

Three Questions: Randolph Kirchain on the spread of electronic waste

December 17 2013, by David L. Chandler



Randolph Kirchain, a senior research scientist in MIT's Engineering Systems Division, has long specialized in analyzing the raw materials used to manufacture new products and the waste generated by those projects at the end of their useful life. In a new study sponsored by the StEP (Solving the E-waste Problem) Initiative and administered by United Nations University, Kirchain and colleagues from MIT and the

National Center for Electronics Recycling studied the growing quantities of used electronics devices—including computers, televisions, and cellphones—that are shipped around and out of the country every year. The study was published online yesterday.

Q. How much of a problem could this growing stream of used electronics become, and what are the most problematic components of it?

A. Used electronics contain some materials that are valuable and some that have the potential to be harmful to humans or the environment if treated in an improper manner. In an ideal case, these products should be dismantled by a certified recycler who ensures that the toxic materials are disposed of properly and the valuable materials can be separated and sent to advanced material-recovery facilities.

Sending the products to a modern landfill in the U.S. does not pose a health risk, per se, but it is an environmental loss because all of the resources that went into mining and refining the [raw materials](#) in the components and then assembling them into [electronic products](#) are lost and cannot be recovered (unless we end up mining the landfills in the future).

The worst-case scenario is sending used electronic products to developing countries for disassembly because the methods used in these countries are usually harmful to the health of the people doing the disassembly, and the environment in which they live. The risks only continue to mount as the volumes of electronics used in society continue to grow.

Q. What value could this comprehensive overview of the issue have in helping governments, regulators, and

industry with their planning?

A. There is a lot of discussion at all levels of government in the U.S. and worldwide about efficient and effective ways to manage used electronics. In particular, there is legislation being proposed at the federal level that would ban export of whole used electronics.

The issue is that there have been very few studies quantifying the amount of e-waste that is generated, collected, and exported, and as such, decision-makers have little information on the amounts of used electronics in these categories. This study provides a context by which people can make informed decisions on the degree to which policies are necessary and the type of impact that can be attained.

Q. Does this study suggest the need for particular kinds of actions to deal with this growing volume of e-waste?

A. The study has several recommendations for how to improve the type of information that can be collected to track the flows of e-waste, particularly export flows.

No trade codes exist for shipping used electronics from the U.S., and as such, a significant portion of our research involved studying trade data to infer which shipments included used electronics. The creation of trade codes for used electronics and investigations into the types of trade codes currently used by exporters of used electronics would significantly improve the ability of governments to track these flows.

In addition, other methods should be used to track flows of used electronics, including investigations of shipments that are likely to have used electronics in the U.S. and in destination countries. Finally, flows

should be analyzed across multiple years—ideally on an annual basis, at least—in order to discern trends for these flows.

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