

**Product-Service Systems as a promising approach to
sustainability: exploring the sustainable aspects of a PSS
in Brazil**
by

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Presentation outline

- Context and objective
- Research methods
- Analysis of the PSS
 - Reverse osmosis water system description
 - PSS sustainable potential
- Findings on sustainable PSS
- Conclusions and future work
- Acknowledgements

Context and objective

- Sustainable PSS models has still not been widely implemented
- Literature is in the early phases regarding how to define when a PSS is sustainable and successful
- Empirical investigations might help theory building regarding PSS and sustainability
- **Paper's objective:**
 - Investigate the sustainable potential of a reverse osmosis water purification PSS available in Brazil in comparison with bottled water

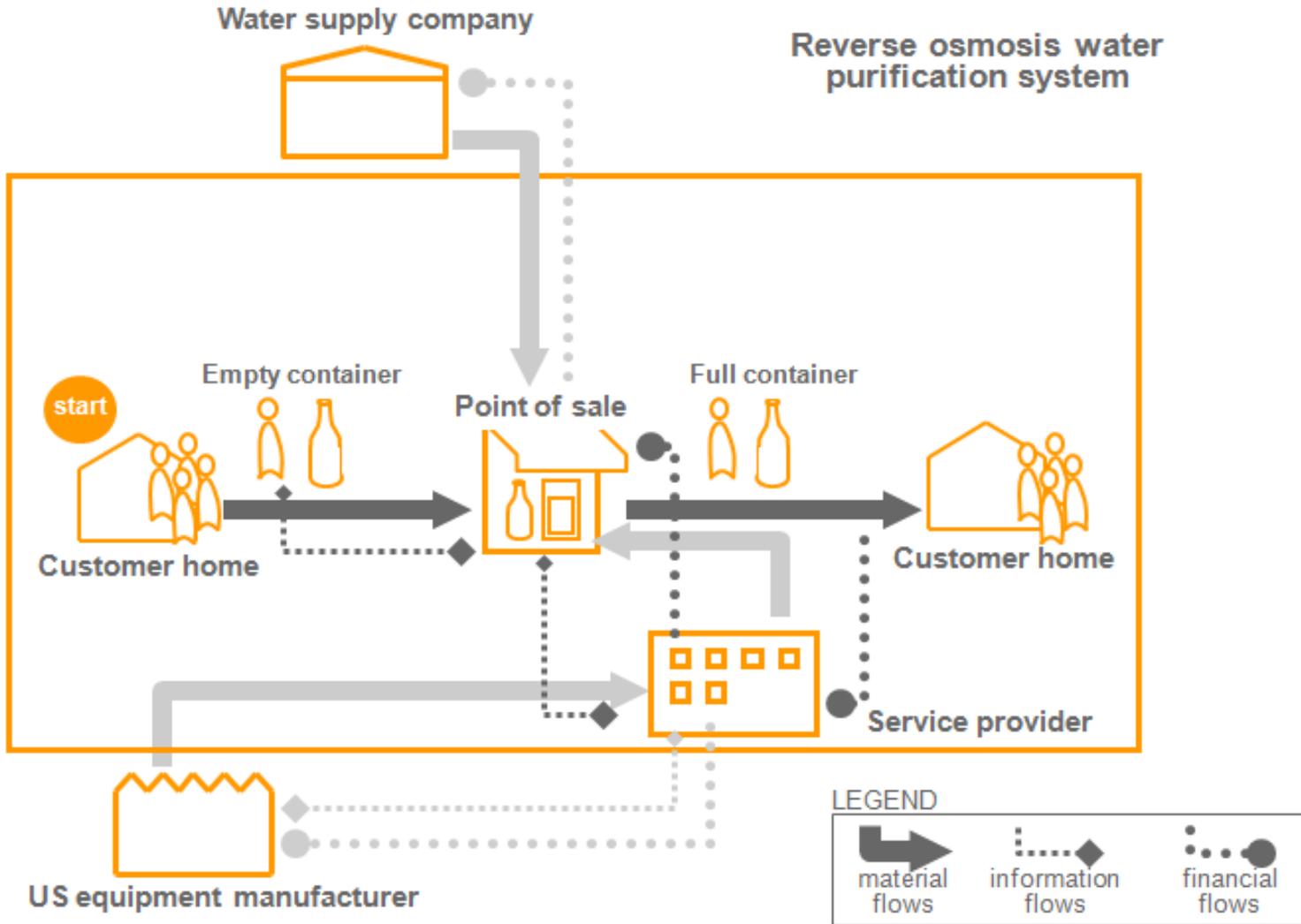
Research methods (1/2)

- Study involving a B2C reverse osmosis water purification system
- Analysis of PSS elements, classification and contextual conditions in the light of the literature
- PSS sustainable potential analysis
 - Data collected by a combination of techniques based on observations and semi-structured interviews with PSS actors (customers, company and commercial establishments)
 - Literature review addressing sustainability aspects that could be used for PSS sustainability assessment in three sustainability dimensions

Research methods (2/2)

Conceptual element	References
Greenhouse gases emissions Renewable resources use Efficient use of resources	Manzini, Vezzoli (2003)
Waste generation Energy consumption Efficient use of transport	Omman (2003); Evans et al. (2007); Lee et al. (2012); Hu et al. (2012)
Health and safety	Omman (2003); Lee et al. (2012); Hu et al. (2012)
Employment of labor	Omman (2003); Devischer, Mont (2008); Hu et al. (2012)
PSS acceptance by customers	Mont (2004); Devischer, Mont (2008); Hu et al. (2012); Armstrong et al. (2014)
Operational costs	Evans et al. (2007); Devischer, Mont (2008); Tonelli et al. (2009); Hu et al. (2012)
Added value	Omman (2003); Devischer, Mont (2008); Hu et al. (2012)

Analysis of PSS - system description (1/2)



Analysis of PSS - system description (2/2)

PSS elements	RO system elements
Product	Water purification equipment
Services	Services in the point of sales
	Water purification service in pay-per-service unit
	Equipment installation services
	Equipment maintenance services
	Refurbishing services
	Reuse services
	Recycling services
Infrastructure	Public water network
	Commercial establishments infrastructure
Actors	Brazilian company
	Commercial establishments
	Equipment manufacturer
	Public water supply company
	Customers

Analysis of PSS - sustainable potential (1/2)

	Aspects	PSS	Bottled Water
Environmental	Greenhouse gases emissions and efficient use of transport	Transportation is only needed for equipment installation and maintenance	Several transports are performed until the product reaches the point of sales
	Renewable resources use and efficient use of resources	There is almost no water waste, customers brings their clean container for filling and purchase exactly the desired volume	Major water consumer, not only as raw material but also as an input in the process
	Waste generation	Filters are the only waste during use phase	It generates wastes at all stages of the process (plastic bottles, labels, caps, seals and contaminated water)
	Energy consumption	Energy consumption is minimum (the equipment has only a low energy consumption hydraulic pump)	It uses large amounts of energy to manufacture, transport, and recycle the packaging

Analysis of PSS - sustainable potential (2/2)

	Aspects	PSS	Bottled Water
Social	Health and safety	It does not offer risks to workers and customers health	The plastic resins transformation involves the handling of chemical substances which offer health risks to workers
	Employment of labor	It has the potential to generate more jobs, as it involves many actors	It is still responsible for a large employment of labor
	PSS acceptance by customers	It is well accepted by customers and the sales has been increasing, as well as the demand for more water purification equipment	—
Economic	Operational costs and added value	It allows gains to all stakeholders for the customers the costs is € 1.2/20l	The cost of the same bottled water volume in the region is around € 3.0

Findings on sustainable PSS

- The use of plastic packaging is still internalized in customer behavior
 - Scenarios can be used to support PSS transition and to discuss alternative perspectives in different contexts
- PSS should be approached as a transformation of existing practices and needs
- PSS must be embedded as a stimulus that could be used to create new beliefs and habits
 - When actions become routines is easier to embed in the culture
- The relationship between actors was noted as an important aspect in customer satisfaction

Conclusions and future work

- This study aimed to contribute to the PSS empirical knowledge by analyzing a PSS with high sustainable in an emerging economy
 - In comparison with bottled water, this PSS is competitive, satisfies customer needs, and has a lower environmental impact
 - It represents a significant opportunity for contexts where people do not have access to potable water
- Future Research
 - Sustainability assessment tools to quantify PSS sustainable potential
 - More studies about PSS social implications, especially in developing countries and regions that people do not have access to potable water

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