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INNOVATING SCIENCE: OPEN ACCESS AND THE SITUATED FIELD OF PHYSICS

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In the recent academic debate about Internet-related technologies, in particular web-based ones, these technologies have been conceptualised as a means to democratise innovation, or foster a new and innovative form of organization. In the face of this hype on the transformational role of the Internet and the Web, a suitable dose of academic scepticism requires an empirical discussion on whether it is appropriate to consider the Web and the Internet as able to bring about such radical innovation in organizations.

Other IS scholars pointed out that, in the social debate about technologies, we can find the presence of computopian and computropian views, the former giving technology a full positive role, the latter one rejecting it in favour of a negative perspective. Unlike these exaggerated standpoints, an argument that considers Web technologies as a phenomenon, as suggested by Ciborra, can lead to a deeper and more balanced insight into the relationship between the Web and innovation processes.

In our study, we try to understand the situated practices that lead scientists to endorse the Open Access way of publication, going back to the origin of the web with High Energy Physicists, trying to demonstrate that in this field it is not possible to reduce everything to universalistic claims.

Keywords: Phenomenology, Scientific Publications, Open Access, Institutional Field.

1 INTRODUCTION

This study intends to reflect on innovation in relation to Internet-related technologies. It is almost undeniable that these technologies are part of our daily life and that their importance is crucial in the field of scientific research.

Going further, in the recent debate about these technologies, claims of a deep societal change have been made by scholars in almost every field, and in this paper we want to underline how these claims have been defined with a theoretical perspective that dismisses the practices of technological adoption in favour of universalistic claims. To do this, we consider Internet and the Web as a phenomenon, emerging in the practices of development and use, and able to give information about the institutional framework surrounding the technology itself, which becomes a lens through which we can look at society.

In particular, we studied Open Access (OA) publishing practices in the field of High Energy physics, because this was the institutional field in which the World Wide Web was initially developed, at the CERN in Geneva, and it is also a field where the potentialities of the Internet as a facilitating technology in the practices of science were understood almost immediately, changing the way academic communication takes place. What happened? And is the involvement of technology deeply changing the way society is organized, or is it "simply" participating in the practices of users, giving us a more detailed picture of societal practices?

With qualitative research and analysis, we tried to understand this and to focus on how the choice of Open Access can help us understand the institutional field of High Energy Physics, instead of focusing on the universalistic and normative accounts given both by scholars theorizing the new economic and societal paradigm emerging with the Internet and by the advocates of Open Access.

In conclusion, we show how the practices of physics and the institutional field surrounding them are the real participants in technological choices and adoption, while universalistic claims appear to have more a discursive purpose rather than describing the actual arena of change.

2 A SITUATED APPROACH TO THE WEB

The World Wide Web and its strict correlate, HTML language, were developed to make it simpler for academics, especially High Energy Physicists, to share experimental data and sources of information (Ceruzzi, 2003). The technical structure of first generation websites was deeply entangled with the practices of physics, the use of tables for experimental results communication, and it was also the first constitutive element of web-design in the 1990s, reminding us of the origin of HTML language and the Web. Nevertheless, once it had entered the use of a variety of actors, HTML language and the Web structure and concept drifted from the first intuition of Berners-Lee and Calliau, that of providing a platform for collaboration among scientists, to become a way to increase cooperation among people with different interests and needs.

From this point of view, the Web and Internet-related technologies, have been conceptualised in several ways. Von Hippel describes them as a means to democratise innovation, able to bring about radical innovation in organizations: "users' ability to innovate is improving radically and rapidly as a result of the steadily improving quality of computer software and hardware, improved access to easy-to-use tools and components for innovation, and access to a steadily richer innovation commons. [..] As a consequence, innovation by users will continue to grow even if the degree of heterogeneity of need and willingness to invest in obtaining a precisely right product remains constant (von Hippel, 2005, p. 13). The net result is a pattern of increasing democratisation of product and service innovation – a pattern that will involve significant changes for both users and manufacturers. This

perspective seems to place too much emphasis on a democratic aspect of technology, and the same goes for Tapscott and Williams' point of view (2006): they consider technologies as a mirror of a new and innovative form of organization and social revolution, a form of organization changing the economy, because easier access to information technologies creates collaborative instruments, new values and more competition, in everybody's hands, and this gives people the power to be involved and participate in innovation and in the creation of economic wealth: a social revolution in terms of peer production, redistribution of social power in a new business law, rooted in peer collaboration of people connected to create extraordinary scientific wealth. If it is true that technologies related to Internet have created new collaborative instruments, this does not mean that these instruments are really used for social redistribution. Scepticism requires that we don't generalize the transformational power of technology.

Other scholars in social studies of information systems highlighted the presence of computopian and computropian views, the former giving technology a full positive role, the latter rejecting this in favour of a negative perspective (Hakken, 2003).

Contrary to these perspectives, which seem to overemphasize Web technologies, Ciborra suggests considering them as a phenomenon and tries to study them as a social practice in a specific field. We think that this approach, could bring a deeper and more balanced insight into the relationship between the Web and innovation processes. If we look at technology in a phenomenological perspective, we can rediscover the situation of the actors in that specific context and field to grasp all the nuances in the process. Sometimes technology produces an instrument that is not used as the inventor expected. "The main characteristics of ICT as a modern phenomenon in organizations and society is that it is á la dérive: the information infrastructure might have enhancing effects but it also drifts" (Ciborra, 2004, p. 84).

Drifting is the outcome of a convergence between an open technology and humans' situated use interventions. "Drifting can be looked at as the outcome of two intertwined processes. One is given by the openness of the technology and on the other hand, there is the sheer unfolding of the actors' being-in-the-workflow and the continuous stream of intervention, tinkering, and improvisations that colour perceptions of the entire system life cycle"(ibidem, p. 87).

If we adopt a phenomenological approach, we can address new problems and learn new things: "Learning by individuals, groups, and organizations, and their ensuing ability to reflect and to create new knowledge, are, in their turn, factors that permit the information society to evolve, the world to run faster, and simultaneously decrease our chances of effective control and governance given their higher levels of complexity" (ibidem, p. 7). From this point of view it is interesting to understand the social context of Information Systems innovation, reminding ourselves that we can look at it with two different theoretical perspectives: universalistic and situated. "Universalistic assumptions of knowledge and conceptions of values are evident in analysis of Information Systems (IS) phenomena in terms of intentional action, such as decisions for accepting or resisting innovation.". In contrast, "situated approaches, involve the analysis of the specific circumstances of innovation, seeking to identify the meanings and interests involved in IS innovation, the process through which it takes place or is held back, and its consequences."(Avgerou, Madon, 2004, p. 164-165).

The universalistic claim that we intend to consider in this study, is that of on-line scientific publications, different from traditional ones, born thanks to Internet-related technologies.

The spread of the use of the Internet and the Web in the mid-1990s has led to the emergence of a purely scientific and academic set of political claims in scientific communication, known as "Open Access". Simply stated, its advocates consider the Web as offering a substantial number of social and technical characteristics that can help scientists to behave in a more suitable way, referring to a concept of science similar to the one introduced by Robert K. Merton (1952). In his first sociological study of science, he looks at it as a set of structural norms regulating the production of good science, and bad science as the result of a failure in following those norms. He considers science as a collective

property that is the result of everybody's efforts to achieve knowledge progress. The Mertonian standpoint can be associated with the universalistic perspective in IS studies.

The supporters of OA initiatives argue that one Mertonian norm in particular, communism in scientific communication, is now problematically achieved due to the role of traditional academic journals, with high costs and well-defined centres of power, while the Web can offer a new form of scientific communism, making all the published material available for free to everyone who has an Internet connection. The claims by the OA advocates refer to a universalistic and computopian approach to Web technologies, discarding the situated institutional system that relates to the pattern of technological adoption.

In our study we want to understand if the universalistic claims that are promoted by OA advocates, correspond or not in the specific field of High Energy Physics, a discipline that first adopted free on-line tools in its daily research work, and how technology transformation influences or changes situated practices.

3 FROM PHYSICS ONWARDS

The birth of the Web can be traced back to Tim Bernes-Lee who in 1980, at CERN in Switzerland, built ENQUIRE, rather different from the system in use today, but with the same principal ideas. In March 1989, Berners-Lee wrote a proposal, later remodelled with help from Robert Cailliau, that was the formal proposal for the World Wide Web on November 12, 1990[1]. After a few attempts, in December 1991 the first server outside Europe was created and then, in 1993, CERN announced that the World Wide Web would be free to anyone, with no fees due.

The World Wide Web Consortium (W3C) was founded by Tim Berners-Lee after he left the European Organization for Nuclear Research (CERN) in October, 1994. It was founded at the Massachusetts Institute of Technology Laboratory for Computer Science (MIT/LCS) with support from the Defense Advanced Research Projects Agency (DARPA) - which had pioneered the Internet - and the European Commission (Ceruzzi, 2003, p. 298-304).

History shows us the fundamental role of physicists and in particular High Energy Physicists (HEPs), in new technology development, in archives and OA publications diffusion. Pioneers of the World Wide Web, they were also pioneers in all its applications.

In fact, with the advent of the World Wide Web, in physics the standard procedure consisted of sending one's own work in the File transfer Protocol format, an archive available to every colleague. There was a proposal put forward by the physicist Stevan Harnad[2] to extend this practice to every sphere of research, so as to overcome problems caused by the excessive price of subscriptions and scientific publication in general. Internet was a solution to overcome problems connected to scientific journals; yet it is not a coincidence that such a proposal was to arise from a discipline like physics, which had access to an advanced communications system. Electronic mail through the web Arpanet was first launched in 1972, a web limited to the exchange of information between hi-tech universities and other institutions. Scientists started to communicate in a different way, exchanging information by the Web. Financial support for the Arpanet web was allocated by the Advanced Research Project Administration (US Defense Department). In 1979 Internet was launched onto the market, finally spreading globally between 1993 and 1995. 1991 saw the creation of a pre-printed on-line archive, speeding up circulation and increasing its success (Briggs and Burke, 2002).

[1] http://www.w3.org/Proposal.html
[2] http://www.arl.org/scomm/subversive/toc.htm

History shows us how important the Web was for faster circulation of information and experimental results in all fields of research but especially for HEPs, who found an easier and useful tool for their activities. “The dream behind the Web is of a common information space in which we communicate by sharing information. Its universality is essential: the fact that a hypertext link can point to anything, be it personal, local or global, be it draft or highly polished. There was a second part of the dream, too, dependent on the Web being so generally used that it became a realistic mirror (or in fact the primary embodiment) of the ways in which we work and play and socialize. That was that once the state of our interactions was on line, we could then use computers to help us analyse it, make sense of what we are doing, where we individually fit in, and how we can better work together”[3]. Nevertheless, once it had entered the use of a variety of actors, the Web drifted from Berners-Lee and Calliau’s first intuition, becoming a way to increase cooperation among people with different interests and needs.

Our point is to go back to the use of the Internet by HEPs, and try to evaluate the relationship between universalistic claims about technology and its situated use.

4 THE INVISIBLE COLLEGE OF PHYSICS

This study is a preliminary part of a doctoral research that tries to understand how scientists endorse such a form of Open Access publication through situated practices. In order to explore technology as a phenomenon in a situated field, we are going back to the origin of the web, to the community of High Energy Physicists. Therefore, the choice of pre-prints and OA is deeply intermingled with the institutional characteristics of the field of High Energy Physics, which can be conceived as an invisible college. Zuccala has given an interesting interpretation of this important term that we have considered: “An invisible college is a set of interacting scholars or scientists who share similar research interests concerning a subject specialty, who often produce publications relevant to this subject and who communicate both formally and informally with one another to work towards important goals in the subject, even though they may belong to geographically distant research affiliates.” (Zuccala, 2005, p. 6).

In effect, the HEPs are interested in a specific field of physics, that of High Energy. They produce science and knowledge and they publish and communicate through formal and informal channels in order to share results and ideas. The history of this discipline enables us to consider HEP scientists as an invisible college, as suggested by Zuccala: scientists that all study the same research subject, that publish and communicate even if they are geographically dispersed. To confirm this consideration, there are the words of interviewees, who talked about the necessity of having very expensive equipment in order to do important experiments and simulations, which are only available with the economic and social resources of a small number of united departments.

In order to share their results with all members, they needed new tools and created ArXiv. ArXiv is an archive for electronic pre-prints of scientific papers in the fields of mathematics, physics, computer science, quantitative biology and statistics which can be accessed via the Internet. In many fields of mathematics and physics, almost all scientific papers are placed on the arXiv. As of March 2008, arXiv.org contains over 469,000 e-prints, with roughly four thousand new e-prints added every month[4]. It was developed by Paul Ginsparg in 1991 as an archive for preprints in physics. The term e-print was adopted to describe the articles. Ginsparg was awarded a MacArthur Fellowship in 2002 for his establishment of arXiv. It was originally hosted at the Los Alamos National Laboratory (at xxx.lanl.gov, hence its former name, the LANL pre-print archive) and is now hosted and operated by Cornell University, with mirrors around the world. In 1999 it changed its name and address to arXiv.org. Its existence was one of the precipitating factors that led to the current revolution in

[3] http://www.w3.org/People/Berners-Lee/ShortHistory.html
[4] www.wikipedia.com

scientific publishing, known as the Open Access movement, with the possibility of the eventual disappearance of traditional scientific journals. A majority of the e-prints are also submitted to journals for publication, but some work, including some very influential papers, remain purely as e-prints and are never published in a peer-reviewed journal. Professional physicists, mathematicians and scientists regularly upload their papers to arXiv.org for worldwide access and sometimes for reviews before they are published in peer-reviewed journals.

Thanks to this we can investigate how this invisible college works with technology phenomena and define how its daily practices change or do not with new instruments. If they do, in what way do they adapt? Can this phenomenon be defined as a deep societal change?

5 METHODOLOGY

Data collection was conducted through in-depth interviews, by e-mail and by telephone (Kivits, 2005; Meho, 2006). The field study was conducted at Sissa University, based in Trieste, which in the past few decades has been very active in the field of archiving electronic scientific publication. Sissa University started in 1992 with pre-print electronic archives in high energy physics and astrophysics; moreover 1996 saw the creation of Jhep (Journal of High Energy Physics). In particular, one of the authors did in-depth interviews with the keeper of a "MediaLab" (spin-off of Sissa). The journal that we studied has a clear statement of its aims on the journal web page: "To capitalise on the innovative advantages of the new media: rapidity of communication, broad diffusion [...]. [The journal] complements the present system of preprints distribution via the online arXiv service [...]." (Journal Website, Editorial Information). As stated here, and confirmed in our empirical research, the use of OA strategy by physicists meets what is perceived as a practical need: rapidity and diffusion of experimental research. This relates to one of the key factors in the success of the above-mentioned pre-print distribution: high energy physics as a discipline requires, theoretically, the results of experiments which involve machines with high costs of purchase and maintenance, while practically few institutions can afford all the equipment needed to develop a complete set of tools for theoretical processing.

In particular, the Jhep founders and administrators who have followed all its phases were interviewed face-to-face, whereas e-mail and telephone interviews were used with a few scientists who have published in OA and also traditional reviews, chosen through snowball sampling in order to understand different ways of considering the two different types of publication.

In the interview analysis, we were not interested in constructing predetermined theoretical hypotheses but instead in understanding the phenomenon by starting straight from the interview texts, field notes and documents, and then from the data. In this we took our inspiration from the Grounded Theory technique (Glaser and Strauss, 1967) in order to catch all the nuances of the "stories", given the impossibility of directly observing the dynamics that led to the creation of the review.

To this end the interview followed the recommendations of Grounded Theory. Consequently it took on the tones of a conversation aimed at in-depth exploration to bring to light the way in which the actors give sense to their experiences and generate interpretations of them, highlighting how the experiences of the participants consciously fit in with that process. The in-depth interview explores and does not interrogate, it leaves space for the interviewee to digress but is sufficiently focused on the subject in hand (Tarozzi, 2008).

What interests us is to consider technologies related to the Web as a phenomenon (Ciborra, 2004) and try to see how they have led to the construction of publication practices different from the traditional ones. To deal with this subject we have therefore considered it important to start from the community of physicists which, as we have mentioned above, was the first to use the new technologies to facilitate exchanges and interactions, changing well-established practices. This is why, in the study of on-line

scientific reviews, it was essential for us to consider not only the point of view of the founders and developers but also that of the actors who make possible their existence, that is, the authors.

6 HIGH ENERGY PHYSICS WENT OPEN

From the interviews it clearly emerged that the practices characteristic of the community of physicists were at the basis of the choices to publish experimental data and results in OA form both for archives and academic reviews. At the basis of this complex phenomenon it therefore seems there are characteristics that go further and are closely related to the community concerned.

From the very beginning, the communities of high energy physicists felt they needed to speed up the communication of their scientific findings, even though scientific communication in general was always carried out through books or articles in scientific journals. During the seventies and eighties the physicists from this group were communicating through pre-prints sent to different departments. One of our interviewees said:

"*Everyday there was a pile of pre-prints waiting for us on the table, even if specialized journals already existed*."(Interview 3, 05 June 2008)[5].

This seemed to be the only effective way to communicate with their own scientific community, since the different departments were located in the USA and Europe. The main centre in Europe was CERN, one of the few which had powerful equipment capable of simulations, which are essential in this sector.

It was fundamental to exchange results and outputs of these experiments in a short time: that is why they were struggling to find their way to improve their communications, leaving aside the matter of publications. At first, they were communicating through paper pre-prints sent to every department, then by e-mail. Subsequently they tried to find their own way. The result was the ArXiv, which is still functioning and is essential for the physicists' work.

"*Nowadays, every morning, when I arrive at the office the first thing I do is check the new articles on ArXiv and it is the same for all my colleagues*." (Interview 3, 05 June 2008)[6].

Another interviewee asserts:

"*Experiments are very long and simulations infinite, the equipment required is very expensive and from the 80s, when powerful calculators were needed, only a few departments could have it. There are not many of us studying this specific field of physics. We are dispersed all over the world but we have always had the need to communicate fast and to put together our united forces in order to make advances in research*." (Interview 2, 18 April 2008)[7].

Habits and situated practices specific to high energy physicists are the cause of changes introduced by new Internet-related technology use. They have used several tools in order to develop efficacy in their own daily work.

A universalistic vision of science, regarded as accessible to all and belonging to the public domain clashes with an empirical transition dictated by necessity and the specific needs of this particular

[5] "Ogni giorno appena si arrivava in ufficio, c'erano pile di pre-prints sul tavolo ad aspettarci, e questo anche se esistevano già le riviste specializzate."
[6] "Tutte le mattine, quando arrivo in ufficio, la prima cosa che faccio è controllare i nuovi articoli su ArXiv e questo vale anche per i miei colleghi".
[7] "Gli esperimenti sono lunghissimi, le simulazioni infinite e le attrezzature che servono sono costosissime. Solo pochi laboratori potevano permetterseli, fin dagli anni '80 in cui servivano potenti calcolatori. Non siamo in molti ad occuparci di questo specifico settore della fisica, siamo sparsi in tutto il mondo ma abbiamo sempre avuto la necessità di comunicare velocemente e di unire le forze di tutti per riuscire ad avanzare nella ricerca."

community that has managed to adapt the potentiality of the Web to its specific field. Those interviewed do not consider the innovation of open-access on-line archives and reviews from an ideological point of view, but the ideological aspects are considered as a normal and inevitable evolution of the tools in their hands.

"Simulations are our daily work tool for high energy physics. This is a peculiarity. Physics has always been available through OA. Now we have created this new system. I know that it is possible to speak about ethical and ideological aspects but it was not important at the beginning." (Interview 2, 04 June 2008)[8].

In one of his interviews the founder takes his position to an extreme, stressing how for him no ideological idea was involved but only simple rational and managerial reasoning of an economic-instrumental kind on account of the lower costs and the speed of dissemination of experimental results to all the members of the community scattered around the world.

"*I set up Jhep in OA only for economic reasons, not for ideological ones. It made no sense to pay in order to read our own articles, to pay twice for the same things [..] it is only a question of who pays, different people pay [..] the archives were set up to communicate cost-free and OA reviews to minimize the cost of writing in reviews to reduce the costs of scientific publication, fundamental in the academic world for prestige and fame."* (Interview 1, 04 June 2008)[9].

The authors' point of view tends to reconfirm what the founder stressed: the emphasis is on the practical nature and low cost of the tool. For the circulation of results the archives, greatly used in physics, would be enough, but to establish oneself academically and in research in this discipline, it is necessary to publish. This is why the OA reviews represent an alternative to the traditional ones. If the on-line / paper factor is left out, the structure of OA reviews is very similar to that of traditional ones, also as regards peer review and the accreditation ratings of the review, which are fundamental in the academic world.

"If it was only an ideological matter, only scientists at the top of their career could publish in secondary reviews; but many OA reviews are replacing the traditional ones, [..] OA reviews are like low cost reviews: only if a review is competitive and accredited in the community can one allow oneself to choose it for ideological reasons." (Interview 5, 10 September 2008)[10].

"The power of Jhep has been that of being a high energy physics review published by high energy physicists; it is almost like a business card, a guarantee of integrity." (Interview 3, 05 June 2008)[11].

The analysis made contrasts with the universalistic and general claims by OA advocates as, for example, in the Budapest Open Access Initiative: "Removing access barriers to this literature will accelerate research, enrich education, share the learning of the rich with the poor and the poor with the rich, make this literature as useful as it can be, and lay the foundation for uniting humanity in a common intellectual conversation and quest for knowledge"[12].

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[8] "Le simulazioni sono il quotidiano strumento di lavoro della fisica delle alte energie, è una nostra peculiarità, la fisica è sempre stata OA per forza di cose. Ora che abbiamo creato questo sistema, mi rendo conto che si possa anche parlare di un fattore ideologico ma non lo è stato in principio".

[9] "Io non ho fondato Jhep ad accesso aperto per questioni ideologiche ma per convenienza economica, non aveva senso pagare per leggere i nostri stessi articoli, pagare due volte per le stesse cose [..] è solo una questione di chi paga, pagano persone diverse [..] gli archivi sono stati istituiti per comunicare senza costi e le riviste OA per minimizzare i costi di scrivere sulle riviste, fondamentale nel circuito accademico per prestigio e notorietà".

[10] "Se fosse solo una questione ideologica, solo gli scienziati all'apice della carriera potrebbero permettersi di pubblicare su riviste poco considerate, invece molte riviste OA stanno sostituendo le cartacee, [..] sono una sorta di versione low cost delle riviste, solo se una rivista risulta competitiva ed accreditata nella comunità ci si può permettere di sceglierla per ideologia.."

[11] "La forza di JHEP è stata quella di essere una rivista di fisica delle alte energie, pubblicata da fisici delle alte energia, quasi come un biglietto da visita che ne garantiva l'integrità".

[12] BOAI – Budapest Open Access Initiative <http://www.soros.org/openaccess/shtml> in*Framing the Issue: Open Access*, http://www.arl.org/scomm/open_access/framing.html

This declaration and all movement initiatives go back to Merton's ideas and his idealistic way of considering science and scientific circulation of knowledge as everybody's property. In our empirical research there is no trace of "enriching education", there is no talk of "the poor and the rich" or the construction of "the unity of humanity". We have scientists doing their work, worried about speed of communication and sharing the cost of expensive machines.

So we can confirm Ciborra and Avgerou-Madon's standpoint. It is very useful to consider the web as a phenomenon in its empirical changes and this give us the opportunity to grasp the situated practices that it has generated in a specific field like that of HEP.

7 THE INSTITUTIONAL FIELD OF PHYSICS

The analysis made so far has shown how universalistic elaborations move away from the daily practices of scientists. These practices are rooted in an institutional field that allows and favours the adoption of technological solutions not because they correspond more closely to a Mertonian conception of science of a normative and structural kind but because they are more suitable in the emergence of practical solutions to problems that scientists come across daily in their work.
In particular, the idea of high energy physics as an invisible college seems to correspond specifically to the constitutive characteristics of the institutional field as it emerged in our analysis: technology enables relations to exist in a situation of geographical dispersion, relations that come to be characterised by greater speed compared to those mediated by the traditional scientific publication. Economic, technological, human and scientific aspects take up position in the institutional field of high energy physics, reinforcing the characteristics of the institutional field described so far. One of the most widespread practices is precisely that of the transmission of the results of experiments and simulations, fundamental for advances in research, a practice that over the years these scientists have tried to achieve more effectively by looking for alternatives to the traditional publication. The institutional field that supports the practices of high energy physics is also characterised by the centrality of economic aspects, such as the high cost of the machines used for the simulations, very expensive equipment that is often not accessible to single departments. There is therefore an economic aspect of the joining of economic as well as of human resources and reinforcement of belonging to the field. The use of open archives and open-access reviews cannot therefore be attributed to a universalistic aspect but rather to an adaptation of situated practices specific to the field in order to reduce waiting times and minimize the costs of printing and subscription typical of traditional reviews. In particular, in the case of the review studied, attachment to the institutional field one belongs to is highlighted: the fact that it is published by physicists is an extra guarantee additional to the standard refereeing channels.

8 CONCLUSION

The analysis of the data collected shows how it is not possible to talk of a universalistic vision that pervades all fields but of a phenomenon such as that of the Web that has become part of the world of high energy physicists, changing their practices. It is curious to stress how the phenomenon of OA reviews is much to the fore in academic discussion of a sociological, economic and legal (on account of copyright) kind and often takes on very different characteristics from those observed in the specific field of high energy physics. The universalistic approach to OA seems to be a dialectical instrument for presenting the phenomenon in its most general form.

This study does not intend to examine only the specific field described here. It will also concentrate on other scientific contexts in order to try to understand if different fields create different situated practices and on understanding the phenomenon in another field of study such as human and social

sciences to examine whether the practices implemented in the specific field of high energy physics also crop up again in other fields or are peculiar to that particular situated field.

We cannot generalize yet because this research is at an early stage but in conclusion, the situated analysis of innovation in the use of technology, like the Web in its place of origin, high energy physics, has shown how universalistic claims have to be studied in their empirical transformation, and how they can show the different forms of the institutional field that surround the adoption of technologies.

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