Standards for ICT: A Green Strategy in a Grey Sector

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ABSTRACT

This paper takes the recent process towards standardizing the mobile phone charger in the EU as a starting point to consider the role that compatibility standards might play in mitigating the negative impact of ICT on the environment. Building on insights gained from the economics of standards literature, the authors explore how the inherent effects of compatibility standards – such as reducing variety, avoiding lock-in, and building critical mass – can have positive implications for the environment. While there is growing interest in how performance measurement standards initiatives with an explicit environmental purpose can contribute to sustainability, the authors argue that current standardization literature and policy have overlooked this important (side) effect of compatibility standards. Having first illustrated how excessive diversity and incompatibilities in ICT generate e-waste, discourage re-use and make recycling economically unviable, this paper develops an economic-environmental framework for analyzing the sustainability effects of compatibility standards and applies it to the case of mobile phone chargers. The authors conclude that compatibility standards are a form of ecodesign at sector level and should be recognized as a relevant complementary strategy towards greening the IT industry.

Keywords: Compatibility Standards, Ecodesign, E-Waste, Green, ICT

1. INTRODUCTION

Following a much-publicized intervention by the European Commission, the mobile phone industry finally agreed in 2009 – after dragging its feet for two years – to introduce a standardized charger based on the micro-USB plug. In the Commission’s communication surrounding the process, it was explicitly announced that by introducing compatibility there would be a reduction in the generation of e-waste and a significant benefit for the environment. The phone charger case illustrates the point we want to make in this article, which is that compatibility standards can contribute in a fundamental way towards improving the sustainability of the information and communication technology (ICT) sector.

In the next section we first consider the need to limit the direct impact of the ICT sector on the environment – which is negative and growing rapidly – by reviewing figures on energy consumption, use of scarce resources and e-waste. We briefly introduce the variety of sustainability-targeted standardization activities already being undertaken by actors worldwide, before looking more closely at the sustainable
impact of compatibility standards as such. Based on their effects on the market, we extend our economics of standards framework to include implications for the environment. These effects are illustrated by the mobile phone chargers case. Finally we discuss the potential use of compatibility standardization to achieve sustainability policy goals.

2. THE CHALLENGE OF SUSTAINABILITY–IS ICT THE SOLUTION OR PART OF THE PROBLEM?

Implicit in many recent policy reports about the contribution of ICT as an enabler for sustainability in other sectors (Climate Group, 2008; Capgemini, 2009) is the assumption that ICT itself is a clean a sector. The negative externalities generated by the sector are often disregarded. For example, the influential Climate Group study (2008) notes that fifteen percent of the CO$_2$ emissions in 2020 can be saved by applying smart ICT in other sectors. However, the direct environmental and rebound effects, that is, the unintended side effects that negate the intended environmental benefits, are ignored or covered up (e.g., Climate Group, 2008, p. 50). The parallels between current promises of ICT towards making an environmental contribution and the hopes held in the 1990s entail a warning. The rebound effects of the paperless office (direct, primary environmental effect) and teleworking (indirect, secondary environmental effect) have become classic examples (Egyedi & Peet, 2003; van Lieshout & Huygen, 2010). While teleworking was hailed as a means to reduce mileage to work, studies show that it increased other transport (e.g., travel during leisure time); and while ICT was expected to reduce paper use (i.e., ‘de-materialization’), in reality - and primarily because of computers - between 1988 and 1998 it increased by a quarter (O’Meara, 2000, p. 129).

Indeed, in stark contrast with the immaterial notion conveyed by concepts such as ‘virtual’, ‘web’ and ‘the cloud’, the impact of ICTs on the environment is highly concrete. It relates to the energy and materials used in manufacturing products; the packaging and logistics of distribution; the energy and material consumption during use; and disposal at end-of-life. At each of these stages, standards can play a sustainability-enhancing role.

2.1. Energy Use

ICT is responsible for a growing proportion of the global energy consumption and greenhouse gas emissions. In a high profile report titled ‘The Internet Begins with Coal’ Mills (1999) already cautioned about the large amount of energy required for Internet use. He calculated that half a kilo of coal was needed to send a file of 2MB. The energy consumption of the Internet, which was at the time eight percent of the total energy consumption of the United States, was estimated to rise within twenty years to 30 - 50 percent. Although he was accused of exaggerating (Koomey et al., 1999), he was justified in highlighting the rapid growth of the Internet and the enormous amount power which ICT requires (OECD, 2009, p. 15). A major culprit is the energy necessary to cool the heat released by ICT equipment. Thus half the electricity in server rooms is spent on air conditioning (Clevers & Verweij, 2007, p. 22). Given the rising number of ICT users worldwide, number of ICT devices per person, capacity of processors, need for data storage and the trend toward always-on [...], it is to be expected that the current energy consumption of the ICT sector will increase further.

In 2006, the electricity consumption of ICT in the Netherlands amounted to 8.4 terawatt hours per year (Clevers & Verweij 2007). This is equivalent to a capacity of 960 megawatt per hour. To indicate the extent of the problem: two nuclear power plants with the capacity of the one in Borssele, the Netherlands, would still not be enough to generate this amount of energy. In this figure of 8.4 terawatt hours the energy required for the mining of raw materials, the production of ICT and the recycling of electronic devices are excluded. The Dutch
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