Open Source Software Governance Serving Technological Agility: The Case of Open Source Software within the DoD

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ABSTRACT

The development of open source software is currently arousing increasing interest in the IT world. This research inquires some specific paths enlarging the traditional view over open source software in inquiring the US Department of Defense (DoD) and the dynamics associated its front- and back-office activities. We explain how distinguishing basic administration from operational constraints and weapon R&D dynamics introduces specific governance concerns among public and private stakeholders. By no longer defining open source solutions as mere goods, but as services characterized by a flow of knowledge, we particularly highlight new emerging strategies of technological acquisition. Our analysis leads to revise the traditional role focusing mainly on cost issues and introduces open source software with distinctive properties serving the management of innovation and technological agility at the level of complex systems, exemplified here with the constraints associated to weapon systems and the Network centric warfare doctrine. [Article copies are available for purchase from InfoSci-on-Demand.com]

Keywords: Complex Systems; Defense; Hybrid Software Development Models; Knowledge Transfer; Open Source Software; Systems Integration

INTRODUCTION

The development of open source software, the use of which used to be peripheral and anarchical, is currently arousing increasing interest in the IT world from both practitioners and theorists. Although extensive academic research has been carried out into the subject, this research mostly focuses on commercial implications at both market-based and organizational levels and
yields few concrete analyses with applications to the public sector. Open Source Software differ from proprietary ones, since these are usually distributed under commercial license agreements. Open source software development, which previously constituted a marginal and merely ideological phenomenon, today corresponds to an emerging production model that draws increasing attention. Yet, one key research field would be yet to measure to what extent the open source software development model may be perceived differently under the scope of the various missions associated to public administrations.

This article focuses on the case of open source software adoption by the American Department of Defense (DoD). Following the end of the Cold War, the American Department of Defense is currently turning to a new model redefining its resources, structures and capabilities in order to fit in with a new framework where major uncertainty prevails, where military operations are running on all continents and where public budgets need to be refocused on specific civilian purposes. The end of the Cold War had already introduced an important shift at the time of President Clinton’s administration; new constraints associated to the Global War against Terrorism have been introduced during President G. W. Bush’s administration. Appraising the tenants of the adoption of open source software solutions by the Pentagon requires to nuance the evolution managed by the US DoD over the last twenty years.

We analyze the specificity of the activity of Defense in its national security mission purposes and in the shaping of the industrial relations within the sector. By no longer defining software solutions as mere goods, but as services characterized by a flow of knowledge, we particularly highlight new emerging strategies of technological acquisition, notably knowledge sourcing and outsourcing, for the American Department of Defense. The implementing of such new strategies can consequently entail a reshaping of the industrial environment, as it alters the existing competitive relations between the various agents of the American Defense sector. Our analysis thus leads us to revise the role of the DoD as a program manager and to measure how the adoption of open source software by the military stimulates innovation.

The paper focuses is organized as follows. Section 2 surveys prior open source software related analyses. We show that the ‘libre’ development model is nowadays appraised as a pattern improving productivity and software quality. In this context, an increasing number of firms run their activity upon ‘hybrid’ business models. We present the way open source software development is currently perceived by most governmental administrations. We underline that traditional cost cut concerns prevail over innovation. Open source software tend to be apprehended as a pure substitute to proprietary ones. Section 3 highlights that the US Department of Defense endorses the converse way. Our demonstration distinguishes between the various missions – back office vs. front office – performed by the Pentagon and explain how the main dimensions associated to software quality apply in reality to the system as a whole, from which it turns out that software are impossible to separate. Section 4 focuses on governance issues. It explains first how the Pentagon main driver focuses on innovation and technology management in order to achieve at the required technological “agility”. The recent trends introducing service oriented architectures methodologies and the Open Technology Development project are situated in this process. Section 5 concludes.

FROM OPEN SOURCE SOFTWARE DEVELOPMENT TO HYBRID BUSINESS MODEL. THE CASE OF FIRMS AND PUBLIC ADMINISTRATIONS

The ‘open’ nature of open source software tends to make them public goods (Lerner & Tirole, 2002; Johnson, 2002), since they are defined by non-rivalry in consumption (Baldwin & Clark,
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