Chapter 5
Open Source Approach to Contemporary Research: The Case of Geo-Information Technology

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ABSTRACT

As the open source paradigm is influencing the modern economic world, an increasing number of scientific disciplines use the open working model in knowledge production process. The contemporary research field requires a new shift towards the constantly evolving digital age where collaboration and exchange of information is growing. The shift from traditional research models to open science may be the starting point for scientific innovation. This work presents the case of open scientific research as an analogy to the open source software movement and uses a case study from the Geo-Information technology sector.

1. INTRODUCTION

Contemporary academic research environment is evolving rapidly, adapting to modern scientific challenges. Complexity of modern scientific topics requires advanced approaches to handle and analyze rich and dynamic data. Additionally, the structural and methodological research work-flow is becoming even more complex as the scientific approaches require more methods, types of analysis and data. The challenges of modern academic research environment include data compatibility and data management issues. Furthermore, methodological and work-flow transparency is considered a "good-practice" as it is easier to document, debug and expand. Open source methodology is considered to be a viable and reliable approach mainly due to reliability, scalability, cost effectiveness, and performance issues. Additionally, open source software and collaboration approaches, offer valuable tools in a fast growing information age. Freedoms of open source software, such as redistribution and re-calibration of software source code, are particularly attractive to modern scientific labs.

Open source methodology is suitable for the contemporary academic research environment. The transparent and flexible work-flow model is ideal for a highly competitive environment such as modern research lab. The reliability of software tools and the scalability of processes is necessary to such environments and can be very cost effective

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alternative solutions to modern non-transparent proprietary software. The incorporation of collaboration software to a modern scientific environment offers fast data and information exchange and can cope with the rapidly evolving arena of scientific research. Finally, data-related issues such as data interchange formats and open source data-management-logic, offer adaptability of data to a number of working environments. Everyday researchers worldwide are lowering the barriers to collaboration and communication, especially with the increase of internet infrastructure. Not only is software being "open sourced," but so is hardware and scientific research itself. Many researchers are going beyond passively being open and they are actively seeking participation and creating communities to refine their research. The aim of this text is to illustrate the suitability and comparative advantage of open source working model, in contemporary academic research environment and in geographical science with the example of OpenStreetMap.

2. OPEN MODEL OF KNOWLEDGE PRODUCTION

Open source as a term refers to the availability of the source code of a software. Computer software is made of source code which is compiled and generates an executable software. The term "open source" indicates that the source code is freely available to everyone. Open Source Software (OSS) is licensed in one of the approved OSS licensing agreements that guides the rights and freedoms of the user and the developer. Today there are more than thirty open source licenses recognized by the Open Source Initiative (OSI 2011) and the Free Software Foundation (FSF 2011), which offer a number of legal rights. On the other hand proprietary software refers to the material that does not offer the source code of the application. And are products of mainly closed and concentrated model of production which includes the use proprietorial capital resources. The development circle of the software is centralized and managed by the company which owns the copyrights

Open source production uses a distinctive development and distribution model and it may also be part of a proprietary material. The product may also have two licenses which offer a flexible scheme to the end user to choose the one which best suits his needs. Open source material is sometimes confused with *public domain material* or *shareware* or *freeware*. This is not always true as the term open source refers to the freedom of the end-user and is not related with the price of the software. The "openness" of the term refers to the liberty of the user and not the price. The open source licenses give the user freedom to run the program, to study the code and adapt it, to redistribute copies and improve it.

Those freedoms characterize the development and use of open source material such as software and provide the necessary framework of action for future licensing. Each of the above freedoms has some benefits for the end-user and the community. The freedoms focus on computer software products, but can be also applied to other "open source" processes such as knowledge production process and research. Knowledge production process can be any research and development process in an academic institution, at a research center or in a proprietary environment.

The reason behind the fast spread of open source production model is due to a number of advantages over other production models such as: standards, flexibility, value customers, innovation, quality and choice. More specific, technology and knowledge which is build on true open standards that are consistent and compatible overtime with other technologies is more competitive than other as it offers compatibility (Krechmer 2005, Chen et al. 2006). Ability to customize the production process according to the needs of the product is a valuable ability which makes open source production very competitive. Furthermore, customers