

The Business of Making an Encyclopedia and the Impact of Digitization: The Example of the *Encyclopædia Iranica*

A dusty row of volumes with grey-paper backs and dingy labels—the volumes of an old cyclopaedia... They were on the highest shelf, and he stood on a chair to get them down.

George Eliot, *Middlemarch*, 1871, book II, chapter 15

A database is a collection of electronic information or records organized, stored, and updated for the sole purpose of providing information. In this sense, ... any online encyclopedia or dictionary is considered a database.

Chicago Manual of Style, 15th edition, 2003, 17.357

In the brave new world of digital publishing on the internet, encyclopedias have been transformed from unyielding bookcase fillers to online databases with a seemingly unlimited potential for expansion. The web-based publication of encyclopedias seems particularly appropriate for a multi-disciplinary field such as Medieval Studies that is primarily defined by the time frame of 500–1500 CE. But in order to design databases for reference works that foster comparative research and interdisciplinarity—approaches that we hold so dear because they are rather difficult to realize in our work—it is necessary to understand how digitization and the internet have changed the role of encyclopedias in teaching and research. In the following reflection on how internet encyclopedias fit into the Western history of encyclopedia production since *l'Encyclopédie* (1751–1780) by Diderot and d'Alembert, I draw upon my experiences as one of the associate editors of the *Encyclopædia Iranica* (*EIr*), which includes entries on medieval Iran and medieval Persian literature as part of its comprehensive coverage of Iranian civilization from prehistory to the present (for the conceptualization of the study of medieval Iran within Iranian Studies, compare the approaches of Bulliet 1994 and Fragner 1999). Although the *EIr* continues to be published in print, its enlarged free online version iranicaonline.org has the potential to become a web-based collaborative project that would promote teaching and research across geographical and disciplinary boundaries.

I. *Printed encyclopedias and the organization of teaching and research*

In literate societies encyclopedias are a fact of life because written texts are used for the transmission of knowledge (for an introduction to research on premodern and non-Western encyclopedias, see the conference proceedings of Picone 1994, Binkley 1997, and Endress 2006). Although encyclopedias do not constitute a formal literary genre, works that are written as educational compilations, and which aim at completeness with

regard to their stated subject, form a distinct group of texts. For example, the *New Encyclopædia Britannica* (15th ed., 32 vols., London: Encyclopædia Britannica, 2002) shares the commitment to completeness and usefulness with the *Dictionary of the Middle Ages* (13 vols., New York: Scribner, 1982–1989) and the *Verfasserlexikon* (2nd ed., 14 vols., Berlin: de Gruyter, 1977–2004), but only the *Britannica* is a general reference work. Until the end of the twentieth century, before the internet and its ever increasing access to powerful search engines fundamentally changed the rules of data retrieval, printed encyclopedias embodied a successful strategy of knowledge management. For the ideal of completeness allowed encyclopedias to be used in two ways: as a library substitute and as a bibliography. As a *summa*, an encyclopedia contains the gist of all things worth knowing, but as a *vade mecum*, it is a guide to those books that are worth reading.

This double role in knowledge management made encyclopedias indispensable aids to teaching and research with a highly ambiguous status. In general, encyclopedias are used, but not cited. Although it remains a mark of distinction to work as the general editor of a well-regarded encyclopedia, the writing of the entries themselves is considered a fairly mechanical process, if not hack work. Encyclopedia entries pull little weight in a tenure portfolio, because even a well-written entry that provides a concise, state-of-the-art summary for any given topic, while outlining lines of inquiry for the future, is strictly distinguished from original research published as an article or a book. With regard to an eminent historian such as Arnaldo Momigliano (1908–1987), his important 1930s contributions to the *Enciclopedia italiana di scienze, lettere ed arti* (36 vols., Rome: Istituto Giovanni Treccani, 1929–1939) are considered separate from his monographs, while the political and economic reasons for Momigliano's involvement with this encyclopedia enterprise are not any further explored (Murray 2004). Momigliano's case illustrates why it is much easier to recruit a general editor for a grand encyclopedia scheme than to find contributors for the individual entries, colleagues for the peer review, and copy editors for proof reading and the enforcement of a uniform in-house style. A persuasive general editor, however, can wield considerable power to assign entries to authors, and subject areas to consulting editors, in such a way that young and mid-career scholars fiercely compete for the great honor of supplying entries and serving their scholarly community by actively participating in peer-review duties.

Until the rise of digital media in the last decade of the twentieth century, publishing an encyclopedia was a viable business model because most libraries had standing orders on regularly updated works of reference. Since an encyclopedia's content is defined as a synthesis of the accepted knowledge of a certain discipline or topic, the generation of content does not pose a costly challenge. The steadily increasing research on early modern publishing practices provides ample evidence that publishers could always rely on a large pool of unemployed academics as the cheap, yet well-trained workforce for writing, proof reading, and copy editing (for unemployed academics in early modern Europe, see Chartier 1988, 127–150). The work in printing houses can appear as intellectually exciting because scholars turned correctors “could not confine themselves to working only with texts and one another” (Grafton 2010, 96), though it should be noted that there is a wide “gap between the high ground of principle and the hardscrabble of everyday life” (Darnton 2010a, 4). In those Dark Ages before internet search engines, students were trained to rely on encyclopedias for developing new projects. Encyclopedias, together with dictionaries, grammars, book reviews, and bibliographic surveys, formed the indispensable, though not very prestigious backbone of all academic research. In sum, the steady demand for orientation vis-à-vis low-cost content and production ensured that publishers could make a profit on encyclopedias.

In the second decade of the twenty-first century, every encyclopedia project has to confront how the internet has already impacted our access to that knowledge which was previously sequestered in a library's reference section. The physical separation of reference books from primary sources and original research was important, because professors and students trusted the librarians to make the right judgment call, weeding out the unworthy stuff and keeping revered classics available. While it was a seal of approval for encyclopedias to live as non-circulating books in the reference section, the spatial separation enforced the hierarchy between secondary reference and primary research. Faculty perhaps recommended additions to the reference section, but, in general, the use of the reference section was habitual, and everyone trusted that which was at hand. As far as possible, professors relied on promising research assistants to conduct the tedious initial stages of collecting introductory information and compiling bibliographies.

II. *Social networking, open access, and commercial publishing*

These initial stages of research have dramatically changed. On the one hand, printed books are less and less used for research, because more and more reference works and studies are made available as completely digitized texts. The internet has become an overcrowded reference section in which too many things can seem equal (Hodgkin 2000, 14). In an ironic twist, the National Endowment for the Humanities (NEH), as well as other grant-making institutions, muddies the waters because in general they prefer, all things being equal, to fund digital reference websites that are not restricted to paying subscribers. This NEH funding preference further increases the number of free digital reference works, which, in turn, creates a growing need for more resources for their critical evaluation. I hasten to add that I consider such government support for the free access to knowledge and research on the internet a moral imperative in a democratic society which values freedom of expression over censorship. Yet the time we no longer spend in the library's reference section is now needed for teaching our students how to identify legitimate scholarly websites. On the other hand, it has become accepted practice, at least on the specialized Middle East Studies lists of which I am a member, to post help requests for information which in pre-internet days would have been obtained by consulting a few books in the library's reference section. As a matter of fairness, it is important to remember that not all libraries are created equal. This practice definitely evens the playing field for scholars with poor library resources. Since it is obviously more efficient to directly ask colleagues and peers for information and advice, specialized online communities may increasingly perform the tasks currently assigned to professional reference librarians (Shachaf 2009).

The impact of scale on the working conditions of every academic discipline is easy to miss while one is busy with distinguishing oneself as a scholar. The smaller a discipline, the faster new technologies will be adapted because fewer scholars are needed to generate the peer pressure necessary for establishing new standards and changing paradigms. The moderate size of the Medieval Studies community is one of the reasons why medievalists early on adapted computerized and web-based tools for their research (cf. the example of classicists discussed by Greg Cane in Schreibman et al. 2004, 46–55). The digital projects presented in June 2010 at the 3rd MARGOT Conference http://margot.uwaterloo.ca/DMAConference/conference_outcomes.html illustrate that these tools focus on repositories of large data collection (e.g., catalogs, bibliographies, dictionaries) and on data analysis (e.g., recognition of hands), as well as web-based editions and the digitization of rare manuscripts. Most projects were

concerned with improving access to primary sources or honing their classification and analysis, while the digital dissemination of studies, reference works, and textbooks received short shrift despite the continually shrinking library budgets in the humanities (Grafton 2009; Darnton 2010b).

There is, however, a crucial difference between adapting to new research technologies and accepting new media for publishing research. Although digitization is replacing physical publishing (Epstein 2010), printed books will probably remain the main vehicle for the dissemination of research in the humanities for the foreseeable future, because the printed first book, preferably from a prestigious university press, has remained the tenure requirement *sine qua non* for most American scholars in the humanities (Zuckerman and Ehrenburg 2009, 139–141; Darnton 2010b, 23). It is on the market for textbooks and reference works that the size of an academic discipline seems most directly related to the choice of media—printed book, digitized book, or networked e-content—and a cost-recovery model that guarantees long-term sustainability (Michael Jensen in Schreibman et al. 2004, 545–547). Although Medieval Studies is by no means a large discipline, most medievalists work in Europe and North America so that the digital divide between rich and poor countries (Grafton 2007, 53) does not seem relevant to the dissemination of scholarship. In the 1990s, a reference work such as the *Dictionnaire encyclopédique du Moyen Âge* by André Vauchez and Catherine Vincent was published in print (2 vols., Paris: Éditions du Cerf, 1997) and translated (Italian, 3 vols., Rome: Città nuova, 1998–1999; English, 2 vols., Chicago: Fitzroy Dearborn, 2000). But in the last decade the publication of digital Medieval Studies encyclopedias has become commercially viable for large academic publishing houses, and so medievalists have little incentive to obtain institutional support and outside funding for encyclopedia projects. The subscription-only databases of the *International Encyclopaedia of the Middle Ages* (Brepols, since 2009) and *Bibliographies Online – Medieval Studies* (Oxford University Press, since 2010) take full advantage of digital technology by creating a single platform for searching several reference works at the same time, while providing translated versions, or translations tools, and regular updates.

III. *Teaching and research outside the Western civilization curriculum*

The field of Iranian Studies does not belong to the core disciplines of the Western civilization curriculum. This marginal position is reflected in how Iranian Studies

scholars design, finance, and use publications to organize teaching and research. Iranian Studies only emerged in the 1960s, when in the US the concept of Area Studies led to a reorganization of Oriental Studies departments according to the boundaries of twentieth-century states and national languages (Keddie 1987). Since Iranian Studies is dedicated to all aspects of Iranian civilization in Eurasia, from prehistory to the present, the field is extremely fragmented, and specialists in various disciplines, such as archeology, classics, historical linguistics, religious studies, political science, or anthropology, work on matters Iranian. The scholarly community is widely dispersed in Europe, the Middle East, Asia, and North America, and there is—as in any field centered on a contemporary nation state such as American Studies or French Studies—a certain tug of war between insiders and outsiders. The *EIr* receives regularly user complaints that the website language is English, and not Persian, whereas Iranian studies scholars struggle with making their research accessible and relevant to colleagues in other fields, even though many are publishing in English.

For a scholar of medieval Iran the situation is particularly dire. Although ancient Persia features prominently in Greek, Roman, and Byzantine historiography, the Dark Ages of Iranian history begin with the Muslim conquest of the Sasanian Empire (224–651 CE) and end with the establishment of the independent Shi'ite state of the Safavid dynasty (1501–1722 CE). If scrutinized from the European shores of the Mediterranean, medieval Islamic civilization appears as an Arab culture because Mediterranean Muslim societies were dominated by Arab and Arabicized elites until the beginning of the twelfth century (for an example of this approach, see Metlitzki 1977). Since Arabic was the dominant language of politics, religion, science, and philosophy, it is, for example, easy to miss that, after the Byzantine defeat in the battle of Mantzikert in 1071 CE, Persian, which is after all written in Arabic script, became the language of high culture and administration at the Turkish courts in Asia Minor. Even though some areas of research—such as Muslim-ruled societies in Spain and southern Italy, or Egypt and the Levant during the Crusades—are well established in Medieval Studies (see for example the contribution policies of *Speculum*, the journal of the Medieval Academy of America http://www.medievalacademy.org/speculum/speculum_submissions.htm), both medieval Iran and the diversity of Islamic civilization in the Middle East have remained largely invisible to medievalists.

It is against this backdrop that in the early 1970s Ehsan Yarshater, then Hagop Kevorkian Professor of Iranian Studies at Columbia University, embarked on the ambitious project of an English-language Iranian Studies encyclopedia. He envisioned the *EIr* to combine the model of a national encyclopedia as the *Encyclopædia Britannica*, with that of the academic *Encyclopaedia of Islam* (2d ed., 12 vols., Leiden: Brill: 1960–2004), one of the most important reference works in Middle Eastern studies since the beginning of the twentieth century (for the *EIr*'s official history, see Elton Daniel's entries about the *EIr* <http://www.iranicaonline.org/articles/encyclopaedia-iranica> and the *Encyclopaedia of Islam* <http://www.iranicaonline.org/articles/encyclopaedia-of-islam> in *EIr* 8: 430–435; cf. Josef van Ess in Endress 2006, 4–6). Serving two clearly distinct audiences with very different reference needs, the *EIr*'s publication was never commercially viable, and the project has always depended on the institutional support of Columbia University and on outside funding, particularly from the NEH. From the project's inception, the editorial staff has worked at Columbia's Center for Iranian Studies, while Yarshater relied on his peers to establish a small Advisory Committee and a group of about forty Consulting Editors to plan and supervise the *EIr*'s content. In 1982, the first fascicle appeared in print, and in November 2010, fascicle 5 of volume 15 was published. After more than three decades, the printed edition has reached the letter K, so that the project is not even half way through the Latin alphabet. The slow progress has of course been frustrating to Yarshater and his many supporters, yet the *EIr*'s plodding pace of production is not surprising, if one considers the organizational challenges of coordinating an international group of contributors and consulting editors (Donaldson 1996, 59–60). Moreover, the *EIr*'s very broad definition of content is realized on a shoe-string budget for contributors and editorial staff, a situation that is, as already mentioned, quite common for grand encyclopedia schemes.

A greater challenge was created by Yarshater's own decision to establish an internet presence exclusively dedicated to the *EIr* project. In 1996, the first electronic version of the *EIr* was made available at the website iranica.com (redirected to iranicaonline.org since April 1, 2010), giving internet users free access to pdf-files of all printed fascicles. Although it was slow and cumbersome to locate specific information in the huge pdf-files, it must be stressed that the *EIr* was, and has remained, the only Middle Eastern studies encyclopedia that is published in the West and available for free on the internet. The digitized version of the printed *Encyclopaedia of Islam*, together with its more

recent companion works of the *Encyclopaedia of the Qurʾān* (6 vols., Leiden: Brill, 2001–2006) and the *Encyclopaedia Islamica* (vol. 1-, Leiden: Brill, 2008–; abridged translation of *Dāʾirat al-maʿārif-i buzurġ-i islamī*, vol. 1-, Tehran: Markaz-i Dāʾirat al-maʿārif-i buzurġ-i islamī, 1367 sh./1989–), is sold as a subscriber-only online database (for a discussion of subscription pricing from the perspective of a professor turned library director, see Darnton 2010b, 24). The free English-Persian online database of the *Encyclopedia of Iranian Architectural History (EIAH)* was established in 2007 (http://eiah.org/en/About_Us, accessed February 17, 2010), and is financed by the Iranian government.

The *EIr*, however, can only afford its free website because in the early 1990s Yarshater had the foresight to establish the Encyclopædia Iranica Foundation (EIF), for which he is vigorously fundraising. The EIF covers part of the *EIr*'s operation budget, and has thus become crucial to the *EIr*'s continued ability to attract outside funding. For in this time of drastically shrinking budgets in the humanities, US grant-making institutions routinely require from their applicants a business plan for long-term financial sustainability and an unwavering commitment to open access publication (Darnton 2010b, 24; cf. Darnton 2010a). Thanks to the EIF the *EIr* project enjoys not only institutional support through Columbia University but it has also built up its own independent third-party funding.

Yarshater's headlong plunge unto the world-wide web added significant costs for proprietary programming, hardware, and commercial website maintenance to the *EIr*'s operating budget, while slowly transforming, in completely unforeseen ways, the printed book into a digital database. In 2002 the *EIr* changed its mode of production by continuing the printed edition according to the order of the Latin alphabet, while beginning to commission entries out-of-turn so that prior publication in print was no longer the condition for digital publication on the internet. This decision was in part prompted by the just mentioned NEH focus on open access publishing, and caused the editorial staff to increasingly devote their attention to the online version. Unfortunately, the parallel pursuit of the print and the online version significantly reduced the functionality of the website that suddenly had to accommodate pdf-files for the content of the first six volumes and html-files—written in the special font of *IranWeb2*—for the content of all later volumes and the out-of-turn entries. The website was difficult to navigate, because the pdf-files were not searchable, while the html-files did not display

correctly whenever the downloaded *IranWeb2* font was not compatible with a user's computer. It became therefore necessary to convert all files to the same html format, written in a single Unicode font and uniformly coded, to create a website where all content was fully accessible to the user. This complex conversion process was completed in March 2008, when the all-Unicode version went online. Yet the conversion process had revealed structural weaknesses in the old website whose original purpose in the mid 1990s had been the comparatively humble online storage of digitized *EIr* entries. Between 2009 and 2010 a new website was developed from scratch to create a full-fledged, interactive platform which would allow the digital database of the *EIr* project to attract users in the continually growing internet.

With the launch of the new website's beta version at a new domain name, the *EIr* reached a critical juncture. The parallel pursuit of the print and the online version is no longer feasible, because the digital database has effectively outgrown the printed edition. As of December 2010, some 6,000 entries are available on the website, and approximately 850 of these are exclusive to the online version. The complete database has at the moment about 10,000 html files. If measured by the purely quantitative criteria of the Wikipedia founder Jimmy Wales (Lih 2009, xv–xvi), the web edition is not yet a comprehensive encyclopedia, as the *EIr* project has less than 10,000 entries in the same language, although the *EIr* has definitely crossed the critical threshold of 1,000 entries in the same language, a milestone which for Wales indicates that a new language version has enough committed authors to grow further. Since the *EIr* is now first and foremost an online encyclopedia, the project relies on Columbia's Center for Digital Teaching and Scholarship to keep a regularly updated secure backup of the entire database on Academic Commons, the online repository of Columbia University. The *EIr*'s printed edition will be continued, as long as the fragility of all digital content remains a great challenge (Epstein 2010, 6), but the debate is already underway as to how a new publishing model should accurately reflect the central role of the online version for the overall project.

iv. *Organizing content in an online database*

Every online encyclopedia which aspires to be more than just another digitized book faces the question of how the abandonment of the physical book format with its a priori defined limitations demands a new systematic framework for the organization of its continually growing content. In general, I am optimistic that encyclopedias, which in

late Antiquity survived the momentous technological change from scroll to codex, can again adapt as new forms of knowledge management evolve on the internet. While it is the great strength of encyclopedias that they are flexible and diverse because they do not constitute a formal literary genre, it is their claim to completeness that seems fundamentally challenged by the obvious fluidity of knowledge available on the internet (Hodgkin 2000, 14). It is therefore salutary to remember that the claim to completeness has always served as a rhetorical sleight of hand to divert the reader's attention from an encyclopedia's impossible task of catching a moving target. The larger and the more comprehensive a printed encyclopedia project was designed, the more likely it became that the first volumes were outdated before the last volumes were forthcoming in print. In other words, the fast pace of change on the internet suddenly highlights a challenge that has been part and parcel of encyclopedia projects since Antiquity.

The fundamental challenge posed by the digital environment is therefore not the permanent expansion of the human knowledge base, but how a small academic non-profit publication can keep on top of it while preserving a modicum of academic standards. In 2009 the Wikipedia project comprised a total of about 10 million entries in some 200 languages (Jimmy Wales in Lih 2009, xv–xvi; there is not an up-to-date aggregate number on Wikipedia's main page wikipedia.org, accessed December 14), and in November 2010, Harvard University Library had created some 12.8 million digital files—though one html file does not equal one book or other document—for free internet use (Darnton 2010b, 22). As a free online encyclopedia that depends on private and federal grants, the *EIr* database must proactively attract visitors to its website in order to justify future funding. In the near future it is imperative that the project addresses two issues. The first is that the development of the digital database must reflect how search engines of different browsers crawl the web in the search of information, for in the end every search engine can only find that which has been coded and indexed for discovery. The other issue concerns the internal organization of the database. As the *EIr* project originated as a printed encyclopedia, its transformation to a digital database happened by fits and spurts so that despite all the energy committed to the new website during the last few years, extensive labor is still needed for quite tedious tasks, such as cleaning the database from fragments of previous coding, detecting meaningless cross references to originally envisioned printed supplement volumes, or replacing q.v.s with active hyperlinks.

As a medievalist I find it salient that the role of search engines for data retrieval on the internet has led to a renaissance of the systematic arrangement of content in encyclopedias. In the Western world, a systematic order of content was preferred in encyclopedias from Antiquity to the seventeenth century, because it reflected an author's competence and commitment to providing both knowledge and guidance (Burke 2000, 110). Only in the eighteenth century did the formal alphabetical sequence of entries become synonymous with a modern encyclopedia, the perhaps most famous example of which is *l'Encyclopédie*. As long as the *EIr* was compiled as a printed encyclopedia, the purely formal order of the Latin alphabet easily veiled the critical role of the underlying Iranian Studies concept. The *EIr*'s most basic definition as an encyclopedia about Iran identifies merely geographical borders, a clear indication that the project was started during the heyday of Area Studies Programs; it does unfortunately not provide any criteria for a systematic arrangement of the entries within an hierarchical structure. On the website, the reader's freedom to move in a nonlinear manner between entries may create the visual fallacy of their nonhierarchical arrangement. Yet the website's content and the functionality of its search engine depend on an hierarchical structure in order to determine the prioritizing of entries to be commissioned and edited, and to organize indexing, tagging, and the embedding of hyperlinks.

The internet's immediate challenge to how the *EIr* organizes its content offers Iranian Studies scholars the opportunity to rethink their relationship with other disciplines, including Medieval Studies. It is in general a hallmark of small disciplines that the card-carrying members tend to keep to themselves, while bemoaning that outsiders are not engaging with their scholarship. Large disciplines are envied because of their greater synergy, and feared as being potentially overpowering. As a medievalist I was, for example, surprised that in the 1970s the members of the Advisory Committee did not commission an entry on the Crusades when they planned for entries about Turkish dynasties in Asia Minor, Mongol history, Eastern Christianity, Judaism, or Islamic historiography. The task of successfully adapting the *EIr* to the internet will demand that we look outside our tight-knit community because scholars of other disciplines will only use the *EIr*'s website if its systematic arrangement of content integrates their terminology and reflects their methodological concerns. It should facilitate this task that during the last decades Yarshater cultivated a diverse group of Consulting Editors and contributors who have made the *EIr* already a large-scale collaborative project. But

it is a matter of intellectual honesty to stress that at this point the *EIr* project is merely multi-disciplinary. Those who are not involved with the nitty-gritty in-and-outs of making an encyclopedia are easily fooled into believing that an encyclopedia's fragmented display of content reflects a multi-cultural approach to the humanities. If specialists write separate entries relating to a single topic, the result is not interdisciplinarity, because working on the same region is different from working together.

Within the last decade the commercial search-engine *Google* and the open-source online encyclopedia *Wikipedia* have become dominant forces of internet use. They are often mentioned in the media, and even occasional internet users are familiar with them. But the search engine and the encyclopedia are usually approached as unrelated phenomena, probably because only professional organizers and “information magi” (Grafton 2010, 96) such as librarians or marketing and public relations specialists, who know that digital files invisible to search engines are lost in ether, worry about content retrieval as an essential aspect of content organization. Within the walls of academia *Wikipedia* is primarily discussed as a challenge to undergraduate education (Shahaf 2009) because the free crowd-sourced reference work does not rely any institutionalized academic peer review process, which continues to be regarded as the most effective way to ensure factual reliability, however flawed it may be (Sproat 2010; cf. Runciman 2009). Scholarly debates about *Google* often focus on its large-scale digitization project of *Google Books* as the prime example for the many challenges of how to reconcile the financial interests of authors and publishers vis-à-vis the common good of free access to humanity's cultural heritage (Grafton 2007; Darnton 2010a). Amidst all the excitement about the wealth of digitized books, archival documents, and other artefacts, there is an astonishing silence about the high cost of labor indispensable for guaranteeing a reliably full-fledged interactive website. Since every website demands constant service and ongoing programming, the printing of an encyclopedia in book format is a comparatively cheap one-time event.

As long as research universities will manage to provide IT support and comprehensive library privileges for their faculty as part of their fringe benefits, there is little pressure on academics to consider the actual labor costs of hardware engineering, software design, and library development whenever scholarship is first prepared for publication and then acquired as a research resource. Although grant-making institutions have to

some degree succeeded in making all of us to think about business plans and sustainability whenever we are preparing a grant application (Darnton 2010b, 24), it is curious that the relationship between non-profit academia and for-profit service providers, such as software companies, is rarely mentioned. On the one hand, many non-profit institutions of higher learning economize by cutting funding for their own IT research and development by contracting with Google and Wikipedia for customized software solutions, which do only generate minuscule revenue streams for these companies (for a recent discussion of Google's revenues, see Petersen 2010). On the other hand, the continued success of commercially published Medieval Studies encyclopedias suggests that in smaller fields academic encyclopedias will remain in demand, even if their subscription-only database merely combines the digitized text of a printed version with a good full-text search. The future of the *EIr* will therefore depend on how Columbia University wants to approach the conundrum of a labor-intensive, yet open-access academic web resource which is not financed by subscription or commercial advertising (Hodgkin 2000; Petersen 2010).

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