

Sustainable transition of electronics products: WEEE and RoHS linking innovation to governance policies on electronics waste

Erik Hagelskjær Lauridsen
Department of Manufacturing Engineering and Management
Technical University of Denmark, Denmark
e-mail: ehl@ipl.dtu.dk

Ulrik Jørgensen
Department of Manufacturing Engineering and Management
Technical University of Denmark, Denmark
e-mail: uj@ipl.dtu.dk

ABSTRACT

The European Commissions WEEE directive is a governance initiative targeting the complete electronics industry supplying the European market. The directive introduces an extended producer responsibility requiring producers to take hand of end of life electronics products in an attempt to stimulate innovation in a sustainable direction to lower the environmental impacts of the amounts and composition of waste electronics.

Parallel and supportive to WEEE, the RoHS directive has banned the use of a specific (small) number of hazardous substances commonly used by the electronics industry, such as lead, cadmium etc. and known as causing both damage to health and environment where they tend to accumulate. There have been long term preparations towards meeting the standards of the RoHS directive through e.g. the dissemination of technologies for e.g. lead-free soldering and new battery technologies. But there have been no similar product innovation activities in order to meet the intended outcomes of the WEEE directive. Here even the planned inclusion of design criteria and standards in the directives portfolio has been taken out. Instead the focus has been on establishing a variety of organizations and procedures including product registers to handle the economic responsibility transferred to the producers and importers of electronics products.

Present results of the WEEE implementation do not indicate that the introduced economic measures and incentives do influence product innovation in a radical sustainable direction or even lowering the amounts of waste; rather an increased amount of electronics waste is instead exported from all European countries to third world regions based on the possibility (often highly questionable and some times even criminal) for redefining waste as recycled and reused products.

We suggest that this outcome is the result of the complexity of electronic products and supply chains, with evidently no strong, coordinating agents as e.g. in the case of the end-of-life vehicle regulations, where the automotive industry plays such a role. WEEE is conceived in the idea of economic rational agents responding to the created cost incentives of handling the waste as a mechanism that would provide continuous stimulation of innovation through market forces, and thus diminish the need for government involvement and regulation. This model however lacks insights into the specific conditions for producer agency in innovation processes in the electronics sector which does not satisfy the expected outcomes of the delegated agency. While the basic idea sounds great and builds on a positive use of structured governance the involved theory of agency compromises the outcomes and limits the expected impact on a sustainable transition process.

Also the policy processes involved in defining the European Unions waste policies demonstrates the mixed and sometimes contradictory policy goals and management objectives where the interest in removing future costs of waste handling from government including solving the problems of lack of waste handling facilities and regulations in the southern and eastern part of Europe has been overriding the goals of a transitions towards more sustainable electronics products. A few open ends are still to be negotiated keeping a window of opportunity for the transition to get back on track in the form of energy and quality standards for groups of products to be defined as a follow up on the WEEE directive.