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SUSTAINABLE SERVICES AND INITIATIVES IN JAPANESE AND AUSTRALIAN CONVENIENCE STORES

MARIANO RAMIREZ, Dr | UNIVERSITY OF NEW SOUTH WALES, AUSTRALIA
EDILSON SHINDI UEDA, Dr | CHIBA UNIVERSITY, JAPAN

ABSTRACT

Responding to the lack of academic literature about sustainable services in convenience stores, this preliminary study explores the current situation for sustainable services and initiatives among convenience stores in Japan and Australia. More specifically, the paper explores the potentials for enabling collaborative consumption and product-service systems in convenience retailing spaces.

KEY WORDS

Sustainable services; Service design; Convenience stores; Japanese retail; Australian retail.

1. BACKGROUND

Convenience stores are 'retail businesses with primary emphasis placed on providing the public a convenient location to quickly purchase from a limited array of consumable products and services, predominantly food and fuel' (NACS, nd). The convenience store industry was born in Dallas, Texas in 1927 when the Southland Ice Company opened the Tote'm Store in their ice dock and sold milk, bread, and eggs after the grocery stores have closed for the night. While the concept took decades to gain critical mass, by 1946 Tote'm had several branches across the United States and started operating from 7 am to 11 pm, prompting a business name change to '7-Eleven'. In 1963, the 1,052 7-Eleven stores in 250 cities all over the USA were open 24-hours, 7 days a week (ANZILOTTI, 2016). The convenience retailing concept spread globally and in 2021 the USA had 150,274 stores operated by 202 large chains (CSP, 2021; NACS, 2021). Many other home-grown convenience-store franchise chains operate in Europe, Asia, and North and South America. In the USA, 80.9% of convenience stores sell motor fuels and 22.6% of sales come from prepared foods (NACS, 2021).

Like most food retailers, convenience stores generate significant amounts of municipal solid waste, including food waste, spent coffee grounds, and packaging. In-store food losses eat up to 10% of the total food supply at the retail level; perishables such as baked goods, produce, meat, seafood, and ready-made foods account for most food losses in stores, mainly due to overstocked product displays, an expectation of cosmetic perfection, expired sell-by dates, damaged goods, outdated seasonal items, and over-supply of unpopular items (GUNDERS, 2012). Food retail stores are notoriously linked to the problem of single-use plastic shopping bags.

1.1. Convenience Stores in Japan

Japan's first convenience store was launched in 1969 (KIM, 2001). While the general concept of a convenience store was born in the United States, in Japan a unique business service system developed. Known as *konbini* (コンビニ) in Japanese, the convenience store model has been very successful, and where previously convenience stores used to be simply 'a place to sell merchandise' they now have become 'a place to offer services' as well (ISHIKAWA & NEJO, 2002).

The 24-hour service of convenience stores is considered as one of the most important factors that changed the lifestyle of Japanese consumers (JEA, 1994). With the aging of the Japanese population and the tendency to live alone, one-stop convenience retailing has become more practical. The proximity of convenience stores to homes and workplaces, the wide range of services, the 24-hour availability, and the small portions of products available are appealing to a rising number of aging, single-person households (TAKEMOTO, 2015). As of May 2021, there were around 55,889 convenience stores in Japan (JFA, 2021). Table 1 lists some of the most popular convenience stores in Japan.

Convenience stores in Japan have become a part of the local community life, providing bank, postal, and courier delivery services; acting as ticket agents for concerts, theme parks, and airlines; offering multimedia stations (MMS) for photocopying, fax, printing; accepting utility and tax payments; selling stamps, postcards and prepaid credits for cellular phones; facilitating the recharging of electronic wallets; and even handling laundry, home cleaning services, large garbage pick-up, and online shopping (STORZ & MOERKE, 2009). New products are introduced every week, in a relentless race to outdo competitors. It is common to find street corners in major Japanese cities crammed with three or four conveniences stores (MARTIN, 2018).

Today convenience stores in Japan stress the role of their stores as being part of the social infrastructure, such as supplying goods during disasters. Due to the greying Japanese population, some convenience stores are revising their offerings to suit the tastes and needs of seniors by introducing home delivery, healthy bentō (boxed meals), in-store pharmacies, elderly care support counters, universal design bathrooms, assistance in choosing day-care and nursing facilities, and social meeting spots with seating and karaōke (sing-along) (KODERA, 2015; NAGATA, 2012). A few have become 'hybrid stores' with bookstore sections (KYODO, 2019). Most have eat-in spaces, with microwave ovens and electric kettles, allowing customers to enjoy sit-down meals and dine with family and friends. Japanese convenience stores are also sales points for the official city-designed domestic trash bags for combustible and non-combustible waste, and voucher-stickers for disposal of large items, in line with the Japanese pay-as-you-throw legislation.

Convenience Store	Business Name of Parent Company	Origin	Establishment	Japanese Locations	Comments
7-Eleven	Seven & I Holdings Co Ltd	USA	1977	22,500	See Section 3.3
FamilyMart	Itochu Corp	Japan	1973	16,504	See Section 3.4
Lawson	Mitsubishi Corp	USA	1939	14,691	See Section 3.5
MiniStop	AEON Co Ltd	Japan	1980	2,002	See Section 3.6
Daily Yamazaki	Yamazaki Baking Co Ltd	Japan	1983	109,361	Some stores are bakeries only
Poplar	Poplar Co Ltd	Japan	1976	818	
Seico Mart	Secoma Co Ltd	Japan	1971	1,261	Japan's first homegrown konbini
New Days & Kiosk	JR East Japan Railway Co	Japan		900	Inside train stations only

Table 1: Selected list of convenience stores in Japan. SOURCE: Prepared by the authors.

1.2. Convenience Stores in Australia

In Australia, convenience stores trace their roots to the traditional suburban 'milk bars', which were small and local 'Mom-and-Dad' businesses that sell newspapers, groceries, fish-and-chips, hamburgers, milkshakes, ice creams, and confectionery, and that served as socialization venues for the community, replete with seating, jukeboxes, and pinball games (O'CONNELL, 2017). In 1977, 7-Eleven Stores Pty Ltd introduced the franchised convenience store concept in

Australia. As franchised 24/7 convenience stores and fast-food restaurants became popular, many traditional milk bars closed shop (AFN, 2012). In 2021 the Australian convenience retailing industry included 8,011 businesses nationwide and employed 24,260 people (IBISWORLD, 2021). Table 2 lists the well-known convenience chains in Australia.

Convenience Store	Business Name of Parent Company	Origin	Establishment	Australian Locations	Comments
7-Eleven	7-Eleven Stores Pty Ltd	USA	1977	708	See Section 3.3
Coles Express	Eureka Operations Pty Ltd + Coles Group Ltd	AUS	2003	723	See Section 3.7
EG (Euro Garages)	EG Group Australia Pty Ltd	GBR	2018	540	See Section 3.8
Star Mart	Caltex Australia Pty Ltd	AUS	2011	550	See Section 3.8
The Foodary	Ampol Ltd	AUS	2017	66	See Section 3.8
Woolworths Metro	Woolworths Group Ltd	AUS	1997	64	See Section 3.8
BP (British Petroleum)	BP Australia Pty Ltd	GBR	1957	1400	Truck stops, cafés, ATMs, car wash, trailer hire, lawnmower hire.
IGA Xpress	Metcash Trading Ltd	AUS	1990	*1600+	*Includes full-size supermarkets
OTR	On The Run Pty Ltd	USA	1984	145	Automatic car wash, touchless car wash, and valet car wash; coin-operated dog wash; trailer hire.
Puma Super 7	Chevron Australia Downstream Fuels Pty Ltd	USA	2013	211	Car wash, trailer hire, free Wi-Fi, ATM, showers.

Table 2: Selected list of convenience stores in Australia. SOURCE: Prepared by the authors.

2. THEORETICAL FOUNDATION

The literature does not provide a clear definition for ‘sustainable services’. It can be surmised that the multiple indicators that help define ‘sustainable products’, ‘sustainable solutions’ or ‘sustainable design’ could be applied to ‘sustainable services’. By this, we refer to solutions that inherently have lower environmental impacts from materials and energy at various stages of the lifecycle, during production and consumption as well as at end-of-life.

In the absence of an accepted framework for assessing the sustainability of services, this paper will draw on some of the accepted concepts for assessing the environmental and social aspects of the sustainability of products and solutions, namely dematerialization, product-service systems, circular economy, and corporate social responsibility. These concepts are not mutually exclusive; they are highly interrelated and overlap in many cases.

Dematerialization refers to the reduction in the intensity of materials in physical products or systems for their delivery (CLEVELAND & RUTH, 1998; HEISKANEN & JALAS, 2000; WERNICK *et al.*, 1996). This strategy could decrease the quantity of raw materials embodied during production or consumption, and consequently of waste during disposal, thus potentially minimizing environmental impacts. Related to the dematerialization strategy are miniaturization (designing for size reduction, such as micro-SD cards), lightweighting or optimization (designing for weight reduction, such as thin-walled bottles), immaterialization or digitization (designing for intangibility or virtual substitution, such as emails and teleconferencing), and servitization (designing to sell the utility of a product as a service, such as car-sharing).

Product-service systems (PSS) refer to a ‘mix of tangible products and intangible services designed and combined so that they are jointly capable of fulfilling specific customer needs’ (TUKKER, 2004). Because they typically promote access-based consumption instead of conventional ownership-based consumption, they are strongly related to dematerialization. PSS solutions can be distinguished into 3 categories: product-oriented PSS (consumer owns the product, then maintenance and repair services are added on); use-oriented PSS (service provider owns the product and sells its function via leasing or rental); and result-oriented PSS (customer pays for results from products and services without handling a product) (TUKKER, 2004).

Circular economy (CE) refers to an industrial system that opposes the traditional ‘linear economy’ model of production and consumption, aka the ‘take-make-waste’ process and proposes one where products and materials are kept within productive use for as long as possible and effectively loops them back into the system when they reach their end-of-life (LACY & RUTQVIST, 2016). CE is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems; through the superior design of materials, products, systems, and business models, waste can be eliminated (EMF, 2019). Several strategies help promote a circular economy – many of which overlap with eco-design and design-for-sustainability – and these include refuse, rethink, reduce, reuse, repurpose, repair, maintain, remarket, resell, refurbish, remanufacture, upgrade, adapt, recycle, re-refine, standardize, disassemble, reassemble, emotional attachment, amongst others (BOCKEN *et al.*, 2016; MORENO *et al.*, 2016; POTTING *et al.*, 2017; STAHEL, 2019).

Corporate Social Responsibility (CSR) refers to the philanthropic, activist, or charitable activities of a business to support some social good, beyond the interests of the firm and legal requirements (KOTLER & LEE, 2005; MCWILLIAMS & SIEGEL, 2001). CSR enhances the social impact of a business, expresses its citizenship, and ultimately contributes to the brand’s reputation and directly relates to its social sustainability; it can address a wide range of aspects in society including community development, human rights, working conditions, livability, health equity, and social justice.

3. METHODS

This paper is a collection of case studies, based on ethnographic observations during site visits to some of the largest convenience store chains in Japan and Australia. Additional information was sourced through informal conversations with convenience store staff, photographic documentation, literature review, corporate annual reports, and customer reviews and blogs. The Japanese cases include convenience stores visited around Inage Station in Chiba City, while the Australian cases included convenience store sites around Sydney.

The National Association of Convenience Stores (NACS) in the USA describes convenience stores as having the following features: floor spaces typically smaller than 465 m²; off-street parking and/or convenient pedestrian access; extended hours of operation, mostly open 24/7; offer at least 500 stock-keeping units; and product mix includes grocery items, beverages, snacks, confectionery, and tobacco (NACS, nd). While known to charge higher prices than supermarkets, convenience stores are still popular due to their easy-access locations in urban areas, their long open hours, and the shorter time needed to find needed items and to queue for payment.

The cases for this study were filtered to select only those which conformed to the above NACS descriptors of ‘convenience stores’ as well as various descriptors of ‘sustainable services’ (SHIRAHADA & FISK, 2011; SIERRA-PÉREZ *et al.*, 2021; VEZZOLI *et al.*, 2015; WOLFSON & TAVOR, 2017; WRIGHT, 2020):

1. Considers sustainability as a basic value and as an essential part of each process of the service
2. Fit-for-purpose and necessary
3. Integrates tangible and intangible resources to create value for the recipient, via a solution that satisfies needs and demands with minimized negative impacts on the natural or social environment
4. Reduces the consumption of materials and energy and the discharge of waste and pollution to the environment
5. Considers a lifecycle-oriented perspective on the relationships between consumers, providers, and suppliers
6. Understands the attitudes, values, lifestyles, habits, behaviors, motivations of the consumer or user
7. Learns and adapts to changes over time

The sustainable services from each convenience store chain were analyzed from the perspectives of dematerialization, product-service systems, circular economy, and corporate social responsibility.

4. RESULTS

This section presents the findings from the case studies of convenience stores found in Japan and Australia. Some of the sustainable services that have been identified were not found in the visited stores but were derived from corporate literature and news reports. All convenience stores offered ATM services, free Wi-Fi, hot snacks, and eat-in areas, so these common services were excluded from the comparative tabulations.

4.1. 7-Eleven

7-Eleven is the world's largest and most widely recognized convenience store chain, with 71,800 stores in 18 countries worldwide and patronized by 64.5 million customers per day (SEVEN&I, 2020). In 1974 the first 7-Eleven store opened in Tōkyō, Japan. Since 2005 the 7-Eleven global convenience store chain, which used to be owned by its Dallas-based founder Southland Corporation, has been owned by Seven & I Holdings Co Ltd, headquartered in Tōkyō. As of 2020, Japan had 22,500 stores serving over 25 million customers per day (SEVEN&I, 2020).

Since the launch of the first 7-Eleven store in Australia in 1977, the number has grown to 708 stores, operated by 7-Eleven Stores Pty Ltd. In North America, there are 11,829 stores run by 7-Eleven Inc (SEVEN&I, 2020). Many 7-Eleven stores in Australia, North America, and Scandinavia are also fuel stations. Sustainable services found in 7-Eleven are listed in Table 3 and illustrated in Figure 1 left and right.

Sustainable service	Location	Description	PSS	De mat	CE	CSR
Bicycle sharing	Japan	Some 3,700 bicycles are available for rent at the parking spaces of 630 stores.	●	●	●	
Car wash	Australia	Many 7-Eleven convenience stores within fuel stations in Australia operate an automatic car wash, branded as Softwash.	●		●	
Cup Rescue	Australia	In 2017, 7-Eleven in Australia partnered with the Simply Cups initiative of Closed Loop Environmental Solutions Pty Ltd to collect takeaway cups, lids, and straws using special bins (Figure 1R, #3), and recycle them into outdoor furniture and other products. As of 2021, over 620 stores had Cup Rescue bins and more than 19.7 million cups have been diverted from landfills.	●		●	●
Easy Delivery	Japan, Australia	7-Eleven Japan started food delivery in 2000; products were home-delivered using environmentally friendly Toyota Coms super-compact battery-electric vehicles and electric bicycles. In 2020, 7-Eleven Australia started contact-free home-delivery services in selected Melbourne suburbs.	●			●
Government services	Japan	Since 2010 7-Eleven in Japan has been authorized to issue copies of resident certificates and certificates of registered seals.	●	●		●
International Money Transfer	Japan, Australia	In 2010 7-Eleven Australia opened 24/7 self-service kiosks for international money transfer via MoneyGram Payment Systems Inc (Figure 1R, #1). In 2011 Seven Bank Ltd (Japan) partnered with the Western Union Company to offer international money transfer services via mobile and internet as well as in Seven Bank ATMs.	●	●		
Mobile Checkout	Australia	In 2019 7-Eleven Australia launched an app that enables customers to use their smartphones to scan the barcodes of items they wish to purchase, and then pay using the app without having to queue at the checkout; a digital receipt is sent via email (Figure 1R, #6). Mobile Checkout is currently available in only one 'cashless and card-less' concept store in Melbourne.		●		
Multi-copy machines	Japan	Registered customers can use 7-Eleven Japan's multi-copy machines, which can photocopy, fax, print, and perform certain administrative services (Figure 1L, #5)	●	●		
Parcel Mate	Australia	Australian customers can send and receive parcels to and from domestic destinations, using special in-store lockers, available 24/7 (Figure 1R, #2).	●	●		
Reverse vending machines (RVM)	Japan	Since 2012, 7-Eleven Japan and its sister companies have installed 820 RVM, which recover around 365 million PET bottles annually, totaling 9,740 tons; the PET bottles are automatically compressed before transport to a recycling facility. The world's first 100% recycled PET bottles, used for the 7-Eleven Hajime Green Tea One-a-Day, and the polyester fibers for 7-Eleven Body Cooler innerwear are both sourced from the RVM collections (SEVEN&I, 2020).	●		●	
Safe Delivery	Japan	Launched in 2011 to deliver food and daily essentials to regional communities with limited retail infrastructure, as well as to elderly people who have difficulty leaving their homes. In 2019, 94 Safe Delivery service vehicles were operating in Japan	●			●
Trailer hire	Australia	Through a partnership with Move Yourself Trailer Hire Pty Ltd, trailers, utes (pickup trucks), and lawnmowers can be rented from selected 7-Eleven stores.	●	●		

Table 3: Sustainable services and initiatives in 7-Eleven stores. SOURCE: Prepared by the authors.

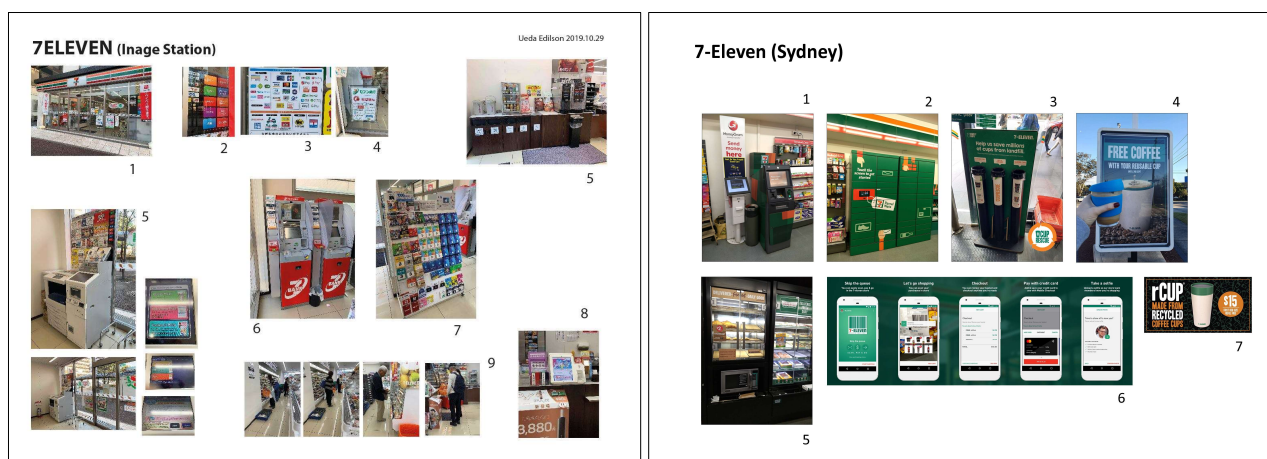


Figure 1: Sustainable services in 7-Eleven in Chiba (L) and Sydney (R). *SOURCE: Edilson Ueda, Mariano Ramirez.*

4.2. FamilyMart

FamilyMart Co Ltd is the world's second-largest convenience store chain, with 24,163 stores. Of these 16,504 stores (68%) are in Japan, while 7,659 franchisees (32%) can be found in Taiwan, China, Philippines, Thailand, Vietnam, Indonesia, and Malaysia. Founded in 1973, FamilyMart is headquartered in Tōkyō. There are no Family Mart franchisees in Australia. Sustainable services and initiatives in FamilyMart are listed in Table 4.

Sustainable service	Description	PSS	De mat	CE	CSR
Car sharing service	Parking spaces in 54 FamilyMart stores support a car-sharing service, where people can hire cars instead of owning them (UFHD, 2018)	●	●		
Children's Cafeteria	Space for children and parents to enjoy fun meals together and for community interactions (FAMILYMART, 2020). Some stores offer hands-on experience of handling cash registers as a Child Store Manager and visits to staff-only areas.	●			●
Electric vehicle charging	Parking lots of about 700 Family Mart stores are installed with quick chargers for electric vehicles and plug-in hybrid vehicles (UFHD, 2018)	●			●
Famima Laundry	24-hour coin-operated laundromats in some stores target double-income and single-person households. Customers can shop or eat at FamilyMart while waiting for their laundry to finish (UFHD, 2018).	●	●		●
FamiPort	Launched in 2000, this in-store multimedia kiosk accepts donations for disaster-affected areas and fundraising for other charities (UFHD, 2018).	●			●
Fit & Go gym	24-hour fitness space, with treadmills and showers, launched in 2019 in FamilyMart Ōta Tōkyō; sells supplements and sportswear (UFHD, 2018).	●	●		●
Luggage-to-airport service	On behalf of Yamato Transit, FamilyMart and 7-Eleven accept luggage to be forwarded to the airport (ZILNIK, 2018).	●			
Mobile convenience stores	Since 2011 FamilyMart has offered mobile store services in areas where getting groceries is inconvenient, particularly for Japan's aging society. FamilyMart now has 18 trucks (FAMILYMART, 2020).		●		●
Takuhai Cook 123	Provides nutritionally balanced boxed lunches with daily-changing menu choices tailored to the health conditions and needs of each elderly customer. Options include low-sodium meals, dialysis diets, and easily chewed foods. Delivery staff gauge the physical health of elderly customers (UFHD, 2018)	●			●
Taxi dispatch service	This service, launched in 2012, enabled customers in 164 FamilyMart stores to call local taxis (family.co.jp)	●	●		

Table 4: Sustainable services and initiatives in Family Mart stores. *SOURCE: Prepared by the authors.*

4.3. Lawson

Ranked as the world's third-largest convenience store chain, Lawson Inc originated as a neighborhood store in Ohio in 1939 but now exists as a Japanese company headquartered in Tōkyō. The first Lawson store in Japan opened in 1975 in Ōsaka. Now there are 14,691 Lawson stores in Japan and 2,450 overseas (China, Thailand, Philippines, Indonesia, Hawaii). Lawson shops can also be found in hospitals, on university campuses, and in office buildings (PRIDEAUX, 2002). There are no Lawson stores in Australia. Lawson's sustainable services and initiatives are listed in Table 5.

Sustainable service	Description	PSS	De mat	CE	CSR
Bring-Your-Own tumbler	To reduce waste from paper cups, customers are encouraged to bring their tumblers and receive a 10-JPY (0.09 USD) discount on the drink	●	●	●	
CO2 offset program	Customers can opt to offset the carbon footprint of purchases through afforestation, forest preservation, or clean energy use, by exchanging shopping reward points for CO2 offset credits, using the in-store 'Loppi' multimedia terminal. So far, 38.74 million customers have helped offset 29,300 tons of CO2	●			●
Happy Lawson	Offers an assortment of baby products and provides playing space for children (NIKKEI, 2003).	●			●
Health check-ups	In 2013 Lawson in Hyōgo used the store parking lots to provide community health check-ups and consultations twice a year; now 9 areas in Japan offer these services. Conventionally these services were offered at governmental offices and community centers, but Lawson stores are often located closer to residents. In 2017 and 2018 Lawson in Kyōto provided lung cancer screenings on their store parking lots.		●		●
Home delivery services	Lawson sells and delivers food products and daily necessities to elderly customers and customers living in remote locations, mountainous areas, and depopulated villages. The mobile service has become an 'eye-on-the-community', allowing Lawson staff to periodically check on the health and safety of the elderly.	●			●
Loppi	Introduced in 1998, this in-store multimedia terminal allows customers to buy tickets for concerts, sporting events, theatres, cinemas, and leisure facilities; buy CDs, DVDs, and books; pay for mail-order and online purchases and credit card bills; apply for campaigns and certification tests. Annually 98 million people use the Loppi terminals to take advantage of their 'pay, play, purchase, benefit and live' features.	●	●		
Nursing care center	In partnership with Wisnet Co Ltd, 'Care Lawson' first offered community-based nursing care in-store in Saitama in 2015; now there are 16 Care Lawson stores in Japan. Care Lawson targets senior citizens and their families, offering a home-care support office, 'community salons' for intergenerational interactions, dementia support workshops, care consultation counter, with a full-time nurse or care manager on duty.	●	●		●
Smartphone cash register	Since 2018, customers can use a smartphone app to scan barcodes on products and pay for purchases, saving time and reducing waiting at checkouts. The system is now in use in 116 stores.	●	●		

Table 5: Sustainable services and initiatives in Lawson stores. SOURCE: Prepared by the authors.

4.4. Coles Express and Coles Local

Eureka Operations Pty Ltd, trading as Coles Express, was launched throughout Victoria, Australia in 2003 and now operates in 723 Shell Australia fuel stations nationwide (COLES, 2020). It is owned by Coles Group Ltd, Australia's second-largest retailer. Some of the sustainability services and initiatives of Coles Express are listed in Table 6.

Sustainable service	Description	PSS	De mat	CE	CSR
Car wash	Coles Express has automated drive-through car washing facilities that use biodegradable detergents and recycle 85% of used water and vacuum cleaning facilities with fragrance options.	●	●	●	
Click & Collect lockers	Customers can order online and pick up from refrigerated lockers in selected Coles Express stores. (Since COVID19, this was replaced by 'direct-to-boot' service; customers wait in their car while Coles staff deliver the order straight to the car's cargo compartment, thus enabling a contact-free transaction.)	●			●
Community bags	After the phase-out of single-use plastic bags from Coles stores in 2018, colorful reusable shopping bags designed by Australian schoolchildren were offered as an alternative carrier. 10% of sales of these 'community bags' are channeled to charities to help schools, sporting clubs, disadvantaged people, and the environment; more than 5 million AUD has been raised since 2018.			●	●
Gas bottle exchange	Empty LPG (liquefied petroleum gas) cylinders can be swapped for refilled ones at Coles Express.	●	●	●	
Pet Treat bar	Unpackaged scoop-and-weigh pick-and-mix station for dog biscuits and snacks.	●		●	
Second Bite	Since 2011, Coles Group has been donating all surplus and unsold edible food to Second Bite, a national food rescue group that redistributes the food to people in need. In 2020 Coles provided Second Bite with 15.5 million kg of food or 31.3 million meals (SECONDBITE, 2020).			●	
SodaStream cylinder swap	The SodaStream Sparkling Water Maker is a PepsiCo Inc home carbonation system that enables consumers to infuse CO2 gas into their tap water to create soda water. Customers can swap their empty CO2 cylinders for refilled ones at Coles Express.	●		●	●
Trailer Hire	Through a partnership with Move Yourself Trailer Hire Pty Ltd, Coles Express customers can rent cage trailers, furniture trailers, car carrier trailers, bike trailers, horse floats, utes (pickup trucks), and panel vans in selected stores.	●	●		

Table 6: Sustainable services in Coles Express stores. SOURCE: Prepared by the authors.

4.5. Woolworths Metro, The Foodary, Star Mart

Woolworths Metro, launched in 1997 in Sydney, is a small-format convenience operated by Woolworths Group Ltd, the largest company in Australia by revenue (WOOLWORTHS, 2020). There are 64 WW Metro convenience stores, typically located in central business districts and targeting office workers and commuters in highly transient locations.

Woolworths Plus Petrol was founded in 1996 by the Australian Independent Retailers Pty Ltd and in 2003 became a co-branded joint venture with Caltex Australia Ltd, Australia's largest transport fuels company. As a convenience store within a service station, it sold food, grocery items, and fuel. Caltex Australia continued to operate its own service stations and convenience stores, which were named Star Mart; in 2017 there were 550 Star Marts and Star Shops.

In 2017, Caltex piloted 'The Foodary' convenience hub format in Concord NSW, which had a bakery, ATM, and sold fresh on-the-go food, barista-made coffee, quality grocery products, and parcel pickup services. By 2021, The Foodary was operating in 66 locations. Several of the former Star Mart stores were transitioned into The Foodary. In 2018, Woolworths Petrol sold its 540 convenience stores with service stations to the UK-based Euro Garages Group Australia Ltd. Table 7 lists some of the sustainable services and initiatives found in Woolworths-related convenience stores.

Sustainable service	Description	PSS	De mat	CE	CSR
Australia Post Parcel Locker	Selected Woolworths stores have free parcel lockers operated by Australia Post, where customers can get their online shopping parcels delivered.	✱	✱		
Bag for Good™	Woolworths customers can purchase 99-cent reusable bags, which can be swapped for new ones once damaged. Profits from sales go to the Woolworths Junior Landcare Grants, in partnership with Landcare Australia, which will support Australian primary school children with hands-on sustainable food production, waste management, and native habitat enhancement.	✱		✱	✱
Crate to Bench	Bag-free home delivery option, where the driver delivers the customer's orders in a reusable plastic crate, which gets unpacked upon arrival at the customer's kitchen bench and then returns to the store with the driver. (During COVID19, this option has been suspended as it is not contact-free; drivers now leave the bagged groceries on the customer's doorstep.)	✱	✱	✱	✱
Macro Wholefoods Market	Woolworths' home brand for organic foods that are free from artificial colors, flavors, sweeteners, added MSG, hydrogenated oils.				✱
Online plastic bag returns	Unwanted reusable plastic shopping bags can be returned to Woolworths delivery drivers.	✱		✱	
Scan & Go	Scan & Go enables Woolworths loyalty scheme members to scan the barcodes of grocery items using their smartphone as they put them into their bags, pay using the app, and exit at the Scan & Go checkout by presenting the generated QR code. There is no need for cards or cash, so the checkout experience is contact-free and paperless. First trialed in 2018, this service is now available at 7 Woolworths Metro stores and 24 Woolworths supermarkets.	✱	✱		
Surplus fresh food	Oz Harvest, Food Bank, and FareShare rescue surplus fresh food from Woolworths stores every month; in 2020, an equivalent of 21 million meals were delivered to Australians in need			✱	✱
The Odd Bunch	Woolworths own brand for misshapen or imperfect fruits and vegetables, sold at significantly lower prices.			✱	✱
Uber Eats	Partnership with the popular online food ordering and delivery platform was finalized in 2019 and launched in 325 Caltex stores including The Foodary.	✱	✱		

Table 7: Sustainable services and initiatives in Woolworths Metro stores. SOURCE: Prepared by the authors.

5. DISCUSSION AND CONCLUSIONS

Due to their compact nature, convenience stores can be considered as dematerialized or scaled-down models of full-sized businesses. They are not only miniaturized versions of grocery stores and supermarkets, but also light-weighted and decentralized platforms of traditional brick-and-mortar government offices, banks, ticket booths, copy centers, post office boxes, and vehicle hire.

Convenience stores are neighborhood service hubs, communal spaces offering a range of services to the community. Their service design is deliberately to facilitate self-operation by consumers; the 'anywhere, anytime, anything' philosophy illustrates this well. From a sustainability perspective, these communal services are an important reference

for the development of new eco-businesses in convenience stores, such as product-service systems focused on sharing, renting, leasing, or maintenance agreements. The parcel lockers, LPG cylinder swaps, DIY coffee dispensers, coin-operated dog-wash, trailers-for-hire, car-sharing spaces, and crate-to-bench delivery services are good examples from the Japanese and Australian cases that demonstrate PSS, CE, CSR, and dematerialization well at work within convenience retailing businesses. Sharing a public multicopy machine makes more economic sense than owning a personal machine if it is not likely to be used intensively.

The possible initiatives for the implementation of eco-efficient services in convenience stores depend on the distribution system of products and services through integrated information technology, which has been introduced with success in these businesses. This initiative can encourage rethinking and re-designing of product-services mix and assist the development of a successful sustainable services system. Regulatory frameworks can encourage component standardization to increase re-use, refurbishment, and recycling and principally facilitate the development of eco-efficient services.

Amongst the sustainability lenses by which the above cases were analyzed, the consumer-facing circular economy services and initiatives seemed lacking. The few which have been identified include the 7-Eleven Cup Rescue and the reverse-vending machines for complete bottle-to-bottle PET recycling; this is not to say that the convenience store chains do not engage in circular economy activities in the back end. For instance, used cooking oil collected from fryers in some 7-Eleven stores are refined into bio-diesel fuel for some delivery vehicles; coffee grounds are recycled into an antibacterial deodorizer used for cleaning the stores; plant-based plastics replaced the previous oil-based plastics in salad cup containers and baked-goods wrappers; paper-aluminum cartons for Seven Premium alcohol products have been substituted with non-aluminum cartons for better recyclability; fixtures, shelving, chiller cases, and building materials from closed stores are reused at other stores; unexpired foods are donated to food-banks and social-welfare councils; and foods past their sell-by date are converted into animal feed or compost (SEVEN&I, 2020). At FamilyMart, used frying oil is collected and processed into medicated hand soap that is used in the stores (FAMILYMART, 2020).

Store-based incentives and initiatives – such as the BYO tumblers, The Odd Bunch, and Bag for Good – make the benefits real for the consumer and can steer their behavior towards more responsible consumption and towards greater care for less fortunate people in society. Making healthy and sustainable living easy – such as in-store health checkups and fitness gyms integrated with the laundromat – facilitates the conversion of hesitation. Lastly, integrating spectacle and pleasure into the preferred positive action – such as crushing your own bottles in the reverse vending machine – proves that the ‘fun theory’ helps motivate action and change behavior for the better. This paper on convenience stores is just the beginning of a larger study on eco-efficiency and a deeper analysis of each field of products and services will follow.

Lastly, the connection that convenience stores have already built with persons with disabilities, elderly people, and other vulnerable people can be further intensified. The increase in the aging population and the challenges brought by the COVID-19 pandemic opens provides useful lessons as well as open opportunities for new types of services. New scenarios for sustainable retailing can be explored in future studies, to meet the needs of 21st-century customer demographics in diverse fields of daily life.

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