and be paid as a producer of value.

With crowdsourcing, we could go from a mode of production in which the proletariat sells its labor to the capitalist in exchange for a salary, to a participative economy in which the contributor offers his or her participation in the interests of a community of Internet users. The Amazon Mechanical Turk Marketplace, for example, following the example of other paid crowdsourcing platforms, allows an extension of freelance independent work, a new form of work: employers offering tasks on the platform and workers freely carrying them out as microentrepreneurs and outside of any rule other than the law of supply and demand in a totally open and liberal market where people freely sell and buy work from each other online. Instead of risking burnout in its employees, the employer can use this method to, in a few minutes, recruit

11 See: http://www.internetactu.net/2012/06/01/vers-un-nouveau-monde-de-donnees (consulted June 23, 2016).

crowds of workers with diverse profiles who are available all the time, usually inexpensive, accessible without other administrative steps and paid only once the work is accomplished. The employer can thus carry out tasks that were impossible to imagine before. It can, in a few minutes, recruit a workforce that is just as large and diverse as those of large businesses and mobilize them around projects.

From the point of view of workers, some are happy to be able to work when they want, when they need to, as much as they need to and for whomever they like, and to choose the activities that they will do. Others make a living, for example, on the services that they provide through Uber as drivers, or doing odd jobs or gardening on TaskRabbit. They share the goods which they own, but of which they have limited use and are focused on quality and use rather than ownership in order to lower their expenses and avoid waste due to collaborative consumption [PEU 15].

However, from an ethical point of view, the exploitation of volunteer or underpaid work and the freedom from any legislation within the framework of Amazon Mechanical Turk poses a problem that is simultaneously legal, social and even economic. It should be noted that it also involves, like all outsourcing, a form of "social dumping" and unfair competition vis-à-vis businesses or corporations. We can see that workers in the network play the role of a reserve army of industrial labor, which weighs down wages, and that Amazon's platform offers the same type of services as traditional service providers at an appreciably lower rate since it is not subject to the same regulations or to the same taxes.

With crowdsourcing, there remains a serious risk of turning human beings into a simple means to reach a commercial end, to turn them into a simple computer [SAG 11], to take away any sacred character, to see them as a simple raw material and end up in conflict with the moral philosophy of Kant who stated, "always treat others as an end and never only as a means".

Crowdsourcing can be accused of being unfair. In one case, a team participating in the Shredder challenge organized in 2011 by DARPA (Pentagon), involving reconstructing documents that had gone through a paper shredder, was the victim of vandalism, since it was considered to be using unfair methods. The team used crowdsourcing in the form of puzzles while its competitors were using computer algorithms to assemble the images. The

latter considered this method cheating compared to the algorithms that they were trying to develop, and quickly vandalized the crowdsourcing project.

As [FOR 11] emphasizes, the Amazon Mechanical Turk Marketplace is not a game or a social network but an unregulated market that pays no taxes and where workers, regarded as miroentrepreneurs, sell their labor for repetitive and unskilled tasks. They are underpaid[12], interchangeable, do not enjoy any protection and are doubly subordinate to the client and to the platform: in short, a kind of digital servitude. As [SAG 11] claims, it is probable that neither the "turkers" nor their employers declare their revenue, contribute to a social security or retirement fund and are listed in the business register. This off-the-books platform thus deprives States of lawful income and directly challenges their labor legislation. The fact of making anonymous people work without ever meeting them would encourage inhuman behaviors and exploitation of their workforce without limits or ethics. For their part, workers could also, for the same reasons as the employers, feel free from any moral obligations and develop cynical behavior [KIT 13] or fraud.

Regarding creative competitions that call upon "speculative work", i.e. work produced for free with the hope of being compensated [REN 14] by crowds of graphic designers who in the end have little chance of being to be paid, they greatly favor businesses that benefit from a much larger number of design proposals all the while having only a few individuals to compensate for a much lower overall cost than that of traditional agencies. It involves, finally, outsourced professionals rather than true amateurs. And, insofar as no contract connects the participant in the contest to the business, labor laws cannot apply; as much as it is a way of life for certain candidates, is it just a simple leisure activity for others. Crowdsourcing could also allow the renaissance of piecework and favors disengagement of the employer who would no longer be constrained to "be tied to a small number of people when one could have access to of a crowd of employees" [LEB 15].

With crowdsourcing, the consumption of free services on networks becomes a producer of data, information and value, making every aspect of social life productive, and free time and the consumption itself become production. In the same way, Guy Debord predicted "a colonization of every sphere of social existence by the authority of commodity in the organization

12 The average hourly rate would be $2, according to [KIT 13].

of the Spectacle" [SAR 14]. In the continuation of the interest centered on the consumer through the economic model of "on demand", crowdsourcing appears to be participating in carrying out this colonization, and finally this integration of the consumer into the production process as an unpaid helper. As Harald Staun laments, downtime, free time, disappeared with the arrival of commerce and the profit motive during free time. Life itself thus becomes the engine of productivity, capitalism a "biopolitical" mode of production (according to Aspe in 2013, reported by [SAR 14]). Even our deepest human relationships are susceptible to being converted into algorithms by social networks and being valued commercially. Commercial relationships are also becoming widespread since, with collaborative consumption, each owner of a consumer item becomes a merchant who can rent out its use. The difference between production and consumption, between work and leisure is being blurred; Internet users create value through the free contributions that they provide and will be able to be reused and monetized via Big Data.

As certain authors [SCH 08] claim, Web 2.0 has all of the characteristics of an ideology, a totalitarian ideology promising "better tomorrows", an ideology that does not confine itself to the public and political sphere, respects no constitutional limit to its power, but interferes all the way into the private and intimate, the dream of a society where everyone would be connected, above nations and classes and within the framework of a worldwide government: in short, a Tower of Babel. Crowdsourcing could after all also show a kinship with libertarian and antiauthoritarian ideas since it substitutes activities of a community of volunteers that self-organizes in a decentralized way, for the hierarchical and centralized leadership of employees. Sociologist Michel Lallement who has studied Californian hackers thus believes that they are prolonging the libertarian counterculture [LAL 15]. The existence of the Internet seems to show the possibility of functioning that is harmonious and without hierarchy. In the participative encyclopedia Wikipedia, for example, an article written by scientist will find itself on the same level as an article written by a college student about his favorite comic-book hero. Linux is the result of the aggregated work of thousands of programmers, working on a common project on volunteer basis, for free and in a decentralized way. Christian Quest (*OpenStreetMap*) perfectly sums up this idea: "We would never ask you to have a master's degree in geography just to add a business near your house to an existing map!" Michel Bauwens uses the term "anticredentialism" for this type of position against the monopoly of degrees and laments the fact that we cannot be as credible as a scientist without a doctorate, or as a journalist without a press pass [BAU 15]. In the same way, some

creative contests offer to graphic designers, artists, amateur publicists, beginners, without jobs and without references, to have as much chance of succeeding as an experienced professional with a job or a well-known personality and breaking into the industry more easily this way [REN 14].

The process of giving more responsibilities and power to act to the people and to the consumer, giving capacity for action to Internet users and freeing them goes back to the concept of *empowerment*. In this way, the participative science project fold.it states that its goal is for ordinary people to possibly, thanks to its puzzle game, be able to win the Nobel Prize [GOO 11].

Just as the border between production and consumption seems to disappear with crowdsourcing, the border between the authors who write and the readers who read is in the process of being gradually abolished since each one is now both reader and writer on the Web, therefore following even more Walter Benjamin's analysis (*Der Autor als Produzent*, 1934). Walter Benjamin thinks, in fact, that the emergence of new media would call into question the paradigm of the expert and that technological progress underlies political progress [DEO 14]. We could also talk about "active reading", a lack of separation between the actions of reading and writing, for example by annotating during the act of reading.

As we have seen in the preceding text, crowdsourcing is capable of appealing to Marxists as much as to liberals, for diametrically opposed reasons. As [SCH 05] remarks, for example, the ambiguity of info-communism is one of the principal resources of neo-liberal knowledge economy and can be described as simultaneously revolutionary and reactionary. It combines both the dreams of info-capitalism and those of Soviet constructivism. As Bastien Guerry also notes, "the 'leftists' of the Web are also liberals or even patriots" [BEN 14]. Elisabeth Grosdhomme Lulin also believes that "as far as ideas and doctrines are concerned, [the idea of the coproduction of a public service by its beneficiaries] has its roots as much on the left as on the right: on the left with self-managing utopias, on the right with libertarian utopias – on one side, in the wake of Pierre Joseph Proudhon, giving power back to the people, worker or citizen, to the other, following Friedrich Hayek, limiting the influence of the State on the economy and society". [GRO 13]. Rachel Botsman and Roo Rogers think, in the slide show *what is mine is yours*, that collaborative consumption responds both to socialist ideologies and capitalist ideologies without itself being an ideology. Finally, Nelson *et al*. [NEL 12] notes, for his part, that there is in the end, in all of this

confusion, a paradoxical kinship between the Soviet ideology of Socialist Emulation and the liberal American ideas of gamification. Indeed, the Stakhanovist methods intended to motivate and develop worker productivity by rewarding the best workers with points, decorations, Soviet medals, the title of "Hero of Socialist Labor" and Stalin prizes, and by organizing competitions between workshops, businesses, factories, *kolkhoz*, *sovkhoz*, districts, towns, regions and republics to develop their spirit of initiative and enterprise, is in the end not that different from competing to be named employee of the month at the symbols of American capitalism that are McDonalds restaurants, which also sometimes offer gifts. The International Amateur Scanning League, a heritage digitization project using volunteers, offers, for example, medals based on this model, according to the number of DVDs burned.

This paradoxical proximity between socialist and liberal ideas is well represented in the "Californian Ideology", which combines the hippie spirit of independence and autonomy and the Yuppie (Young Urban Professional) spirit of enterprise. Silicon Valley thus led to the emergence of libertarian ideology, liberal (*Yuppie*) and libertarian (*hippie*). Richard Barbrook [BAR 00c], the originator of the term, even believes that the Internet could be a modern form of the gift economy like sociologist Warren Hagstrom [BAR 00a, p. 504] who believed that science was also a gift economy [SUR 04]. Each contributor adds to collective knowledge and receives much more from other contributors than any one individual could provide. The scientific researcher, the developer or, more broadly, anyone who possesses information or knowledge does not lose anything by sharing it. According to [BAR 00b], Californian Ideology would nevertheless be the ideology of a kind of high-tech Nietzschean aristocracy, a kind of Jacobin elite, a cybercommunist avant-garde or of a kind of technocracy of the Web that he calls *digital literati* or *digerati*. These *digerati* are convinced that new technologies will revolutionize society. They seek to educate the masses and lead them toward modernity to create a utopian civilization, a society of information. The *digerati* would therefore be the reactionary modernists seeking to impose a renewed dictatorship of the proletariat which itself would last only the time necessary for the emergence of the new society. They are similar to Anonymous, whose slogan "we are legion" could also refer to the power of the crowds of Internet users who support crowdsourcing.

As [CAR 10] emphasizes, the Internet is the heir to the American libertarian and egalitarian counterculture and of the liberal meritocracy of

the world of research and computing. They combine the ideas of Marshall McLuhan with certain radical libertarian ideas. McLuhan thought that the medium, that is to say the intermediary between the sender of information and the receiver that can take the form of speech print, film, radio, television and today the Internet, supersedes the content of the message itself ("the medium is the message" [MCL 68, p. 404]). McLuhan is also the origin of the concept of the "global village". Cyberlibertarians, these "technofans", proponents of the "myths of techno-utopia" [CHA 13], these partisans of technological determinism and "technological solutionism", believe that technologies will inherently bring about a democratic counterculture, change society and solve social or societal problems in the same way that Marxists were waiting for the Communist paradise of the development of productive forces and the revolution that they had to inevitably bring about.

1.5. Economic, sociological and legal consequences

1.5.1. *Economy of crowdsourcing*

On the strictly economic level, crowdsourcing could represent a significant source of markets and developments. Indeed, the cumulative time spent connected to the Internet worldwide should be close to 160,000,000 hours per day. The underlying idea of crowdsourcing is that the free time spent on the Web consuming content could be used in a way that is productive for the economy. In this way, personal data on the social Web are converted into statistical information, and therefore into value. Games on the Web in particular might have educational goals (serious games) but also produce data (gamification). Regarding crowdfunding in particular, according to the article "Global Crowdfunding Volumes Rise 81% in 2012" published on August 4, 2013 in *The Huffington Post*, crowdfunding sites had raised 0.89 billion dollars in 2010, 1.47 billion dollars in 2011 and 2.66 billion dollars in 2012.

1.5.1.1. *The disappearance of necessary work?*

Technologies evolve, productivity and growth increase, and the amount of work necessary for the survival of humanity has become lower and lower. In 1982, the United States was producing 75 million tons of steel with 300,000 workers. In 2002, 100 million tons were produced by only 74,000 workers. In the service industry, it is estimated that a traditional bank today requires ten times fewer employees to manage the accounts of the same number of clients. We are producing much more with much less work.

Jeremy Rifkin thus predicted that "it would require only 5% of the adult population to operate traditional industries" and that "factories, offices and farms, without workers or nearly so, will be the norm throughout the world" [RIF 96]. The improvement of labor productivity, linked to the development of new technologies, would destroy jobs. As an example, the traditional major industries are hiring a much larger number of employees than the largest Internet companies. For example, Facebook only had 3,976 employees in September 2012 for a billion users, which adds up to 250,000 customers per employee, Twitter had 900 employees for 500 million customers, Google 54,604 employees pour 1 billion unique visitors per month in July 2012 (according to Jean-Paul Lafrance, 2013, reported by [SAR 14]).

If technologies make it possible to reduce the marginal costs of services until they are practically free and if this movement has now also reached the production of goods equipped with sensors that produce data, these are the same bases of the capitalist economy, which will collapse according to [RIF 14]. According to these theories, if humans are replaced by robots or algorithms, they will no longer have the capacity, in the absence of income, to consume what machines have produced and we will be headed toward catastrophic overproduction crises calling into question the capitalist system and its Fordist model, which precisely hoped to avoid overproduction crises by indexing salaries to gains in productivity and in this way allowing workers to consume more that they have produced.

For Michael Osborne and Carl Benedikt Frey, cited by the blog InternetActu.net, 47% of the 702 professions studied could disappear via automatization[13]. This movement obviously would affect less skilled and less creative professions more, pushing employees toward higher activities. This movement would also be accompanied by the development of volunteer and associative activities, hobbies and crowdsourcing and comforts the proponents of an unconditional base income (or "universal income" or "guaranteed minimum income" or "universal allowance") as we will see later.

At the beginning of the 19th Century, labor leader John Ludd destroyed numerous machines, and, throughout this period and up until the 20th Century, the working class contested the automatization of work and Fordism for the same reasons, without imagining that one day, the majority of workers

13 See: http://www.internetactu.net/2014/06/17/travail-et-automatisation-la-fin-du-travail-ne-touche-pas-que-les-emplois-les-moins-qualifies (consulted June 23, 2016).

would be part of the tertiary sector of services. Today, the Internet and the Uberization of the economy can provoke the same type of anxieties. The famous economist Joseph Schumpeter's theory of creative destruction might, however, lead to optimism. This theory states that in the economy, the disappearance of industries goes hand in hand with the appearance of new activities participating in the evolution of the economy.

The current revolution in production process could nevertheless not be "Schumpeterian" and could destroy more jobs than it creates. As a result, according to Wendell Wallach of Yale University, 47% of jobs in the United States could be replaced by algorithms within 10–20 years. Moreover, the giants of the Internet are hiring only a few employees, when you compare their number to the company's total revenue and the number of its clients. On these subjects, we find an analysis that is relatively balanced between growth and decrease in postindustrial society from economist Daniel Cohen [COH 15].

1.5.1.2. *Crowdsourcing, basic income and the theory of the commons*

The invisible work of Internet users could be recognized in the form of a guaranteed income in order to restore to them the value that they have produced. Some proponents of a guaranteed minimum income, which would be financed by the value-added tax and paid out unconditionally and for life to citizens, even think that this "creative contribution" would make it possible to change their relationship with free time by encouraging the creation of businesses, but also unpaid labor, volunteering and allowing them to invest their time in contributory work in the service of others in the form of crowdsourcing, for example. For this reason, Bernard Stiegler prefers to talk about "contributory income" [STI 15]. Instead of working to earn an income and worrying about losing that work, a person would have an income to be able to freely devote themselves to the activity of his or her choice. No longer motivated by vital needs, but by higher needs, this would allow individuals to be more creative and innovative and to cooperate better. This movement would respond to the destruction of jobs by automatization and would not lead to a society of unemployed people, but a society of free and dependent entrepreneurs. This income would be the conceptual equivalent to that of copyright holders who make a profit from the commercial use of their ancestor's work until 70 years after his or her death. Citizens could consider that they profit from the accumulation of knowledge built up by humanity as intangible heritage. It could be seen as an investment by the government

which allows contributors to pursue their participative work. With automatization, the evolution of work and the development of invisible volunteer work in the form of crowdsourcing, new forms of remuneration might emerge.

The concept of the commons comes from the 18th Century English countryside, which was seldom divided into separate properties and the use of which was shared among rural communities. Michel Bauwens, P2P theorist, remarks that "businesses base a portion of their economy on scarcity, which is contradictory to the logic of the commons" [BEN 14] and the work/capital contradiction is gradually being replaced by the commons/capital contradiction. These theories have, nevertheless, been criticized by the theory of the tragedy of the commons which says that free and open access to a resource fatally brings about its overexploitation and destruction. While its use is individual, its costs are collectively supported, and individual interest inevitably consumes beyond its needs. In the world of fishing, this phenomenon is demonstrated by fishermen who have an individual interest in taking as much as possible from the communal stock to the detriment of the collective interest and, in the long term, of their individual interest, once stocks of natural resources are exhausted. This inevitability requires the intervention of the State to prevent it from happening. However, in the case of digital heritage, the material is not "excludable": it is a non-rival good, the resource is not limited, its use by an individual does not prevent another individual from using it [PEU 12], sharing it does not consume it, does not threaten and does not divide up the resource, since, on the contrary, it can be multiplied indefinitely and for almost nonexistent marginal costs.

The emergence of virtual currencies such as BitCoin, created in 2009, could support crowdsourcing. These virtual currencies have, in fact, all of the characteristics of a crowd: decentralization and anonymity [LEB 15]. The Internet Archive, one of the major players in participative digitization, pays a part of its employees' salaries in the form of BitCoins. This virtual currency, convertible into dollars, makes it possible not only to transfer value from one Internet user to another and without intermediaries, but also to purchase Amazon gift certificates and consumer goods in certain marketplaces.

On May 1, 2013, already close to 300,000 BTC were in circulation at the unit price of 94.80 €. On March 13, 2013, the BTC was selling at $47 and in 2012 at only $4.93 (see: mtgox.com).

1.5.1.3. *The amateur, new motor of the economy and development?*

In the 17th and 18th centuries, the term *amateur* referred to those who could be elected to the Royal Academy of Painting without actually being painters, because of their passion for art. Today, it refers to people who act only out of love for a particular discipline, but it is also used pejoratively to discredit contributors for their lack of professionalism, also referred to as amateurism.

The figure of the amateur appears to be divided into two distinct types: one which will organize his or her professional and social life around a passion such that they do not impede it or even agree with it to the point of professionalizing it. This amateur regards the activity as sealed off from his or her professional and social life, even going so far as to sometimes do the activity in secret, hidden from familial or professional relations. There are both extroverted amateurs, who desire social recognition and follow a logic of networks, and introverted amateurs, who act more like selfless volunteers and respond to a sense of community.

With the development of crowdsourcing, we could move from a model of innovation, as described by Joseph Schumpeter, going from active producer toward the passive consumer, business being at the forefront of modernization and seeking to change users, to a model of innovation centered on active users who take their ideas back to the businesses that inspire them. The separation between production and consumption thus seems to be disappearing gradually. Users no longer want to be passive consumers and believe that a person does not really own something if they cannot open it up; they want to act and gather together in more and more in collaborative networks, they exchange, tinker and improve consumer goods through DIY (do it yourself), innovate and influence businesses without expecting anything from them in return other than the satisfaction of seeing their ideas come to fruition. They are all developing a “maker” culture. In the scientific field, we encounter, for example, a “garage biology”, supported mainly by the association DIYbio (do-it-yourself biology). This type of association opens science and its means to amateurs. Innovation becomes the result of collaboration between producers and consumers who become its coproducers and coauthors.

As a result, according to Eric Von Hippel who talks about user-centered innovations, innovations through use or bottom-up innovations, 46% of American businesses in innovative sectors originated with a user: most of the

time, a young person with a degree who benefits from a technical culture [VON 11] and who cannot find the service or the product which he or she needs on the market, since traditional companies are still not organized for custom manufacturing or ready to risk investment in the face of uncertain demand. This enthusiast is usually ready to invest time and money to develop, to build rather than to buy, to produce rather than consume and is ready to share his or her discoveries for free. He or she has access to more and more advanced computer science and technologies and the production of a prototype is less and less expensive. The skateboard was invented by consumers in this way, and 80% of innovations in scientific instruments were developed by users and we no longer count developments, which are the fruit of users in the world of freeware [VON 05]. In the area of libraries, the LMS and OPAC functions produced by service providers have therefore largely been inspired by clubs of users made up of librarians, as Von Hippel always points out. Generally, lead users tinker with a product for their needs, this product is adopted, copied and improved by other consumers and the success is such that businesses have ended up becoming interested. Well beyond traditional market research, businesses would therefore have every interest in anticipating and collaborating with these lead users by offering them toolboxes, forums, social networks and platforms. According to [VON 11], consumer–innovators still only represent 6.1% of the population aged over 18 in the United Kingdom, 5.2% in the United States and 3.7% in Japan.

With the development of freeware in particular, users are being recognized more and more as a possible source of innovations. The company Dell, for example, has launched the side site Ideastorm and has collected more than 10,000 proposals for ideas for improving its products and services. With its Techshop project, fully open to the ideas of consumers, the company Ford has increased its filing of patents by 30%.

By comparing the ideas that come from professionals with those coming from users, Poetz and Schreier [POE 12] unsurprisingly report that, according to his study, the ideas from users would be more innovative (average grade of 2.6 versus 2.12) and more advantageous for consumers (average grade of 1.86 versus 2.44), but also somewhat low in terms of feasibility, as the ideas of professionals have a tendency to be much easier to carry out (average grade of 4.33 versus 3.91).

The history of science is moreover full of inventions coming from people outside of the field who are not seeking to reproduce the established models

with which they were trained and who are likely to cause innovative ruptures. In the new economy, it in fact seems that businesses need to increasingly connect to external ideas and energies and integrate the consumer into the production process [LIG 12].

Crowdsourcing makes it possible to create an ecosystem of innovation by having people with very different skills and backgrounds work on common projects with the help of new technologies.

1.5.2. *The users of crowdsourcing*

Crowdsourcers, clickworkers and other "web proletarians" are sometimes compared to "Oompa-loompas", a tribe that works by having fun for the chocolate maker Willy Wonka in exchange for chocolate in Roald Dahl's novel, *Charlie and the Chocolate Factory* [REN 14]. Do all these workers constitute a socioprofessional category or even a social class? Will we see the emergence of a class of *prosumers* or *produsers*, that is to say, a class of individuals who are both producers and consumers–users of their own products, more tied to the shared use of goods than to their private appropriation, as Jeremy Rifkin predicts?

The emergence of Generation Y or *digital natives* in business could also have an influence on the development of crowdsourcing. This generation is overturning hierarchies, authorities and frames of reference; its culture is more open and participative. It is therefore probable that it will be more open to crowdsourcing, as shown in figure 1.10, which shows the percentage of contributors to Wikipedia by birth year.

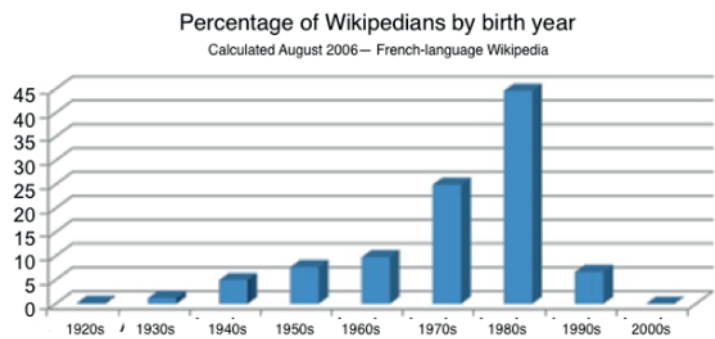

Figure 1.10. *Percentage of Wikipedians by birthdate, according to Wikipedia*

Younger generations have a tendency to build their identity through their participation on the Web, for example, writing blogs, setting up or participating in fan forums. Amateurism and crowdsourcing could be a way for them to cultivate their e-reputations and showcase their participation in cultural projects: participation which could also be beneficial for their resumes and job search.

However, older generations can also be involved in crowdsourcing. Although the Beuth Hochschule Für Technik's [BEU 14] report shows that 26% of Wikipedians are between 22 and 26 years old, it also indicates that 28% of them are over 40 years of age and that 36% of this older category is some of the most active. In fact, many are retirees who have significant free time available and are already somewhat active in organizations and volunteering and, when it comes to crowdfunding, they have more available capital than the generations preceding them, who often need to pay off loans and less often have access to real estate income and financial investments.

The free time that all of these categories of populations have is a formidable reservoir of goodwill for crowdsourcing. Each minute, 35 hours of video are put on YouTube in this way, and each hour 38,400 photos are posted on Flickr, according to the report "Crowdsourcing in the cultural heritage domain: opportunities and challenges"; [PAR 13] mentions the figure of 72 hours of video, uploaded to YouTube each minute and 2,500 photos on Flickr.

The theory of communities is a conceptual framework that can be enlisted in order to analyze crowdsourcing from a sociological perspective. An online community or a virtual community of practice is a relatively homogeneous group of Internet users who work together for the benefit of a common undertaking in a relatively self-organized and informal way, who help each other in order to resolve practical problems in the form of mutual commitment and who share a repertory, i.e. a heritage of information [WEN 98]. The virtual community is generally built around a solid core of active members. A culture of community is likely to develop with a common identity, shared references and implicit rules. This culture is transmitted to novices by leaders or by senior members of the group [DAE 09]. When this community is more heterogeneous, is more creative, produces new knowledge recognized, is considered authoritative in the scientific community and wants to ensure that this knowledge consists not just of improving practice, but that it is "usable knowledge" [MEY 11], that is to say, having an influence on public policy,

we instead talk about epistemic communities [MIL 11]. A community of practice can gradually transform into an epistemic community [LIE 14a]. The type of community will obviously be variable depending on the type of crowdsourcing present. Epistemic communities are found, nevertheless, more within the scope of citizen science or Wikipedia than in the digital libraries projects that we have identified.

1.6. Managerial, library science and technological consequences

1.6.1. *The cultural factor*

Very broadly speaking, in Anglo-Saxon culture, the sharing of information by communities of interest is relatively natural. This is still not always the case in Latin or African institutions, for example. The latter would have to go through a major cultural change in order to adapt to these new models.

Meanwhile, it seems clear that the cultural factor is important in the adoption of crowdsourcing [EST 15]. Moirez [MOI 13c] notes, for example, that Web 2.0 projects and in particular, crowdsourcing projects in libraries, for example, are more successful in Anglo-Saxon countries due to cultural differences. Bœuf *et al*. [BOE 12] notice the same difficulty in developing citizen science in Latin countries due to lower involvement of individuals from Latin culture compared to individuals from Anglo-Saxon cultures in collective life and due to a larger distrust, a fear of being taken advantage of or of working on a useless project.

1.6.2. *The corporatist factor*

Libraries have gradually seen storekeepers challenged with the development of open access, catalogers called into question with the development of shared cataloguing on a worldwide scale, and finally, reassessment of acquisitions with the development of electronic periodicals followed by e-books. As Clémence Just reported in *Archimag* on July 21, 2015, researchers at Oxford University estimated the probability that the profession of librarian would be automated soon at 64.9%.

Libraries sometimes remain distant from the world of business and their managers often consider public interest to be more ethical than the profit motive. Crowdsourcing could therefore be considered a form of privatization or as a renewed and alternative public/private partnership [MCS 11].

It could be difficult for the profession of librarian to experience challenges to its monopoly. Libraries are no longer the inescapable intermediary between information and the public. This feeling, which is never clearly expressed, is similar to the feelings of gatekeepers, the guardians of the established cultural and political order, described by Cardon [CAR 10]. According to this researcher, the media seeks to retain its privileges, control and monopoly on access to information by a people considered insufficiently responsible and enlightened to form an opinion independently. The Internet is therefore, for them, a threat to the vertical and monopolistic model of diffusion of information that they have created and a challenge to their authority. The information which was produced by some (including authors, journalists, editors and librarians) in the Web 1.0 is now produced by the multitude with the Web 2.0.

For a cultural institution such as a library, agreeing to open up its indexing, its cataloging, its choice of which documents to digitize to amateurs requires a major cultural evolution[14]. It involves, in fact to going from a policy of supply centered on collections and the activities of librarians to a policy of demand centered on services, the needs and activities of users then directly activated and driven by the initiative of the individual user themselves and which corresponds well to "on demand" models. The user thus becomes a central actor in the digitization policies of libraries, hitherto reserved for its professionals [KLO 14]. According to this point of view, as depositories of printed heritage, libraries should become actors in the development of heritage that includes Internet users.

For professionals, the setting up of a crowdsourcing approach in a cultural institution can nevertheless, justifiably, be felt as devaluing the work of curators and documentalists, which could lose value since they can be done for free and by anyone. This change therefore requires a significant investment in change management and in internal communication. As Ben Brumfield reports on his blog, manuscripttranscription.blogspot.fr, as part of the Manuscript Fragments Project developed by Harry Ransom Center, close to 20% of comments (around transcription of sources or the identification of fragments) received about medieval manuscripts came from professionals, but these all preferred to send e-mails rather than contribute directly online.

14 It nevertheless remains important that institutions be guardians of permanent references and it is certainly possible to create hybrid information systems that make it possible to add to permanent references without modifying them.

This can probably be explained by the necessity of preserving their reputation and the fear of putting their contribution at the same level as that of the layman and to see their skills discussed by them or their authority shared with them. Crowdsourcing is generally seen by professionals as a simultaneous loss of control over the choice of documents which will be digitized (in particular with digitization on demand) and the way in which the cultural material will be exhibited and used and, at the same time as an inescapable commitment to contributors, the results of their work having to be accessible permanently.

Nevertheless, the involvement of private amateurs can, in certain subjects, provide contributions for the benefit of public institutions and usefully complete the work of professionals whose workforces, means and knowledge remain limited despite all good intentions. Thanks to crowdsourcing, libraries can draw from an unlimited crowd of Internet users which can contain real specialists in a particular subject who know the content and the interest of a particular book much better.

Crowdsourcing is a more user-centric model. Successor to the Web 2.0, it is more interactive and reciprocal and less hierarchical than top-down models of diffusion of knowledge. Nevertheless, certain institutions are still sometimes not sufficiently centered on their users and remain focused on supply. They can sometimes not worry enough about demand. Yet, as [LEV 14] mentions, cultural institutions could from now on concentrate on the aggregation and delivery of digitized heritage while Internet users could take care of the enrichment of metadata. This would involve a cultural revolution in the profession, since archivists privilege collections and their meticulous description compared to their users. It would involve, on the contrary, favoring user access to content, even if it has not been described yet, and it would be free of charge. Nguyen *et al*. [NGU 12] thus invite librarians to give more power to their readers to encourage their participation and to develop a true culture of participation.

With crowdsourcing, if the Internet user becomes a librarian, the librarian and the library curator could feel brought down to the level of Internet users. Yet, certain companies are based on the aristocratic idea of election or delegation. Each domain has its specialists, its experts whose legitimacy and authority might now be called into question. The profession of curators and librarians could not be an exception and crowdsourcing could be the name

given to their challenge by the mass of anonymous and sometimes incompetent Internet users: the name given to their "Uberization".

1.6.3. *The reign of the amateur: toward mediocracy?*

Loss of monopoly, of control, of power; the risk of low quality, malicious intent, vulnerability to *lobbies* and ideologies; risk of non-representative minorities taking control, questioning professional expertise; loss of responsibilities, etc. There is no lack of reasons to oppose the coming rapid expansion of crowdsourcing in libraries.

Indeed, professionals and experts who have produced metadata within a formal framework that is institutionalized and collective and recognizes risks may not favor diffusion on the Web leading to participative redocumentarization. This can be synonymous with personal and individual appropriation of collective heritage by a handful of Internet users who feel authorized to leave their traces, to tag, or to add their profane, informal, personal, intimate, banal, average, trivial and mediocre points of view.

The comments on the images are often ones like "Excellent", "Superb", "WOW!" "Great!", "Perfect!", etc. [LIE 14b] and are, consequently, completely unusable.

The term "amateur" itself is ambivalent. It can refer to both someone who loves something or a non-professional who does a bad job. The amateur is an enthusiast who dedicates a large part of his or her time to the passion and who does not look for any compensation other than recognition. Fundamentally, what distinguishes the professional from the amateur is the knowledge of the methodologies and standards for cataloguing and bibliographic descriptions, the rules for indexing or diplomatic transcription, TEI or EAD encoding standards, etc. Allowing access to this knowledge by the layman and neophyte could end up devaluing these skills and expose the fact that this knowledge is not based on any specific science, but on a group of rules that can also be partially arbitrary. By accepting that amateurs are capable of acquiring their knowledge, professionals might however convert amateurs into semiprofessionals and therefore into defenders of their professional interests.

As Rose Holey emphasizes, when libraries were still only offering their users printed documents, readers already enjoyed interacting with the

reference librarian or with other readers and shared documents, but it was not possible for them to annotate a book under penalty of exclusion. When libraries went from printed books to electronic libraries, readers need to be able to not only be only simple consumers of information, but also be producers and above all collaborators for information professionals. Thus, they can now add a summary of the book or article that they have read; share it with their social networks; add information, metadata, comments, annotations; correct errors in metadata; converse with other users and even organize collaborative work with them. Amateurs and professionals can now collaborate, as much as amateurs who collaborate can acquire a high level of expertise rather quickly. By agreeing to use these crowds of amateurs, libraries might then be able to find more easily an expert on a particular subject within reduced teams of curators [HUV 08]. In any case, crowdsourcing already has a huge advantage compared to the traditional outsourcing already widely practiced by libraries, which have access to low-cost labor such as from India, Vietnam or Madagascar, since a knowledgeable and passionate genealogist generally becomes more competent more quickly and knows the subject better than a subcontractor from a low-cost country whose language and culture are more distant and who might only work on the project for a short period of time.

1.6.4. *Crowdsourcing: the highest stage of outsourcing?*

As we have previously and extensively mentioned, crowdsourcing falls within the economic movement of flexibilization and outsourcing that began with the subcontracting of entire facets of production to countries with more competitive labor costs or to suppliers, consultants, or even sometimes employees of the business who have become self-employed workers or miroentrepreneurs. With crowdsourcing, we now outsource on the Web. Some people even talk about “open outsourcing”. Instead of outsourcing to a specific subcontractor in a country for a low cost, crowdsourcing is outsourcing to a crowd of anonymous Internet users from every country.

In a difficult climate for libraries, crowdsourcing can also prove to be a way to do more with fewer resources. In the area of digitization, in particular, we have witnessed in recent years outsourcing of OCR correction or metadata entry work to low-cost countries (Madagascar, India, Vietnam, etc.). This outsourcing has made it possible for digitization service providers to reduce costs and offer more high-performance services by developing abroad,

using foreign companies that already exist or benefitting from specialists that certain foreign countries have access to. Outsourcing is also an occasion for a company to open up to other work cultures and to enhance its own procedures. Crowdsourcing is a form of outsourcing that is not concerned with where the contributor works, as the only condition required is to be connected to the network of the WorldWideWeb. Indeed, Jeff Howe in the article "The rise of crowdsourcing" published in *Wired Magazine* in 2006 and which popularized the term crowdsourcing, pointed out that during the ten previous years businesses have sought to relocate to countries where labor was cheaper such as India or China, but that the place where the employees are located could have less and less importance in the future, insofar as they are connected to the network. Indeed, why relocate to low-cost countries when, via networks, it is now possible to mobilize, for very low or no cost, a more diverse, motivated, qualified and competent labor force? For libraries for example, this diversity is a major asset, since it has become possible to benefit from the skills of specialists in a particular domain well beyond the narrow limits of teams of curators who, despite a good general education, can never be specialists in every discipline. It allows, moreover, the development of multidisciplinarity. As Nicolas Colin claims in a statement reported by the blog *Internet Actu*, "there is now more power outside of organizations than inside them". Crowdsourcing also thus poses the question of the borders of the organization since it makes it possible to create value beyond those borders [LEB 15, REN 14b].

The border between what can be done by the artificial intelligence of machines and that which needs to be done with human intelligence is perpetually changing. For the moment, the work entrusted to human beings is only done so because it cannot be entrusted to machines.

However, this outsourcing could also be a first phase of the suppression of certain cultural public services after having demonstrated its own feasibility and after having reduced them to a form of begging on the Web. Indeed, in a context of disengagement by the State, why continue to pay professionals to do work that amateurs are willing to do voluntarily? Crowdsourcing could therefore amount to a form of Uberization of public services. With crowdsourcing in libraries, we might be witnessing an "Uberization" of libraries, that is to say a replacement of the services provided by a professional with that of an amateur. Like other forms of Uberization, it could therefore also provoke hostile reactions.

In this conceptual chapter, we have defined crowdsourcing in particular in its application to digital libraries. We have also detailed the historical and ideological origins of the model, and its economic, sociological, legal and managerial consequences.

In the chapter that follows, we will illustrate crowdsourcing in digital libraries with a panorama of the most representative projects in each major type of project according to the type of work that is required of Internet users: uploading, digitization and print on demand, OCR correction and indexing.