

## **Cleanweb: How ICT Creates Environmental, User & Business Value**

**Oriol Pascual Moya-Angeler**  
Orilpascual.com, Spain

### **I. Background**

In the last years distributed, network-based solutions have taken over many aspects of our lives; from how we shop, how we access to education, to how we manage our finances. The spread of ubiquitous computing, together with the commoditization of ICT and software development has also influenced the way we deal with sustainability-related issues. This is reflected with the emergence of ICT for Sustainability (ICT4S), a fairly recent interdisciplinary field of research that refers to the use of information technologies with a sustainability purpose. ICT4S has gained relevance among scholars and practitioners. However, when reviewing ICT4S literature, it becomes evident that existing conceptual frameworks mainly focus on the development of ICT applications to process environmental data, as well as the direct and indirect impact of ICT on the environment. A somehow less researched area, although increasingly relevant, refers to the use of ICT to influence user behaviors and their lifestyles. Moreover, the current conversations on ICT4S are largely overlooking the business dimension; i.e. how ICT4S is used to develop solutions that create and capture market value.

### **II. Cleanweb, a New ICT4S Framework**

The answer to the underserved market and business dimensions might come from a new breed of ICT4S solutions in the form of web and mobile applications that not only create environmental value, but also user and business value. These web-based and mobile solutions form a new framework defined as Cleanweb; a form of Cleantech that builds on the use of the Internet and mobile communications to alter how we consume resources, relate to the world, interact with each other, and pursue economic growth. Cleanweb is rising from the intersection of three different phenomenon: clean technologies (Cleantech), the Internet of Things (IoT), and Collaborative Consumption. Cleantech refers to technological solutions delivering specific functionality consuming fewer resources and causing less environmental damage than alternative means with which it is economically competitive. The Internet of Things refers to the pervasive presence of objects – such as sensors, RFID tags, actuators, mobile phones, etc. – which are able to interact with each other and cooperate with their neighboring objects to reach a common goal. Collaborative Consumption is a class of economic arrangement in which participants share access to products or services, rather than having individual ownership. Cleanweb combines the resource efficiency focus of Cleantech, the network approach of IoT, and the market disruption of Collaborative Consumption. Most notably, Cleanweb's contribution to sustainability is in its ability to create value for the environment, the user, and the economy. This is done by balancing technology, with market and business dimensions. The research presented in this paper has two contributions: first, to develop the conceptual framework of Cleanweb beyond the existing definition, and secondly, to build a bridge between existing ICT4S frameworks and the Cleanweb framework.

### **III. Methodology**

The framework presented in the paper is the result of analyzing 132 companies from nine countries. The analyzed companies fulfill a specific set of criteria, including: ICT is at the core to the solution, a focus on resource efficiency, a demonstrated business model, and scalability potential. The data was collected during 2013, through on-line, secondary data-sources.

### **IV. Results**

The resulting Cleanweb-framework covers the main characteristics of Cleanweb, its drivers and enablers, and the mechanism by which Cleanweb creates environmental, user, and business value. When compared with traditional Cleantech, Cleanweb solutions are characterized by an agile development process, the requirement of relatively low amounts of investment (capital light), reduced risks from a business development perspective, and high scalability. The main driver for Cleanweb solutions are the entrepreneurial opportunities, enabled by scientific and technological advancements that allow ubiquitously allocated computers and sensors to talk to each other. Finally, the paper argues that Cleanweb creates environmental, user, and business value. This is done by helping consumers become more resource efficient, by making environmental data meaningful thought visualizations and game dynamics, and by disrupting Cleantech financing models through new approaches (i.e. crowdfunding). In addition to the ICT4S academic community, Cleanweb provides interesting opportunities also for entrepreneurs and individual consumers.