

Prospectus

Harnessing Data and Application Development for Food Waste Reduction  
(Technical Report)

Reducing Food Waste in Charlottesville  
(STS Research Paper)

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## STS Thesis

There are an infinite amount of potential endeavors to invest in researching while attempting to better a city and its future. However, not all endeavors maintain an equal amount of value with respect to a specific city. Charlottesville is not invincible to the environmental effects of food waste, and so strengthening the environment is already an effort. Therefore, it is important to consider values grounded in the community that have not been commonly examined. There is importance in distributing food between the highly contrastive socioeconomic groups in Charlottesville. Not only is this a method to reduce food waste, which can be supported by technology, but also a way to benefit other parts of our immediate community such as developing an inclusive society, local connectedness, and health.

Therefore, drawing technological inspiration from places such as California, Italy, and China can drive Charlottesville in the direction to significant food waste reductions, and furthermore a healthier society and a smarter community. Charlottesville can rely on and utilize stakeholders to begin a strong movement towards substantial food waste reduction. How can we, in Charlottesville, use technology and ICT applications already implemented in smarter cities to improve the cultural and political ramifications of food waste? Food waste background information, literature, existing data, and field research can help us to begin answering this important question.

Primarily, there are many researchers, countries, and societies that have already made great efforts to understand food waste origination and progression; using this information can provide a foundation for better understanding of the problem. Ciaghi and Villafiorita provide a detailed review of food security and improving the quality of life at all levels of society. Primarily, communities must acknowledge that there is limited scientific literature covering ICT-based tools to help reduce food waste; this is a new emerging trend that requires data collection and analytics. However, large businesses currently utilize technical intelligence tools to optimize inventory and minimize waste at various levels of the supply chain (Ciaghi, A., & Villafiorita, A., 2016). Their motives may be to maximize revenue, but their techniques have improved unnecessary stock loss and are applicable to the food waste problem.

Although these tools are not available as small scale software applications, extracting the core techniques which consolidate the software can propagate into the field of communal food waste. We can apply the business software's algorithms, methods of data collection, and resulting actions to Charlottesville's course of effort. Furthermore, Ciaghi and Villafiorita noted that Farr-Wharton discovered effectiveness in informing users of food expiration and quantity, very similar to how larger businesses ration their stock at larger volumes. (Ciaghi, A., & Villafiorita, A., 2016) Using ICT tools, Charlottesville could implement a system to educate users of the aforementioned dates and quantities.

Next, Damian Maye provides information in his piece of literature titled "Smart Food City: Conceptual relations between smart city planning, urban food systems, and innovation theory". Maye recognizes the importance of technological innovation for the cause, but with a blend of social innovation and institutional change. Charlottesville is located in a first world

country which allows for democratic political change and social innovation, just as Maye suggests. Therefore, the ICT tools that Ciaghi and Villafiorita allude to can be harnessed to accomplish social innovation change by facilitating conversation and communication between community members, producers, and in-need consumers (Maye, D., 2019). The data and city members' opinions can also be supplied to governmental figures to provoke institutional transformations.

An interviewee, a sustainability coordinator at Aramark named Brooke Kinsey, supports the proposed changes that Maye, Ciaghi, and Villafiorita insinuate in their work. Kinsey notes that there are already food waste reduction programs taking place in Charlottesville: local composting, data collection, and food scales. However, Kinsey is quick to note that the programs will not see significant results unless community members are better educated about the subject, there is coordination of a central city effort, and more technology is put into place. Kinsey references California, a state that is far more advanced than Charlottesville in their food waste efforts. California enacted a food waste legislation bill which requires businesses to arrange for recycling and composting services after a certain amount of waste is generated per week. The act also expanded existing state liability protections to cover donations made directly to end users such as food banks, a stakeholder consistent with Charlottesville.

Altogether, Kinsey proposes changes Charlottesville's political, technological, and educational system. Drawing from California's data, Charlottesville could see a twenty percent reduction in food waste if we decided to follow in the state's steps. Kinsey's credible proposals such as a larger database, ICT technology, and formal food donation systems form a foundation of a very promising course of action in Charlottesville.

In conclusion, Charlottesville has great potential for reducing food waste as a city. This statement is supported by the scientific literature, credible sources, and data collection which have been presented. However, this great potential can only come to fruition with continued research, software development, and community education. We need to define the most efficient and effective ways to educate different social groups within our community, be it social media, advertisements, or news outlets; this can be done by analyzing existing social data. Next, technology needs to be put in place to collect data in order to track progress of the movement. In turn, this information can be used to target specific aspects of food waste reduction, such as restaurants, homes, or corporate suppliers. Lastly, there needs to be a project to champion and take hold of a central resource, using ICT applications, for community members to connect and efficiently move leftover food to those in need.

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