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Waste prevention in smart cities

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POSITION PAPER

Smart cities, superficially understood as "using information technologies to make urban management more informed, efficient and easy", are a trend being promoted and, by some accounts, deployed in many parts of the world. Trying to persuade municipalities to use more IT however is not something I see myself contributing much with. I prefer to focus on the question that was on the original call for OpenDoTT, the research project I'm part of: "can we create cities that are not just smarter, but kinder, fairer and more citizen-centred?".

Obviously, there would be many ways to approach this question. Open design, trust and IoT - the overall themes of OpendoTT - could be part of such a future on fields as diverse as traffic control, public safety or urban inventory. I however did not start from scratch. Along with a somewhat fragmented academic career, I have spent the last couple of decades as an activist, as well as working for nonprofit organisations and occasionally advising public administration. I was even elected for a role in a public advisory committee on cultural policy at a local level where I used to live, and tried to create a similar body for science and technology.

A significant part of my research journey since 2019 has been an open inquiry on what my subject field would be. If I do not feel particularly attached to human-computer interaction where our project has its roots, I do acknowledge having learned from research methods used in the area. My topic of investigation however lies at a crossroads of fields: in between design, sustainability and urban studies, to be brief. I see myself living on that multiple boundary. That was also true in earlier stages of my academic career: my Master's was on a transdisciplinary programme, under the supervision of an anthropologist who had researched free software communities. I had also the opportunity to take part on an action-research project on open and

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collaborative science and development in a smaller city in Brazil that allowed me to interact with researchers on very diverse fields.

Surely, themes such as the circular economy, doughnut economy and zero waste are making their way into local and international policy. My first attempt then was to look into how those topics were being explored in smart city initiatives. Much to my disappointment, they are not. In general, whenever smart cities and waste are found in the same sentence, it seems to be about improving the efficiency of household waste collection - often via the deployment of the so-called smart bins, of questionable relevance.

I have then turned my research questions to focus on waste prevention rather than waste management. This change of emphasis has opened many possibilities. It moved my work away from improving the collection and aiming at a larger proportion of discarded materials being sent to recycling, incineration or landfills. The well-known formulation “reduce, reuse, recycle” has indeed a hierarchy of precedence. We should first try to reduce consumption, then aim at reusing as much materials as possible, and only then think of recycling as a last resort. The reason to avoid recycling is that it is an industrial process that has itself environmental as well as economic impacts.

If I aim at reusing second-hand goods and materials, how does that ping back into my research on IoT, smart cities and open design? I expect to explore the idea of cities implementing their own reuse centres. I call them transformation labs. They would resemble makerspaces and fablabs, but with a conscious focus on reuse of materials rather than making or fabrication. And they would seek a wider user base. Very often, places around the so-called maker culture are home to white, middle class university students and are biased with a vocabulary stemming from the worlds of design and computer science. Transformation labs, on the other hand, would welcome any citizen willing to repair or transform objects. They would offer tools and equipment, space to store objects with potential reuse value, and promote unexpected encounters of people with diverse backgrounds. I see transformation labs becoming an integral part of local waste management systems, allowing communities to reap the benefits of becoming more savvy and knowledgeable on how to reuse things. They could even be modular and mobile, mounted on pedal-powered structures available to city dwellers and community groups.

New technologies could emerge along with the transformation labs to enhance their ability to assess the potential value of discarded materials and act on that potential. The two prototypes I am working on - the universal registry of things and E-I, the evaluation interface, are telling examples. And I'm sure more could emerge as future transformation labs interact with technical schools, repair shops, zero waste communities and others.