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A socio-technical analysis of software policy in Korea: Towards a central role for building ICT ecosystems

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ABSTRACT

Software has become a core component of the information and communication technology (ICT) industry. While South Korea makes active software promotion efforts, the performances and outcomes of such attempts have not been remarkable. Applying a socio-technical system framework, in this study we address fundamental problems of the software industry and successive software policies that have been implemented in Korea. Based on in-depth analysis, we suggest implications for more effective and productive software policy. With the aim of spurring a strong shift in the software industry, culture, and society towards a central role for building the ICT ecosystem, we provide suggestions regarding the concept of a social platform, the importance of core technology, and key properties. Other countries can use this study as a reference as they promote their own software industries.

1. Introduction

Software is increasingly used as a tool or facilitator for the development of society in general, and is therefore becoming more important for the development of the national economy. Software is particularly important in the information and communication technology (ICT) industry, being crucial in the whole ICT value chain from content to platform, network, and device. According to data published by Gartner in 2014, global ICT spending is projected to reach $3.67 trillion in 2015, with the share of software products and services being more than one-third (34.7%) assuming a 4.9% market growth rate. In 2014, IDC forecasted that the worldwide software market would grow at a compound annual growth rate of 6% from 2013 to 2018.

As a global ICT power, South Korea (hereafter Korea) has been successful in ICT innovation. However, growth of the ICT industry in Korea has been concentrated in the network and device sectors. Specifically, Korea has focused on expanding wired and wireless telecommunication network penetration, rather than the software sector. Realizing this gap, the Korean government began implementing software policies in order to promote the software industry and to apply software in fields. Numerous software promotion plans have been published, such as the Software Korea Quantum Jump Strategy in February 2010, the Software Innovation Strategy in October 2013, and the Software Oriented Society Strategy in July 2014.

Even after these efforts, however, the software industry in Korea lags behind other Korean ICT industries. According to data published by the Ministry of Science, ICT, and Future Planning (MSIP), the market size of the Korean software industry in terms of expenses was less than one percent (0.99%) of the worldwide software market in 2013. In terms of sales, only

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three Korean software firms were listed in the top 100 IT service companies, and none were listed in the top 100 packaged software companies in 2013. Therefore, judging by numerical facts only, the efforts of the Korean government aimed at invigorating the software industry and leveraging other industries have not been effective. The Korean software industry has not been activated in terms of economy indices, and the environment to grow a software-oriented society has not successfully been constructed.

Why have software policies in Korea faced continuous failure? While there are several possible reasons, it is noteworthy that software has not been fully discussed in the development of the ICT industry in Korea, and it is necessary to examine why software policies have not been effective despite efforts by policy makers. As Shin and Jung (2012) point out, the meaning of software in the socio-technical context is broader than its technical definition, and includes communities of practice, social practices, technical cultures, and uses. As the ICT industry evolves and enters into the era of the Internet of Thing (IoT), moreover, the meaning of software is becoming broader and the needs for contextual software analysis are increasing.

In light of this problem, in this study we first address the problems of the software industry in Korea while investigating how policies for promoting the software industry have been implemented. Specifically, we apply a socio-technical systems perspective, which systematically and holistically takes into account the social context as well as technological aspects. Based on the socio-technical framework and context, we then examine the main factors that were once disproportionately considered in the development of software policy and make suggestions for designing a more effective and productive software policy as a central role for building an ICT ecosystem. It is worthwhile to focus on software policy, given that previous studies of the evaluation of software policy have only considered open source software (OSS) (Bouras et al., 2014; Lakka, Michalakelis, Varoutas, & Martakos, 2012; Kshetri & Schiopu, 2007) and piracy issues (Andrés & Goel, 2012; Jaisingh, 2009).

In general, a socio-technical system framework has been used to examine policies regarding information systems and large-scale infrastructure (e.g. Shin, 2010b). In particular, this framework has been applied to evaluate ICT policy making, policy implementation, and policy stakeholders (e.g. Shin & Jung, 2012). Since software is the core component of the ICT ecosystem, it is necessary to comprehensively examine general ICT development policy. Therefore, the application of the socio-technical system perspective to software analysis is an appropriate and legitimate way of understanding the intrinsic context in Korea. Necessary data were collected using expert interviews, industry reports, government publications, and other materials to analyze software-related policies in Korea. The following socio-technical inquiries guide this study.

RQ1: What fundamental problems has the government faced in effectively implementing a series of software policies and invigorating the software industry?
RQ2: What factors should be taken into account when shifting software policy toward a central role for the ICT ecosystem?

Answering the questions above will reveal problems in the Korean software industry and in the successive software policies that have been implemented. Interpretive inquiries may help lead to an in-depth understanding and insightful analysis of Korean software ecology. These findings will enable suggestions for effective and feasible software policy that are specific to the Korean situation. To facilitate a stronger shift of the Korean software industry, culture, and society, suggestions such as the concept of a social platform, the importance of core technology, and key properties are provided.

The remainder of this study is structured as follows: Section 2 explains the socio-technical system framework and how it is used in this study. The methodology used in this study and the history of software policy are explained in Sections 3 and 4, respectively. Section 5 describes software policies in reference to the socio-technical framework. The discussion and suggestions for effective software policies are included in Sections 6 and 7, respectively. Section 8 concludes this study.

2. Research framework: socio-technical system

Shin and Choi (2015) argue that technical aspects have traditionally been the focus in investigations of systems and their applications. This conventional approach tends to be narrow, and studies must highlight the interactions between the technology itself, the people who use it, and the organizational and environmental contexts in which it is embedded. A more comprehensive view of the system may be achieved by studying the different layers and the interactions between them. In addition to examining the technical core, it is necessary to consider the manufacturers that control the technical equipment as working conditions affect system function as a whole. The organizational infrastructure is also of great importance, since all parts of the organization need to function together in order to enhance system performance. The environmental context in which the system is embedded also affects its operation. Depending on the system type, environmental factors could include laws and regulations, market competition, or societal factors. Shin and Jung (2012) argue that a holistic approach to system analysis is central, since all of the layers together define the overall performance of the system. Similarly, Shin (2014) highlights the need for a cross-disciplinary framework that represents all aspects of technological systems, including the technical equipment, market, users, and society in which the system is adopted. If all aspects of the system have not been adequately considered, any new design runs the risk of being a failure.

The socio-technical approach has been used frequently in information infrastructure studies. This perspective can be a powerful tool for looking at dynamic and sustainable technology development. When governments seek avenues toward