Strategic niche management of zero-waste cities in the transition to sustainability: Japan and Italy cases

Introduction and Background: Global efforts for creating sustainable environment are seen with the endeavor of the Sustainable Developing Goals from United Nations that focus on circular economy principles. Despite of the 9R hierarchy proposed by the circular economy, some studies indicates that incineration is not a sustainable solution (Morris, 2016; Lee et al., 2020). Alternatively, there is the Zero Waste Hierarchy of Highest and Best Use 8.0 that avoid the practice of burning trash for the municipalities and propose a lifestyle focused on responsible consumption for citizens around the globe (ZWIA, 2022).

The emergence of zero-waste cities constitutes a significant global trend, integral to the sustainable evolution of smart urban environments (McQuibban, 2022). This study explores the proliferation of zero-waste initiatives in Italy and Japan, examining the progression from localized efforts to national strategies. The central research inquiry focuses on the existence of zero-waste networks and their role in facilitating this transition. In-depth analysis was conducted on the developmental potential and technical systems that influence regional implementation, alongside factors that accelerate or impede the transition to zero-waste status.

Literature Review: The Strategic Niche Management (SNM) approach suggests that sustainable innovations can be facilitated by creating technological niches, protected spaces for experimenting with the co-evolution of technology, user practices, and regulatory structures. If well-constructed, these niches can drive broader social changes towards sustainable development (Schot and Geels, 2008). According to Rozakis et al. (2024) SNM is a framework aimed at actively developing niches, seen as protected environments that encourage sustainable innovations. These niches are made up of local projects or experiments connected through global networks and intermediary organizations. These intermediaries collect knowledge from local projects, make it transferable, and aid in setting up new projects that adapt this knowledge to their specific needs. As projects replicate, niches expand and can potentially challenge or replace existing, less sustainable systems. The SNM approach has identified three key elements for successful niche growth: shared visions and goals, networking, and learning.

Nations could potentially actualize their zero waste objectives through the formulation and implementation of a comprehensive national zero waste strategy. This strategy would encompass the integration and promotion of zero waste initiatives, both within community frameworks and industrial sectors, into the broader waste management policy. By embedding these initiatives at the core of waste management strategies, countries can pave the way towards a more sustainable and waste-free future, aligning environmental goals with practical policy measures (Zaman, 2015).

In Asia, the data from Kamikatsu (2021) substantiates the town's commendable achievement of an 81% recycling rate in 2020, positioning it among the foremost in the nation in terms of recycling efficiency. This rate is surpassed only by Toyoura in Hokkaido and Ozaki in Kagoshima, marking Kamikatsu as a leading exemplar in national recycling efforts. This statistic not only highlights the town's commitment to environmental sustainability but also sets a benchmark for other regions striving for excellence in waste management practices (Shenyoputro and Jones, 2023).

Capannori, a municipality in Italy distinguished for its early adoption of a zero-waste strategy in 2007, with the ambitious objective of eliminating landfill waste by 2020, this locale offers a distinctive case for scholarly investigation in the field of business management. Capannori's role as a first mover in this sphere provides a compelling research opportunity. In this case, the local government initiatives in zero-waste management translate into substantial policy transformations as opposed to being merely symbolic political acts. Capannori's approach shed light on the operational effectiveness of zero-waste strategies at the municipal level (Romano et al., 2019).

Methodology: The research approach, including secondary data analysis and field observations started in 2022 with a visit to Kamikatsu, a municipality of Tokushima, in Japan that has around 1.300 inhabitants, and known as the leading zero-waste city in that country. Later in 2023, the field observation was in Capannori, a municipality of Lucca, in Italy, known as the first zero-waste city in the country. Countries with small area extension have less options regarding waste management once landfills occupy valuable space and can create many negative externalities as leakage, methanol emissions, bad smell propagation etc. In addition, they are not the most efficient option to deal with used products with potential to be reused or recycled.

The selection criteria for the case studies in Italy and Japan, emphasizes their geographical, demographic, and waste management similarities. Japan and Italy are countries with advanced economies and technologically developed industries. Both face similar demographic challenges, such as an aging population and low birth rates. Geographically, both are mountainous countries with significant seismic and volcanic activity. Geological instability can affect the structural integrity of landfills and incinerators, requiring special engineering and monitoring measures. It is crucial to ensure that this waste management’s plants are designed to withstand earthquakes, preventing the release of pollutants, and ensuring public safety.

Findings: In coherence with what was identified by Shenyoputro and Jones (2023), the case of Kamikatsu presents an exemplary model for operationalizing Zero Waste principles through a tripartite strategy. Firstly, it emphasizes the pivotal role of recycling and resource recovery, facilitated by meticulous source separation. One outstanding aspect of the field visit was observing how clean and organized all the materials are in the segregation station. This enhances a lot the possibility of a material be recycled.

Secondly, it underscores a collaborative approach between residents and governmental bodies, aiming to alleviate the fiscal responsibilities associated with waste management. Not paying for waste taxes and making profit to the community with the help of the elderly community with zero-waste is a practical example of the triple button-line.

Lastly, it advocates for a paradigm shift among product manufacturers, as the zero-waste brewery, urging them to reconceptualize and redesign their products with a focus on reuse. This comprehensive approach exemplifies a forward-thinking in waste management, harmonizing environmental stewardship with practical, community-driven solutions.

Despite of well-established zero-waste practices, only in 2020, Ōyama-san founded the Zero Waste Japan (ZWJ). He was joined by Okuno-san, who also had prior experience with the Zero Waste Academy. ZWJ, emerging as a derivative entity from the Zero Waste Academy, signifies a strategic

expansion from its local origins. The Academy, established in 2005 and located in Kamikatsu, that laid the groundwork for this national initiative. Based in Shinjuku, Tokyo, ZWJ operates as a General Corporation with the mission of co-creating opportunities for the adoption and implementation of Zero Waste practices, as outlined in their 2020 manifesto (Dam, 2020).

Even having almost identical objectives, the scenario in Italy was different. Established in 2009, Zero Waste Italy (ZWI) serves as a pivotal organization in the alignment and coordination of "Italian Zero Waste" (other organization) initiatives with the broader European and global frameworks of this movement. This entity operates in a synergistic and non-competitive capacity alongside the "Italian Zero Waste", in accordance with the International Charter of Naples by the Zero Waste International Alliance, from the United States.

ZWI engages in extensive collaborative efforts with numerous local groups, offering essential resources in terms of contacts, expertise, and training programs. Notably, it maintains cooperative relationships with the Zero Waste Research Center of the Municipality of Capannori, Ambiente e Futuro (Environment and Future), ANPAS Nazionale, and the Volunteer and Participation Center of Lucca. A significant aspect of Zero Waste Italy's mandate involves the regular compilation and updating of the list of Italian Zero Waste municipalities. Furthermore, Zero Waste Italy actively participates in global environmental advocacy by partnering with GAIA (Global Alliance for Incinerator Alternatives). This collaboration focuses on the co-coordination of the World Days of Action for Alternatives to Waste Incineration at the national level in Italy, underscoring its commitment to sustainable waste management practices and alternatives to incineration.

The current president of ZWI, Rossano Ercolini, was president of the Zero Waste Europe in 2013, that function as a non-governmental organization with a focus on empowering communities to transform their relationship with resources. It operates as both a knowledge network and an advocacy group, aiming to redefine societal interactions with resources. The organization supports local groups by providing them with independent knowledge and efficient tools, enhancing the effectiveness of their change initiatives. Currently, it collaborates with active groups in 24 countries. Additionally, Zero Waste Europe plays a pivotal role at the international level, structuring the movement to better represent community interests at the European Union level. This involves engaging with policymakers through a unified voice, advocating for policy changes that align with the organization's objectives of resource sustainability and environmental stewardship.

The relationship between the two is symbiotic. Zero Waste Italy benefits from the broader network, resources, and policy advocacy of Zero Waste Europe, while contributing local insights, experiences, and strategies that can be shared and potentially adapted by other countries within the network. Zero Waste Europe, in turn, relies on national organizations like Zero Waste Italy to implement and adapt zero waste practices in specific local contexts, which is critical for the overall success of the movement across Europe.

Implications and Recommendations: Strategic Niche Management (SNM) plays a critical role in the development of zero-waste cities by emphasizing three key processes: learning, network building, and establishing shared visions and expectations. The learning process in zero-waste cities involves gaining insights from pilot projects, community initiatives, and local policies, focusing on understanding effective strategies and adapting them to local contexts for the improvement of waste

management practices. Building networks is also crucial, where actors like local governments, businesses, community groups, and residents share knowledge, resources, and support, essential for the development and expansion of zero-waste initiatives. SNM underscores the significance of a shared vision and expectations, where a collective goal of waste reduction and sustainable management unites various stakeholders, fostering collaborative efforts towards achieving these objectives.

The establishment of Zero Waste Italy, by Rossano Ercolini, was a precursor of Zero Waste Europe network that currently impacts on directives regarding waste management in all Europe. In Italy the learning and consequently the knowledge flows from the zero-waste niched institutions as ZWI and Italian Zero Waste to the community, municipality, and region. The network develop is internationalized and all stakeholders share the same visions and expectations. In Japan, the learning process gave force to initiatives of the Zero Waste Academy in Kamikatsu that have directed the Zero Waste Japan, a broader network.

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