



Democratization of Scientific and Technical Information

The world of scientific and technical information (STI) has its own culture and its own, long established, rules of use and existence. These have helped bring us many inventions and improvements, to introduce many technological changes, and to make our lives and work much easier and more pleasurable. However, the world is in constant change and the traditional STI environment established long ago is not keeping up with those changes. The democratization of many social activities, which happens around us daily, has not made a significant impact on the world of STI. This is particularly evident in the traditional ways and forms of creating, distributing, accessing, and using information. STI is still operating in an old paradigm. In particular, free and uninhibited access to STI and to the results of scientific research and technological advancements are necessary for the world to overcome current challenges and problems. Poverty, starvation, pandemics and other health problems, clean drinking water, global pollution, overpopulation, energy shortage and world economic and political crises are just some of the areas which can be addressed by and can benefit from the democratization of STI.

As is the case with other social and economic changes, there are factors which can be regarded as instrumental in creating the need for democratization of scientific information and enabling it to ferment further. The main factors of influence are, firstly, the knowledge based economy and the knowledge worker as a user of STI, and, secondly, developments in the area of information and communication technologies (ICT), and particularly the impact of Internet growth.

A knowledge based economy places emphasis on generating knowledge assets such as codified human expertise, research and development (R&D), intellectual, financial, health and education services. In the knowledge economy, markets are increasingly competitive and innovation is in constant demand. Fast assimilation of knowledge is required, while knowledge workers have less and less time to acquire it. They need to find and attain huge quantities of information efficiently and effectively. Information found has to be instantly available and immediately usable. There is no time for conducting complex searches or waiting for information delivery. Once acquired, information and new knowledge are expected to produce added value to specific projects, products and services.

Hand in hand with an emerging knowledge based economy came the development of ICT, modern computers, storage and networking capabilities, and particularly the Internet. These ICT developments led to the critical tools that made the democratization of STI technically feasible. Combined with the knowledge workers' demands, ICT developments triggered a radical change in the existing ways of creating, distributing and using STI. This introduction of increasingly powerful and relatively cheap ICT technologies helped eliminate three previous obstacles from the world of STI. It eliminated physical and geographical barriers, it removed time constraints, and finally, with the introduction of the web and massive storage facilities, it enabled unprecedented amounts of information to be stored and made available online. These two factors, knowledge workers with new and very dynamic demands for STI and newly emerged ICT possibilities, created at the same time a strong demand for democratization of scientific information. There are at least three major areas where democratization of STI is taking place. These include the process of information creation, the ways and means for distributing and accessing this valuable resource, and the conditions for using the information found.

Information creation is a starting point in the process of STI democratization. Science has closed itself behind walls of official titles like professor and official academic degrees such as Dr, PhD, etc. However, at the same time valuable scientific and technical research and development is being performed by engineers, technicians, students, amateurs and enthusiasts. In addition, the use of social networking and collaboration tools is not regarded as sufficiently appropriate for scientific

environments. Democratized science creation needs to open its doors for all others who are devoting their time and energy to these activities. The same applies for publishing the results of such findings. Unless coming from a well known (Ivy League) college, publishing attempts are more or less disregarded by leading scientific and technical journals. Open source journals are slowly gaining ground, but they have a long way to go. The peer review system established to control the quality of published articles in journals is too rigid for the new opportunities offered by today's web-based comments, blogs and social network-based evaluations.

Information distribution and access is another area with high potential for democratization. It requires freedom of access to information and world-wide knowledge, particularly for learning purposes, and reliable and unbiased sources of information. Greater use of open access journals for publishing purposes, instead of commercial journals, can also make a major impact on democratization of distribution and access. The increased use of web publishing is expected to be a major catalyst for this change. The number of new publishers starting up as open access publishers is increasing. The Public Library of Science is one of the best-known examples (www.plos.org). Similar trends are found in the opening of commercial science databases to the general public through free distribution channels. For example, through the World Wide Science (www.worldwidescience.org), regarded by many as a global science gateway.

Conditions for using STI are the third area which needs to undergo some major reorganization and democratization. Current systems of copyrights, licenses, patents and trademarks are counterproductive and dysfunctional from the perspective of a global society and its long-term well-being. Even creators of some intellectual property are not always in the most favorable position. For example, copyright of a published article does not remain with the authors, but gets waived and transferred to the article publisher. So the society at large pays twice for that. In the case of academia, a first time through the grants given to the researchers to do the research, and then later again through subscriptions to journals or through the purchase of published articles. This area is probably the most difficult one to change and democratize, because it involves some fortified privileges and benefits. New models are emerging in the area of software publishing where General Public License (GPL) arrangements are gaining ground and could be applied in other areas, as well.

From the beginning of its establishment in 1970, INIS kept democratization of scientific information at its forefront. The Statute of the International Atomic Energy Agency (IAEA) stated that the IAEA's goal is to foster the exchange of scientific and technical information on the peaceful uses of atomic energy, to encourage the exchange among its members of information relating to the nature and peaceful uses of atomic energy and that it shall serve as an intermediary among its members for this purpose. This goal has led the IAEA to establish INIS, a system to provide computerized access to a comprehensive collection of references to the world's nuclear literature. INIS was designed as an international cooperative venture, requiring the active participation of its members. It started with only 25 members, today, it has 146 members (122 countries and 24 international organizations).

INIS membership benefits include: access to a comprehensive and extensive pool of information in nuclear fields; the right of every INIS member to access relevant nuclear information of all other INIS members; increased access to, and visibility of, a country's national nuclear-related literature; technical cooperation and assistance in establishing and improving National INIS Centers; and help with the transfer of modern information technology and know-how to Member States. It is remarkable that these goals and benefits, based on highly democratic values, were introduced from the very beginning of INIS.

INIS represents an extraordinary example of world cooperation where 146 members give access to their valuable nuclear information resources in order to preserve world peace and further increase the use of nuclear energy for peaceful purposes. Made available are not only bibliographic references to publications, documents, reports and other grey literature, but also their full texts. Besides being a source of information for current search, availability of full texts gives INIS a special role: being a main custodian of this world information heritage and preserving this codified specialized scientific and technical knowledge. A further step in the democratization of INIS took place in 2009 when free, open and unrestricted Internet access to the INIS database was given to all Internet users around the world. This initiative provided easy access to reliable nuclear information on the peaceful uses of nuclear science and technology, including non-conventional literature, and made nuclear knowledge readily available worldwide. Currently, the INIS Database contains over 3.2 million bibliographic records and

almost 350,000 full-text documents, consisting of scientific and technical reports and other non-copyrighted information.

Another advance in the popularization of INIS and its democratization was the introduction of a new public distribution channel. Namely, INIS joined the World Wide Science Organization and has made its database searchable also through their web portal. This sole action doubled the number of INIS database searches, improved its presence in the world of science and increased its usefulness to the scientific and technical community.

Further democratization developments and challenges foreseen by the INIS Secretariat include increasing the number of INIS members, reaching complete world coverage, increasing members' contributions to the database and improving the reliability, accuracy and timeliness of available information resources.

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