PRODUCT SERVICE SYSTEMS: SOME PHILIPPINE EXAMPLES

MARIANO RAMIREZ, Dr | UNIVERSITY OF NEW SOUTH WALES

ABSTRACT

Product service systems (PSS) have the potential to radically reduce the negative environmental impacts of wasteful consumption. An inventory of existing solutions in the Philippines was carried out to inspire entrepreneurs and innovators with alternative ways of needs fulfillment that are less ownership-centric, and to offer new forms of added value to consumers via everyday solutions that can be more ecologically beneficial. The search encompassed cases of collaborative consumption lifestyles, redistribution markets, and the circular economy.

KEY WORDS

Product-service systems; Circular economy; Access economy; Collaborative consumption; Philippines.

1. INTRODUCTION

Business models promoting product-service systems (PSS) collaborative consumption (CC) are often publicized as alternative and resource-efficient approaches for function fulfillment (BOTSMAN & ROGERS, 2010; MONT, 2002). Product-service systems refer to any 'mix of tangible products and intangible services designed and combined so that they are jointly capable of fulfilling specific customer needs' (TUKKER, 2004), while collaborative consumption refers to the shared use of a product or service by a group (CHEN, 2020). The two concepts overlap significantly, and PSS is sometimes considered as one type of CC (BOTSMAN & ROGERS, 2010). Both PSS and CC are seen to disrupt consumerist-driven lifestyles and often shift the focus from the design and sales of products for individual ownership to an alternative function fulfillment via shared or cooperatively owned products and services. In many cases their potential to reduce the adverse environmental impacts from wasteful consumption, as well as their ability to improve person-to-person interaction and cohesion in the community, have been demonstrated (MONT, 2002; TUKKER & TISCHNER, 2006).

Many PSS and CC examples shift the focus from individually owned and purchased products to 'shared' or cooperatively owned or borrowed products, with various forms of services embedded. However much of the academic literature on these topics focus on examples from industrialized countries, which often are not directly applicable to emerging economies where people's daily concerns are much different (RETAMAL, 2019; ROXAS, 2016).

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2. METHOD

This paper used literature review, case studies, and site observation to generate an inventory of various PSS and CC solutions existing in the Philippines. A broad internet search – employing such keywords as 'product service systems', 'product sharing', 'sharing economy', and 'collaborative consumption' – was carried out to identify the examples.

3. RESULTS

The main text below presents some of the more distinctive PSS and CC examples from the Philippines.

3.1. Ridesharing

Several app-based PSS solutions for on-demand ride-hailing that originated in North America are now very common in Asia, but they have been re-contextualized to meet local mobility needs. Location-sharing is used to assign commuters to nearby vehicles for hire, for which ride-sharing companies receive a fraction of the booking fees.

3.1.1. Grab.com

Grab Holdings Inc is a Singapore-based transportation network company, founded in Malaysia in 2012 as MyTeksi and now operating in 339 cities in 8 Southeast Asian countries. In the Philippines, Grab was launched in 2013 and currently operates in 10 cities. Grab has grown to become Southeast Asia's largest mobile technology company that connects millions of consumers to millions of drivers, merchants, and businesses. Grab offers several products to meet public demand for personal mobility: Grab Taxi for taxicabs; Grab Car for chauffeured private cars, with economy and premium options; Grab Bike and Grab Now for motorcycle taxis; Grab Share for carpooling with other passengers; Grab Hitch for lifts with non-commercial drivers who are going the same way; Grab Wheels for personal electric kick-scooters; Grab Pet for animal-friendly vehicles; Grab Assist for accessibility-trained drivers; Grab Family for vehicles equipped with child restraints; Grab Rent for hiring a car and driver for up to 12 hours; Grab Shuttle, Grab Coach and Grab Bus for guaranteed pre-purchased seats on commuter shuttles, vans and buses; and Just Grab for getting the nearest car or taxi in a single tap. Not all Grab services are available in the 8 countries. In 2018 Grab acquired the Southeast Asian operations of Uber Technologies Inc. Grab has expanded its business beyond ride-hailing into delivery services and financial technologies. These included Grab Express for on-demand delivery of parcels in 2015; Grab Pay for in-app mobile payments in 2016; Grab Food for on-demand food delivery in 2016 (see Section 3.4.3). During the COVID-19 pandemic, Grab *Bayanihan* offered free 24-hour services for frontline healthcare workers (*Bayanihan* is the Filipino word for 'community spirit').

3.1.2. Angkás.com

Motorcycle taxi services are popular amongst urban commuters in Southeast Asia because motorbikes can go past the ubiquitous traffic jams and gridlocks in densely populated cities. Angkás is a riding-in-tandem service, named after the Filipino word for 'pillion riding'. The company has more than 27,000 safety-trained moto-taxi drivers, which are referred to as 'rider-partners'. Since the launch of Angkás in 2016, the government has been questioning the legality and safety of pillion riding, citing that Republic Act 4136 of 1964, or the Land Transportation and Traffic Code, does not consider motorcycles as public transport vehicles. In Nov 2017, despite popular support for Angkás from the commuting public, the government transport regulators shut down motorcycle taxi services, forcing Angkás motorcyclists to become couriers of parcels or documents. In Jun 2019 the Department of Transportation launched the Motorcycle Taxi Pilot Program, allowing Angkás to operate provisionally for 6 months, with a 3-month extension. During the pilot study, moto-taxi companies were required to submit monthly data on passenger complaints, traffic violations, and road crashes. The pilot study was due to end in Apr 2020; however, COVID-19 was declared a pandemic in Mar 2020, so all ride-hailing services were suspended. Due to the imposition of community quarantine, Angkás had to shift their business to delivery services for food, medications, and other supplies. In Jul 2020 back riding was allowed again but only for couples in the

same household. The general public was able to access Angkás again in Nov 2020, when the pilot run resumed. Before COVID-19, Angkás passengers were provided with helmets, reflectorized vests, face masks, hairnets, and personal accident insurance. During the pandemic passengers were required to bring their own helmet with a full-face visor, all rides must be preregistered, payments must be cashless, and for added protection, the bikers wear on their backs specially designed pillion-rider protective shields. Angkás bikers regularly underwent COVID-19 testing. In Feb 2021 the Philippine Red Cross partnered with Angkás to deliver blood supplies, first aid, and other humanitarian interventions.

3.2. Variety stores

Neighborhood corner shops, locally known as *sari-sari* stores, are the precursor of modern convenience retailing in the Philippines. *Sari-sari* is the Filipino word for 'variety' or 'sundry', referring to the many essential items that are sold in these village retail kiosks, such as rice, cooking oil, soap, coffee, soft drinks, and tobacco. *Sari-sari* stores are Mom-and-Pop businesses, operating from the front of the family residence, and ranging in scale from micro-enterprises to small and medium-sized ventures. Not only are they one-stop shops for daily necessities, but they also function as social places and as 'hubs of neighborhood life', where the locals catch up with their neighbors for casual conversations (SILVERIO, 1975). These types of home shops are ubiquitous in residential villages in many developing economies, taking the form of the *warung* in Indonesia, the *kirana* in India, the spaza in South Africa, and the *tienda del barrio* in Latin America (COEN, 2006). It is estimated that there are about 750,000 *sari-sari* stores around the Philippines (BOQUET, 2017).

To cater to their bottom-of-the-pyramid (BOP) customers, *sari-sari* store merchants divide bulk packages into more affordable sizes and sell products in small quantities, a practice known amongst Filipinos as *tingî* retailing; for instance, cigarettes are sold by the stick, garlic by the clove, sugar by the cupful, cheese by the slice, and candies by the piece. Before plastic packaging of FMCG (fast-moving consumer goods) became commonplace, *sari-sari* retailers would sell kitchen essentials like cooking oil, vinegar, soy sauce, and kerosene in small amounts, transferring them from wholesale bulk tins to the customer's empty bottle or jar; the dispensed volumes can be quite inconsistent, and the prices charged are rough estimates. This traditional retailing practice has largely disappeared after FMCG manufacturers embarked on a trend of repackaging their products in smaller and more affordable packaging sizes, such as mini bottles, stand-up pouches, and micro-sachets (ANDERSON & BILLOU, 2007; MATEJOWSKY, 2007; ROCES & SEBASTIAN, 2005). Another feature of *sari-sari* stores is the IOU ('I owe you'): due to their close connections with their patrons, store proprietors allowed low-income customers to purchase using promissory notes, and these debts are expected to be settled during the fortnightly paydays. *Sari-sari* stores and modern convenience stores have continuously evolved to offer new types of low-cost services that are suited to the needs and buying capacity of their communities.

3.2.1. '*Pasa-load*'

In 2003, Smart Communications Inc, one of the two largest mobile communications providers in the Philippines, launched Smart *Pasa-Load*, a service that enables a Smart subscriber to electronically transfer 'load' – or prepaid phone credits – to a fellow Smart subscriber via SMS. This is the world's first over-the-air electronic prepaid loading service and is another demonstration of Philippine *tingî* marketing. Many low-income Filipinos who cannot afford a postpaid cellular subscription or a prepaid monthly plan are now able to purchase micro amounts of prepaid credits from *sari-sari* store owners, who are willing to share a portion of their load wallet for a fee of 1 PHP (0.02 USD). As an illustration, the minimum cost of prepaid packages that can be used to call different networks is 149 PHP (3 USD), valid for 7 days; this price can be out of reach for a BOP customer. If customers need to make some calls, they can request the *sari-sari* store owner to *pasa-load* some airtime credits to their phones; a 10 PHP (0.20 USD) *pasa-load* can enable the recipient to make unlimited voice calls and SMS and up to 1 GB Facebook access for up to 3 days. In 2016 due to the popularity of social media and online chatting, Smart introduced *Pasa*-data, enabling subscribers to share a portion of their prepaid mobile data credits with other Smart subscribers.

3.2.2. '*Píso*-Wi-Fi'

Many Filipinos do not have home internet systems and find mobile data costs prohibitive. To provide cheap on-demand internet access, some *sari-sari* stores have installed simple vending machines called '*Píso* Wi-Fi' ('*píso*' is the Filipino word for 1 PHP coin). By inserting a 1 PHP (0.02 USD) coin a customer can connect their Wi-Fi-enabled digital device to the store's Wi-Fi hotspot for 10 minutes. A 5 PHP (0.10 USD) coin buys an hour of internet connection. *Píso* Wi-Fi is an open-source design; it is not a corporate branded product and many YouTube videos demonstrate how simple it is to make them as DIY projects. Enterprising electronic technicians fabricate their own *Píso* Wi-Fi boxes and sell these to *sari-sari* store owners or other businesses in busy pedestrian areas such as pharmacies, hair salons, laundromats, coffee shops, and bus terminals.

Many of these *Píso* Wi-Fi vendo boxes are simply shoebox-sized cabinets made of MDF (medium-density fiberboard), encasing a universal coin slot (for determining the value of the coins inserted), a Raspberry Pi or Orange Pi (a credit-card single-board computer) with SD (Secure Digital) card for memory storage, a power supply unit, and a modem router (a networking unit that routes traffic between the internet and the digital devices). The *sari-sari* store owner subscribes to a high-speed access plan with their preferred Internet Service Provider (ISP), preferably with a fiber-optic connection, and connects via LAN (local area networking) cables to the *Píso* Wi-Fi box, which communicates with the customer's phone and initiates the internet connection upon acceptance of the coin. In essence, the *sari-sari* sells micro-portions of their monthly internet subscription, again demonstrating *tingî* marketing. The Wi-Fi signal typically has a range of 30 meters – which can be increased up to 300 meters via an outdoor extender antenna – so it is expected that the customer will access the internet while in the vicinity of the store. Some *sari-sari* stores have made their *Píso* Wi-Fi vendo available outside the shop by enclosing them in a metal cage, so customers can have 24/7 self-service internet connectivity; up to 50 concurrent users are possible, depending on the bandwidth available. Usernames or passwords are not required. These generic *Píso* Wi-Fi boxes are low-investment business opportunities, costing about 10,000 PHP (200 USD), with some owners being able to fully recoup their outlay in 12 weeks or less.

A more sophisticated version of the *Píso* Wi-Fi vendo uses the patented 'Tap Coin Wi-Fi' hotspot pay terminal manufactured in China by Shenzhen Guanri Netcom Technologies Co Ltd. Marketed under the 'SOL' ('Solution of Life') brand, these tap coin Wi-Fi machines are hugely popular in the developing world and are currently distributed to over 40 countries in Asia, Africa, Latin America, and the Middle East. This plug-and-play unit is encased in an ABS molded plastic housing and has an LCD, a built-in Wi-Fi antenna reaching up to 150 meters radius, a coin slot that has a learning ability to recognize local coins and discriminate fake coins, and a key-locked coin drawer. The customer taps on their phone on the scan area of the terminal, and the internet connection is activated once a coin is inserted. In the Philippines, these tap-coin *Píso* Wi-Fi units are sold for 26,000 PHP (520 USD).

3.2.3. Coffee vendo

For as little as 5 PHP (0.10 USD), customers can access coin-operated self-service dispensers for hot coffee, hot chocolate, or hot soup from many *sari-sari* stores. Each coffee-vendo machine is equipped with a paper cup dispenser, canisters for the powdered beverage, a heating element, a universal coin slot, and an opening at the top to accept the upside-down bottle of purified water. The machines are typically housed in metal cages, allowing customers to access the coffee vendo 24/7.

3.2.4. *Píso*-Water

In many provincial cities, simple vending machines dispensing chilled drinking water can be found. These dispensers are called *Píso* Water, as one cupful of water costs 1 PHP (0.02 USD). Colloquially they are known as ATM or 'Automatic Tubig Machines' (*tubig* is the Filipino word for 'water'). There are two types of *Píso* Water vendo: the first uses an off-the-shelf gravity-fed chilled water dispenser to which a universal coin slot, timer, and coin access door have been added.

The other is a purpose-built water tower, which is a plyboard cabinet encasing the chilled water dispenser that has been modified with a pump to redirect the water supply to an overhead nozzle. Apart from the coin slot, timer, and coin access door, the tower also has a storage area for the plastic cups or bags, a shelf on which to rest the cup, and a side door to facilitate the replacement of the 19-liter returnable bottle containing the purified water. *Píso* Water can be considered as a localized alternative to transporting factory-packaged water in small bottles; however, disposable plastic cups or bags are still used. *Píso* Water machines can be found outside some *sari-sari* stores, as well as in areas with high foot traffic such as marketplaces, bus terminals, internet cafés, pawnshops, laundromats, and similar busy locations. *Píso* Water towers cost about 10,000 PHP (200 USD) and each refill of the 19-liter water bottle costs about 25 PHP (0.50 USD) delivered.

3.2.5. Phone battery charging

Some *sari-sari* stores and convenience stores offer coin-operated charging of cellular phone batteries. A 5 PHP (0.10 USD) coin provides 10 minutes of battery charging time. The phones are kept in lockable compartments and allow customers to boost the battery levels of their phones while they shop or dine in the store (Figure 1).

3.2.6. Smart *Padalá*

'*Padalá*' is the Filipino word for 'remittance' or 'parcel'. Smart *Padalá* is the world's first international cash remittance service linked to the mobile phone. A network of over 27,000 Smart *Padalá* outlets nationwide – many of them *sari-sari* stores – enables financial inclusion for the 'unbanked', 'un-carded', and underserved in many Philippine communities. The system is powered by PayMaya, the pioneer in mobile money and online payments in the Philippines. Smart *Padalá* offers domestic money transfers, international remittances, bills payment, airtime load sales, and reloading of Smart Money e-wallet accounts. On paydays, salaried workers would line up in the *sari-sari* store to send money to their families in the provinces. Recently, True Money Co Ltd of Thailand and GCash *Padalá* offered similar money transfer services in the Philippine market, posing competition to Smart *Padalá*.

3.2.7. Mini *Bayad* Center

In 2018, a new digital transaction hub called POSIBLE was launched by Filipino financial-technology services provider Action Able Inc. This business package enables *sari-sari* stores and other micro, small and medium enterprises to become one-stop shops for bill payments and money transfers in their community, colloquially called Mini *Bayad* Centers (*bayad* is the Filipino word for 'payment'). All transactions are carried out using the POSIBLE device, an all-in-one POS (point-of-sale) touchscreen tablet with an integrated thermal printer, RFID/NFC reader for credit/debit cards, high-resolution camera for identification cards, QR-code reader, magnetic swipe card reader, and a handheld barcode scanner. The interface is Android-based, therefore familiar and easy to use for many people. Local customers no longer need to travel to payment and remittance facilities in the city centers or endure the long queues in those sites. To date, there are almost 4,000 POSIBLE retailers nationwide offering digital services to over 300 partner billers, including utility providers, schools, micro-insurance, bus ticketing, mobile loading, and government agencies. The *sari-sari* store owner makes a one-time payment of 45,000 PHP (900 USD) to become a POSIBLE retailer, and this includes the POSIBLE digital transactions device.

3.2.8. Self-service payment kiosks

Some convenience stores have automated machines that accept bill payments for water, power, telephone, cable internet, and credit cards; payments for insurance premiums, school matriculation fees, and social security contributions; loading of prepaid mobile credits; top-up of e-wallets; and purchase of flight tickets (Figure 1). Examples are the CLiQQ kiosks in 7-Eleven convenience stores, which allow 24/7 bills payment, and the TouchPay kiosks in gasoline stations, supermarkets, pharmacies, bookstores, and shopping malls.

Figure 1: *Phone charger at 7-Eleven and TouchPay in Shell station in Makati. SOURCE: Ms Marian Dacanay*

3.3. Shared tools and equipment

Specialized tools and equipment that are used only occasionally are more economical to rent than to own. Small and medium entrepreneurs invest in such equipment and hire them out to the community. The local examples below are rather unique to the Philippine context.

3.3.1. *Videōke* hire

In the 1970s, *karaōke* machines from Japan first reached the Philippines and they quickly became the favorite form of social entertainment amongst Filipinos. The word *karaōke* was derived from the Japanese for 'empty orchestra', as it allowed people to sing without live accompaniment by musicians. The machines played instrumental versions of popular songs recorded on music cassettes, and because the vocal track of the original singers had been removed the tapes were colloquially referred to as 'minus one' music. The *karaōke* evolved into the *videōke*, which displays the song's lyrics on a TV screen, so singers no longer need to read the words from printed songbooks. *Videōke* consoles soon became a standard feature of local bars and beach resorts. These products typically consist of fiberboard cabinets with large-screen TVs, *karaōke* music players with microphones, loudspeakers, amplifiers with pitch-changers, and push buttons for song selection. Some *videōke* machines were coin-operated, especially those found in shopping malls (Figure 2). Portable *videōke* consoles are rented out by enterprising Filipinos, and these tend to be very popular during baptisms, weddings, birthdays, *barrio fiestas* (village festivals), and Christmas parties (LAGARDE, 2010).

Figure 2: *Coin-operated videōke booth in a shopping mall in Manila. SOURCE: Mr Noel Sadicon*

3.3.2. Písonet

Písonet is the budget version of the internet café in the Philippines. Starting around 2010, business-minded families started to convert their garages into Písonet computer rental rooms, furnishing them with coin-operated workstations that are equipped with internet-ready PC-based computers, keyboards, joysticks, headphones, and a shared printer. For

as little as 1 PHP (0.02 USD) a customer on a tight budget can access the internet for 5 minutes. Písonet is popular in low-income communities for doing schoolwork, searching for employment, sending or receiving emails, doing video chats, web-surfing, and other uses. Unfortunately, Písonet has become associated with arcade gaming and tends to attract schoolchildren, who use their lunch money to surf and play e-games, prompting local government units to ban minors from using Písonet during school hours (SORIANO, 2019).

3.3.3. Laundromats

Industrial laundry services have been serving the hospitality and shipping industries in the Philippines since the 1960s, but in the 1990s they became popular amongst young urban professionals in high-rise condominiums in the central business districts (RETAMAL & SCHANDL, 2018). Conventional laundry businesses were rather large operations, but in recent years small laundromats have been popping up in many neighborhoods and can now be found in most busy streets. Enterprising families have converted their garages or ground-floor spaces into self-service laundromats with coin-operated washers and dryers, and some offer the full range of wash-dry-fold services for drop-off customers. Washing services are no longer confined to people from higher socio-economic groups; these businesses thrive even in lower-income neighborhoods.

Most home-based laundromats are independent businesses, whereas those that operate in shopping malls and commercial centers tend to be franchisees of metro-wide laundromat chains, such as Quicklean, Save5, One Big Wash, and Wash-o-Matic. To differentiate from their competitors, franchised businesses entice customers through such promotional tactics as free Wi-Fi and loyalty cards (e.g., free wash on the 11th visit). An 8-kg load of dirty clothes could cost as little as 65 PHP (1.30 USD) to wash and 65 PHP to dry, and the high-speed machines cut down the total time for the complete cycle to just 1 hour. A waiting area is provided, and customers use the time to read magazines, entertain themselves on their own digital devices, do a bit of schoolwork or office work, play card games, have a snack, or catch a nap. Some customers prefer self-service laundry to drop-off laundry services, after experiencing mishaps with the latter such as clothes missing or laundry mixed-up with other customers. The overall savings in time, effort, space, electricity, and water by using laundromats are excellent value propositions to time-poor millennials and families. However, compared to washing by machine at home and air-drying under the sun, laundromats have a higher environmental impact from energy consumption due to their use of dryers (RETAMAL & SCHANDL, 2018).

3.3.4. Agricultural machinery

Small-scale rice farmers prefer hiring rather than buying agricultural equipment during various phases of rice production. It is common to rent the two-wheel tractor, which plows and harrows the soil before planting. After harvesting, the farmers engage the services of the town's rice mill to remove the hard husks from the rice grains and polish them into white rice to make them suitable for cooking. Many farmers rent combine harvesters, which can reap, thresh, and winnow the rice in one single process, thus saving the farmer much time and labor (MARIANO *et al*., 2012). Hiring combine harvesters and rice mills always include the service of specially trained operators, as many farmers are not trained with their controls or operation. The payment for hiring the harvester machine is typically in the form of sacks of rice grains rather than cash. Mobile rice mills, which are compact de-husking machines mounted on customized trucks, can be found traversing the farming villages offering their rice hulling and polishing services.

3.4. Chore outsourcing

Many domestic chores can now be outsourced using various app-enabled PSS businesses.

3.4.1. *Lipat-Bahay*

Traditionally, when Filipinos move house (‘*lipat-bahay*’), they engage their network of family and friends to transfer carry bulky boxes and heavy appliances out of the old residence into the new one. Many Filipinos now work even during weekends, so finding friends to help with household removals has become a challenge. App-based logistics services like Mober.ph enable customers to request the moving of large and bulky items. Mober has a fleet of company-owned cargo trucks and has a network of vans owned by the driver-partners of the business. Apart from *lipat-bahay*, Mober offers deliveries of furniture and white goods and pickup of items for catering or bazaar sales. Like ride-hailing apps, the Mober app allows precise tracking of the delivery vehicle’s actual location and estimation of the arrival time.

3.4.2. Task assistance

Many Southeast Asian service-seeking businesses match consumers in need with trained and capable service partners. In the Philippine market, some of the players are Gawín.ph (the local subsidiary of Kaodim Sdn Bhd of Malaysia) and MyKuya.ph. Through the digital platforms of these companies, the local community is linked with background-verified freelancing professionals who can accomplish a wide range of everyday projects, such as cleaning the house, fixing broken pipes, photographing a life event, repairing an unresponsive computer, or home-service massage and manicure. The business name of MyKuya comes from the Filipino word for ‘elder brother’ (*Kuya*), who is often portrayed as someone who happily assists with daily errands to make the day-to-day lives of others easier and more efficient. On the other hand, ‘*Gawín*’ is the Filipino word for ‘do’, ‘make’, or ‘repair’.

3.4.3. Personal concierge

Concierge services from Grab Holdings Inc allow door-to-door delivery of various stuff, with location-tracking in real-time. Grab Express is used for the same-day premium delivery of parcels, documents, flowers, and gifts, while Grab Food is for takeaway meals and drinks from restaurants, bubble tea shops, pizza parlors, cake shops, and the like. In 2018, the Grab Assistant personal shopper service was launched, in which Grab drivers can be requested to buy items in groceries or department stores (Grab Pabilí) or to queue in line in banks or bill payment centers (Grab Papila) on behalf of their customers. The restrictions on mobility and the enforcement of social distancing during the COVID-19 pandemic have led to an increased demand for delivery services for food, parcels, and daily essentials (Grab Mart).

3.5. Circular economy

There are many ingenious approaches by which Filipinos recirculate materials in the local economy, through redistribution and reuse of products, and recycling of materials.

3.5.1. *Bote*, *Diario*, *Bakal*

In urban villages in the Philippines, it is common to find people either pushing wooden carts or pedaling cargo bikes and yelling ‘*bote*, *diario*, *bakal*', which means ‘bottles, newspapers, steel’. These scrap traders purchase from residents their old newspapers by the hand-span, their empty glass bottles by the piece, and their unwanted steel, aluminum, and copper items by the kilogram. They also buy unserviceable appliances, air-conditioners, electric fans, car batteries, refrigerator motors, and the like to retrieve any metals of value. Sometimes they also scavenge trash dumps for recyclable materials of value. The traders then on-sell their collection of recyclables to junk dealers, who then sort the materials further and sell these to metal foundries and papermakers. Glass bottles are sold to small businesses who wash and refill the bottles with vinegar, fish sauce, vegetable oil, and other cooking condiments.

3.5.2. *Anticipo*

When buying soft drinks or beer in glass bottles from the *sari-sari* store, the customer pays a refundable deposit known as *anticipo* – the Spanish word for 'advance payment' – to guarantee that the bottle will be returned. When making repeat purchases the empty bottle can be used to swap with a new bottle. The returned empty bottles are collected by the beverage company trucks when they make new deliveries to the store. The glass bottles are pressure-washed at the bottling plant and then refilled with new drinks.

3.5.3. *Ukay-ukay*

Makeshift stalls and carts on sidewalks and marketplaces sell imported second-hand pants, blouses, shirts, jackets, shoes, and bags in huge mixed piles, prompting shoppers to dig in and compete with others in a mad frenzy for the best buys. *Ukay-ukay* comes from the Filipino word meaning 'to dig'. Patient *ukay-ukay* shoppers occasionally spot branded goods among the brandless stuff, so these stalls are also popular amongst owners of second-hand boutique shops, who get their *ukay-ukay* finds cleaned and repaired to fetch higher prices. The *ukay-ukay* practice is believed to have started in the early 1980s when container-loads of castoff clothing were received from around the world to help disaster-stricken victims. Some of these donated garments ended up stacked in warehouses, and into the hands of traders who started selling these otherwise free items at very low prices. Enterprising Filipinos overseas often buy bargain items from thrift shops and send these to relatives in the Philippines to sell in the *ukay-ukay* stalls (LOCSIN, 2007). The popularity of *ukay-ukay* has encouraged traders to import used clothing in commercial quantities, a practice that is considered illegal under the outdated Republic Act 4653 of 1966, but *ukay-ukay* can still be found in many places around the country. Environmentalists argue that *ukay-ukay* should be promoted as they prevent unwanted but wearable clothes from being disposed to landfills.

4. DISCUSSION AND CONCLUSION

The above examples show some rather successful and persistent PSS and CC solutions in Philippine society. Some are 'indigenous innovations' (MEHTA & MOKASHI-PUNEKAR, 2010) which have been around before the internet and mobile communications became commonplace, while others are app-enabled on-demand solutions that are so typical in contemporary PSS.

While collecting cases for this study, several new app-based PSS businesses were found. The growth of digital PSS has certainly been enabled by the increased affordability of internet access, plus the extensive integration of digital apps, websites, smartphones, Wi-Fi access, and online delivery services into the lives of people in the 21st century. Consumer trust in online transactions is rising (BOTSMAN & ROGERS, 2010), as the reliability of providers has been made transparent through customer reviews and rating systems. Another reason is the economic practicality of accessing product utility rather than purchasing and owning those products, especially if they will only be occasionally used and will lie idle in storage.

On the other hand, many Philippine PSS start-ups discovered from the Google search were found to be inactive. These include now-closed businesses on peer-to-peer (P2P) carsharing, P2P carpooling, P2P rentals, swapping or bartering, as well as home-delivered meal kits, online learning, microlending, catering by home-based cooks, chef-cooked parties, and creative professionals' showcase. Larger product-service systems which have a Southeast-Asia-wide presence seem to have better business models that can survive the market better. Singapore's Grab.com, Malaysia's Kaodim.com, and Indonesia's Gojek.com are excellent manifestations of successful PSS models in emerging economies.

Why do many of these new PSS businesses fail? The reality is that 90% of start-ups fail (MARMER *et al*, 2011). The number-one reason is that there is no real market need for the product or it is not solving a meaningful problem. Tunnel vision and not considering feedback from users about what they want or need, whether consciously or accidentally,

have killed many start-ups too. Start-up post-mortems also cite the following reasons for failure: ran out of cash, not the right team, got outcompeted, have pricing or cost issues, a product without a business model, poor marketing, and product mistimed (CBINSIGHTS.COM, 2019). Applying sound design thinking processes can potentially reduce this failure: empathize with customers, then preferably co-ideate the solutions with them, then prototype the idea, and test-and-refine iteratively until they get it right.

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