

Design and Management of Recycling Facilities for Household and Community Recycling Participation

Kin Wai Michael Siu, Jia Xin Xiao

Purpose - This paper addresses convenience as a prominent feature of a scheduled society and examines the nature of convenience; identifies the waste collection system and recycling programmes in some densely populated areas in Asia; and discusses the existing barriers to enhancing the convenience of the recycling facilities in Hong Kong. The paper further identifies some recommendations for the policy and design of recycling practices and facilities.

Design/methodology/approach - In this qualitative study, two districts in Hong Kong from 2013 to 2014 were used as case studies. The research methods included field observations, semi-structured interviews and ethnographic research. The locations for field observation included lobbies, corridors, lifts, ground floors and streets. Direct interviews were conducted with residents, cleaners, government officials and expert planners and environmentalists. In-depth interviews and observations were conducted with six families following the interviews to identify important issues that might have been ignored in the semi-structured interviews and field observations.

Findings - A holistic understanding of convenience in a scheduled society is effective in the design of high-quality recycling facilities. In terms of convenience, the gap between recycling and not recycling is rather obvious in Hong Kong. Therefore, it is necessary and important to adjust the difference in the degree of convenience regarding refuse disposal and recyclable collection. In addition, the enhancement of economic incentives could shift the degree of convenience and encourage public participation in recycling. The challenges of specific living conditions and social contexts should also be taken into account to enhance the convenience of recycling.

Research limitations/implications – Further case studies are expected in other countries and cities with the purpose of gaining an in-depth understanding of the means by which to approach the convenience of recycling programmes within various social contexts. Comprehensive and continuous studies on these factors are recommended throughout the design and implementation processes to account for constantly changing situations. A clear understanding of convenience from the perspective of the users is important.

Practical implications - The findings provide reference and direction for a holistic approach to the design and management of recycling facilities in Hong Kong. The findings also advocate the consideration of convenience from the perspective of the users.

Social implications - The findings illustrate how to design and manage public facilities for waste recycling in ways that encourage household and community participation in terms of convenience.

Originality/value - The paper identifies the manner by which the culture of convenience and an institutionalised rhythm influence recycling practices. Although substantial studies on recycling indicate that convenience is a necessary characteristic of designs and services, the nature of convenience and the means by which to approach convenience in terms of public facilities are seldom discussed. The paper proposes several recommendations on the basis of the studies of the refuse collection programmes in other areas of Asia and case studies in Hong Kong. The findings provide insights for policymakers, researchers and designers to improve the design of public facilities.

Keywords: Convenience, Environmental behaviour, Facilities management, High-rise buildings, Public design, Recycling

Introduction

In recent years, many facilities have been designed to facilitate household and community participation in waste recycling. However, the resulting levels of waste reduction and recycling are unsatisfactory in many cities. Hong Kong is a densely populated city with a fast-paced, modern lifestyle, and convenience is a prominent feature of its scheduled society. The city is commonly perceived as being constantly busy, especially during rush hours, with the scheduled

mealtimes and working rotas serving as the institutionalised rhythms that structure people's everyday lives. This 'rushed' and 'harried' lifestyle influences the recycling practices in contemporary society (Hewitt, 1993; Linder, 1970; Southerton, 2003). Due to their long hours and high-pressure working conditions, residents – especially housewives – have less time than before to deal with domestic tasks (Lo & Siu, 2012).

Substantial studies on recycling indicate that convenience is a necessary characteristic in the design of any domestic waste recycling programme (Foo, 1997; Hage *et al.*, 2009; Neo, 2008; Yau, 2010). However, the nature of convenience and the means by which to approach convenience as related to recycling facilities are seldom discussed. In general, policymakers and designers simply assume that the designs and management of recycling facilities (as well as the promotion programmes and campaigns) are convenient and effective; however, residents may not consider them to be convenient. The government officers, managers and designers assume that they share a common understanding of convenience. Pajo (2008) argues that existing studies of environmentalism mainly focus on scientists and experts rather than on local citizens. In a long-term study on public space in Hong Kong, Siu (2003, 2007) points out that designers cannot impose their own preferences on users because the users have their own personal responses and needs. Thus it is important to understand the users' responses and behaviour on the basis of in-depth observations and then encourage them to behave in a more sustainable manner. Due to a lack of clear consideration of convenience in their planning and implementation, the current public recycling facilities do not meet users' social requirements and preferences. Most of the existing facilities are inefficient and have little effect on the prevention of unsustainable behaviour.

It is thus important to design high-quality recycling facilities in terms of convenience and flexibility; however, such enhancements can be difficult to make without consideration of other issues, such as specific lifestyles and living environments that introduce constraints and limitations on the design of convenient recycling facilities. For example, there is a dilemma between safety and convenience in densely populated high-rise buildings. Likewise, because the living situations are specific to Hong Kong, it is impractical to apply a standardised method or to reuse inappropriate recycling methods from other cities. What, then, is the nature of convenience? What are the constraints and challenges of increasing the convenience of recycling facilities in the housing estates and communities of Hong Kong? How can we approach convenience from the user's point of view? How can the design, implementation and management of facilities be improved to achieve sustainable recycling practices?

The scheduled society: culture of convenience and 'time budgets'

Hong Kong is a highly dense, fast-paced city with a modern lifestyle. Compared to other developed cities, convenience is a prominent characteristic of Hong Kong's scheduled society. In the past few decades, Hong Kong society has undergone tremendous changes in its living conditions, family structure, financial income and educational levels. In terms of the family structure, in the past many women stayed in the home as housewives. Today, many women have the opportunity to enter the full-time labour force. Due to the long hours and high-pressure working conditions, they have less time than before to deal with domestic tasks (Lam *et al.*, 2012; Siu & Lo, 2011). Convenience is thus a desirable attribute, especially for home managers.

The use of modern technologies and services such as microwave ovens, energy-saving refrigerators, cleaning machines, cooked meals, domestic helpers and child care is increasing to improve the standard of living, with the overall goal of relieving women of boring domestic chores.

‘Convenience’ means ‘the state of being able to proceed with something without difficulty’ (Oxford English Dictionary, 2014). The ongoing discussion of convenience and human behaviour indicates that convenience is a multidimensional construct. Yale and Venkatesh (1986) explore six categories of convenience: time use, handiness, appropriateness, portability, accessibility and avoidance of unpleasantness. Brown (1989) argues that some of these categories are ambiguous and difficult to measure, and thus proposes more general dimensions of convenience: time, place, acquisition, use and execution. However, after exploring the construct of convenience, Brown and McEnally (1992) suggest that the categories can be further modified and reduced to two dimensions – time and energy – from which they provide the following definition of convenience:

Convenience is a reduction in the amount of consumer time and/or energy required to acquire, use and dispose of a product or service relative to the time and energy required by other offerings in the product/service class (p. 49).

Similarly, Gofton (1995) suggests that convenience refers to people’s capacity to acquire or gain access to resources and to ‘time availability’. ‘Time availability’ refers not only to timesaving but also to the efficient use of time (Brown & McEnally, 1992). Some researchers suggest that money is interchangeable with time and energy (Linder, 1970, Southerton, 2003). It is also necessary to evaluate cost when considering convenience. The aforementioned research defines convenience and its construct based on the perspectives of consumption and marketing to provide hints as to the methods by which marketing can satisfy consumers. The convenience of acquisition is one of the most obvious factors that lead to symptomatic excess waste, but the means by which the disposal phase of convenience affects recycling activities remains unclear. Disposal characteristics affect people’s perceptions and behaviour, which determine whether they sort their recyclables.

In line with ‘time availability’, the terms ‘rushed’ and ‘harried’ have been widely discussed by some sociologists and economists (Hewitt, 1993; Linder, 1970; Southerton, 2003). The pace of daily life in Hong Kong is commonly perceived to be very fast amidst an overall shortage of time. The city is constantly busy, especially during rush hours, as crowds of people board and exit trains, buses, footbridges and elevators. The schedules for mealtimes, working rotas and sleeping act as the institutionalised rhythms that structure people’s everyday lives. The ‘routinisation’ of everyday life is one of the key challenges for changing human behaviour (Jackson, 2005). In *What Time is This Place*, Lynch (1972) analyses humans’ sense of time and emphasises that a gap exists between personal rhythms and collective rhythms:

Social time, which co-ordinates the actions of many people, may not match the internal rhythms of the body. The precise, abstract time of science and technological efficiency is certainly far removed from that human’s inner experience ... between subjective and “objective” time (p. 65).

The terms 'rushed' and 'harried' are directly related to having limited time, yet some research has shown that people perversely choose to 'rush' despite having enough time to relax (Cross, 1993; Linder, 1970). 'Time budget' is Southerton's (2003) explanation of this particular phenomenon. As Darier (1998) notes, 'speeding up', 'being busy' and being 'rushed' and 'harried' all represent a 'full' and 'valued' life. In this way, people legitimise unsustainable behaviour because of their need to budget their time. In many cases, citizens are generally not even willing to bring their recyclables to recycling bins, even if they regularly pass the recycling facilities.

According to Southerton's (2003) analysis of 'squeezing time', technologies are designed to enhance flexibility and convenience in ways that save time. In affluent and convenient societies, people expect to acquire and consume things in an easy and convenient way (Olsen, 2011). Restaurants, supermarkets, stores, buses, cars, fast food and electronic devices are everywhere (Gofton, 1995). A post-industrial society provides its residents with numerous commodities and the refuse of this consumption is generated by the social production. Recently, people have become more reliant on technology to solve social problems. In *The Question Concerning Technology, and Other Essays*, Heidegger (1977) defines the essence of technology and notes that humans attempt to develop technology to control technology. For example, new infrastructures and technologies such as refuse-chutes and incinerators are now used to manage waste disposal to provide a fast and effective way to deal with the serious waste problem, yet because the focus has been shifted from humanity to technology, the disposal rate has not declined and other social issues have emerged.

The intent here is not to criticise the culture of convenience, time budgeting or new technologies, but to shed light on the nature of convenience and the means by which we can increase the convenience and flexibility of public design in a scheduled society with the institutionalised rhythms of everyday life. From the literature, the nature of convenience can be concluded as follows: (a) convenience is highly related to time and energy, (b) money is interchangeable with time and energy resources, and (c) an individual's perception of convenience is closely related to his or her personal institutional rhythms.

Studies on refuse collection and recycling programmes in densely populated areas in Asia

In recent decades, some densely populated areas in Asia, such as Japan, Korea, Taiwan, Hong Kong and Singapore, have deployed different strategies and types of facilities for the source separation of domestic waste. In Hong Kong, landfilling and recycling are the two existing methods of dealing with massive waste, because all of its incinerators were phased out before 1998 (EPD, 2013). Compared with industrial waste, the recovery rate of domestic waste is inefficient because the complexity and diversity of the waste generated from domestic activities makes it much more difficult to sort. Some reference to surveys of other Asian areas would be helpful in the search for methods for increasing the household recycling rate in Hong Kong.

Minimising the use of refuse bins while increasing the availability of recycling facilities is a significant method to encourage pro-environmental behaviour (SITA, 2012; Steg & Vlek, 2009). One typical example is refuse collection in Taiwan, which has a high degree of

institutionalisation with rigid socio-temporal structures. In the early decades, the waste problem became a serious issue. Garbage was dumped into rubbish bins (i.e., collection points) on the streets at any time, without any classification or even piled up roughly when bins were stuffed, waiting to be collected by garbage-collection crews at night. Since 1997, the government's policy of 'Keep Trash off the Ground' has involved the removal of almost all rubbish bins from the streets (Chang *et al.*, 2008). Citizens are only allowed to throw their waste into garbage-collection trucks when these trucks arrive at designated times and areas. In the evenings, people stand in rows and wait for the garbage-collection and food-waste-collection trucks to arrive. It is common for people to chase after the truck when they are late, because those who miss the truck have to take their rubbish back home and wait for the next collection day. This strategy also provides an alternative method for those for whom the collection time is not convenient; that is, citizens can appoint specific staff to take their waste for disposal at the designated times (Chao, 2008). Along with the implementation of a volume-based fee system, the result of waste disposal rates has been satisfactory; the volume of waste dropped from 1.14 kg per capita per day in 1997 to around 0.45 kg per capita per day in 2011 (EPD, 2013; Lu *et al.*, 2006). The streets where garbage-collection trucks pass can serve as community space by enhancing opportunities for the residents to come together and supervise one another (Lee, 2010). Reducing the convenience of refuse disposal is an effective way to deal with environmental problem in terms of waste management, yet the imposition of collective temporal rhythms onto personal schedules and legitimising the routine of a social practice may lead to frustration and annoyance. This practice is very inconvenient for some residents because they may sometimes arrive home late and miss the collection time.

As in Hong Kong, the recycling of domestic waste in Singapore was implemented on a voluntary basis. There are two methods of refuse collection in Singapore, direct collection from individual households and indirect collection from bulk containers that store rubbish from the refuse-chutes of high-rise buildings (Foo, 1997). Indirect collection is prevalent because 81% of the population lives in government-subsidised flats in buildings with refuse-chutes (Neo, 2010). The residents dispose of their garbage through the indoor inlet of the refuse-chute or an outdoor inlet on each floor. The level of public participation in recycling within government-subsidised flats is low because of the convenience of waste disposal and the lack of economic incentives. *Karung guni* men (i.e., junk-buyers) purchase recyclables from households door-to-door and then sell them at a higher price to the recycling companies. They play an intermediary role between the households and the recycling companies. However, not many residents sell their recyclables because of the irregular collection times and the limited types of recyclables (Neo, 2010). In some modern housing estates, there are two refuse-chutes, one for waste collection and the other for recyclable collection, including paper, cans, glass and plastic. Recycling is just as easy and convenient as refuse disposal; thus some residents are willing to participate in it. These recycling facilities can increase recycling rates; however, they should be considered at the early stage of construction. Moreover, long-term maintenance and management as well as education are required to ensure their effectiveness.

In some areas of South Korea, recycling activities are similar to those in Japan. Different types of materials are collected on a designated date and improper or illegal disposal is rejected or can even lead to punishment (Lee & Paik, 2011). For example, Monday is for waste collection, Tuesday is for paper collection, Wednesday is for plastic collection and so forth. Residents have

to store different types of material, including food waste, at home and then dispose of them according to the schedule of refuse collection. In some neighbourhoods, dryers and processors are provided to handle food waste in situ; in addition, the food waste collection machine can weigh the food waste automatically and charge the disposal fee as people deposit their food waste into it. Local authorities can decrease the convenience of arbitrary refuse disposal by adopting mandatory measures such as restricted collection times and ‘pay as you throw’ pricing. As the degrees of convenience of refuse collection and recyclable collection are approximately the same, people generally separate materials before disposal. However, due to the limited dwelling space in Hong Kong, residents may not be willing to store different types of materials, especially food waste, inside their houses for a few days.

Case study in Hong Kong

Over the past 10 years, the government of Hong Kong has deployed many public facilities to promote and facilitate public participation in waste recycling. Studies show that Hong Kong’s domestic waste recovery rate increased from 14% in 2004 to approximately 40% in 2010 (EPD, 2005, 2010). However, the results of domestic recycling still lag far behind those of many developed cities. The voluntary practices along with inefficient public facilities have had little effect on influencing more sustainable behaviour.

This study aimed to provide an in-depth investigation into people’s perception of convenience to shed light on the design issues related to convenience and flexibility. A qualitative research approach was adopted because it can allow an in-depth understanding of social phenomena and the reasons behind them to be obtained (Denscome, 2010; Merriam, 1988). In consideration of the types of neighbourhood, a case study was carried out in two typical districts (the Eastern District and Sha Tin) in Hong Kong for 10 months (Figure 1). The Eastern District is one of the oldest of Hong Kong’s 18 districts and has the third-highest population density (CSD, 2012). These two districts contain new private housing estates and ‘old slab’-style public rental housing estates that have been used for nearly 40 years. The new private housing estates were built by private developers according to the market-oriented economy, whereas the public rental housing estates are provided by local authorities for lower-income citizens who cannot afford to rent private accommodations. The demographic structure and spatial characteristics of the Eastern District are quite distinct. For example, most of the public housing estates are located from Sai Wan Ho to Chai Wan and the large-scale private housing estates are located in other sub-areas (Figure 2). Thus, the social classes of the residents of the Eastern District are diverse and stratified, ranging from the lower working class to the upper middle class. Sha Tin, a developing district in the eastern New Territories, is one of the selected locations of New Town development (Ho, 1992). The land in this district was planned with the purpose of providing plenty of room for public housing projects (Figure 3). It covers the largest segments of the population (CSD, 2012). A large number of residents need to travel between this New Town and the city centre for work on weekdays.

[Insert Figure 1 about here]

[Insert Figure 2 about here]

[Insert Figure 3 about here]

In this study, the research activities included three phases: semi-structured interviews, field observations and ethnographic research. The first two phases were conducted amongst the residents of the neighbourhoods of the two chosen districts to obtain a general understanding of people's perceptions of the convenience of the different means of refuse collection. The third phase, which involved a detailed study of several households, was conducted concurrently to determine how people allocate their individual time and space to their daily collection activities.

Semi-structured interviews

Face-to-face interviews can be used to gain more comprehensive and 'qualitative descriptions of the life world of the subject with respect to interpretation of their meaning' (Kvale, 1996, p.124). In this study, a semi-structured interview approach was adopted due to its 'open-ended' characteristics, which can enable the revelation of many potential aspects from the conversation.

Fifty-one interviewees were recruited for the study; 45 were residents of the two districts. The interviewees included (1) the residents; (2) cleaners, scavengers, and recycling enterprises; (3) property management officers; and (4) experts from different areas, including urban designers, environmentalists and policymakers. The ages of the participants ranged from 7 to 80 years; three of the 45 residents interviewed were younger than 18 years; and most were female (62%). Twenty-eight participants were employed full-time, 13 were unemployed or retired, and four were students. In terms of family household income, nine participants had a monthly household income below HK\$10,000, 25 had an income between HK\$10,000 and HK\$39,999, and 11 had an income of HK\$40,000 or above. Of the 42 adult participants, 36 had at least a secondary education. Twenty participants lived in private housing estates and 25 lived in public rental housing. An interview generally lasted 30 to 45 minutes. In some cases, the interview was shorter if the subject had little time or had much less to say (e.g., the cleaners and elderly people). In some other cases, an interview could last for more than 2 hours if the subject had a lot to say (e.g., experts from the area of environmental research). All of the interview data were recorded by tape recorder and transcribed verbatim.

Field observations

In *The Practice of Social Research*, Babbie (2009) indicates the importance of recording observations in an unobtrusive manner because people may behave differently if they notice the observer marking down what they say or do. The less face-to-face contact involved, the more likely the respondents are to admit to socially undesirable behaviour (Norman *et al.*, 1979; Sanoff, 1992).

The observations were conducted without influence of or interaction with subjects in time and space. Observations were conducted on weekdays, weekends and holidays. Single days were divided into different periods such as early morning, rush hours and evening, to make the results easier to compare. Regarding the spatial dimension, the research area included lobbies, corridors, lifts, ground floors, communities, streets and recycling centres in correspondence with users' routes in their day-to-day activities, which enabled the observers to obtain general information

from the living environment. Cameras were chosen as a recording tool instead of video cameras, because video recording may have disturbed people in the semi-open housing estates. Notes were made as soon as possible to record what the observer 'knew' and 'thought'. During observations, both the residents and the environment were treated as an indivisibly interactive compound (Rutledge, 1985; Siu, 2007). This phase lasted 6 months, during which thousands of residents were observed within the two districts.

Ethnographic research

To gain an in-depth understanding of the ways in which people allocate their time and space in their daily routine, an empirical study within homes was necessary because households are the fundamental units in which domestic waste is generated. Following sociological and anthropological research methods, Evans (2012) conducts ethnographic research in several households for 8 months to study the routines of household food from consumption to disposal. In this study, following Evans (2012), the empirical material was drawn from an ethnographic study of households between 2013 and 2014. However, conducting ethnographic research in people's homes is difficult, because it involves intruding on their private living spaces and may cause annoyance (Gregson *et al.*, 2007; Miller, 2001). In addition, in contrast to many Western cities, people in Hong Kong are not accustomed to inviting people into their homes due to cultural conventions and the limited household space. Twenty households from these two districts were recruited following the interviews and six households (four from Sha Tin and two from the Eastern District) participated in this study. Of the six households, three were non-recyclers, two were casual recyclers and one was an active recycler. The sample of six households was by no mean representative; however, some heterogeneity in household income, household composition and building types was ensured. The analysis of the sample may contribute to an understanding of people's daily routines related to recycling.

Because the home is a private and intimate space, researchers who conduct ethnographic studies in the home are more likely to visit respondents than to live with them (Evans, 2012). Pink (2004) suggests that a 'multi-sited' approach (Marcus, 1995) is necessary when conducting ethnographic research in the home due to the insufficiency of interviews and the impossibility of classical ethnography. This multi-sited logic allows authors to trace the routines of everyday life and 'follow the people' (Marcus, 1995) to gain insight into their processes, behaviour and rhythms (Pajo, 2008). The authors thus accompanied the respondents to observe and interview them in situ, for example, in their homes, streets, markets/shops and neighbourhoods. In practice, the authors conducted repeated in-depth interviews with these families concerning the ways they shopped, cooked, ate, used, stored, sorted and disposed of materials. This method involved being with the respondents – cooking with them, eating with them and occasionally cleaning with them.

Field diaries were chosen as a tool to record the notes. As the data analysis could be complicated by abundant or irrelevant data collected from daily routines, the researchers mainly focused on these issues:

- (1) the allocation of time and space related to household chores;
- (2) the means by which people sorted and stored materials; and

(3) the means by which people disposed of domestic waste.

The data collected from the households exemplified important issues that may have been ignored through semi-structured interviews and field observations.

Convenience and Recycling

Following the definition of convenience discussed above, the categories of convenience can be reduced to time and energy (Brown & McEnally, 1992). To obtain people's perspectives towards the convenience of refuse and recycling facilities, time and energy were taken into consideration as well. Interviews were conducted with 45 participants; 15 participants were non-recyclers, 8 were active recyclers and 22 were casual recyclers. However, the number of casual recyclers may not reflect the true situation, because some participants, especially well-educated people, are reluctant to admit that they are non-recyclers. In the course of the interviews, the researchers noted that more than half of the participants seldom or never actually participated in recycling.

Figure 4 shows the degree of convenience and the time/energy requirements of different recycling methods from the perspective of the participants. The methods of refuse and recyclable collection highlighted in Figure 4 are the methods commonly used in Hong Kong. On the basis of the data collected through the interviews, it was noted that many participants considered the existing refuse collection system to be very convenient and considered the recycling facilities to be less convenient. In general, the participants explained that recycling was not as convenient as not recycling because they had to spend more time and energy to separate and store the recyclables at home before disposal.

According to the EPD (2010), the recycling network, including the recycling facilities, collection points, material transfer centres, recycle centres and second-hand exchanges, is accessible to households and communities. In practice, many separation facilities are provided in the entrances of buildings, which is a convenient and visible location from the point of view of property management. However, 42 of the participants emphasised that the recycling facilities were neither sufficient nor convenient. In effect, this belief was not only a result of the inadequate and inefficient recycling facilities, but also because the subjects found that dumping their waste without sorting was easier and saved them time and energy. In contrast to the refuse collection methods in the other areas of Asia mentioned above, the gap between recycling and not recycling in terms of convenience is rather obvious. In these cases, people will not be charged or punished if they do not separate materials; thus many citizens are more likely to choose the quicker and more convenient way to deal with their waste.

[Insert Figure 4 about here]

According to general understanding, door-to-door recycling collection was regarded as the most convenient way for many of the participants, especially for those who lived in public housing estates. However, according to the interviews with cleaners, door-to-door collection imposed a heavier workload for them because they had to spend more time and energy handling the recyclables and non-recyclables from hundreds of flats. In terms of categories, for many participants, binary recycling was considered a relatively convenient and time-saving method if

they had to separate materials.

In addition, the researchers found that economic incentives could shift the degree of convenience in line with the discourse above. Many participants emphasised that recycling was time- and energy-consuming and that they did not have time to separate recyclables. They typically were not willing to spend time on housework because they regarded it as a burden. Nevertheless, with regard to volume-based fees and deposit-refunds, some of them indicated that separation was not so inconvenient, because they did not need to spend too much time, energy or space on collection and because they were rewarded for doing so. In these cases, the residents actively collected the recyclables due to the positive feedback from their recycling efforts, proving that time and space are not as limited as so many claim.

Institutionalised rhythms: allocation of time

The term ‘rhythm’ is closely related to everyday life (Lefebvre, 2004). Rhythms are everywhere, repeated, crossing and re-crossing. Where there is interaction between body, space, and time, there is rhythm. Lefebvre (2004) points out the rhythm is the inhabitant who moves in space and that the natural space involves body movement. Each individual has his or her own personal rhythm, just as a society has its social rhythm. The standardised social time and technological efficiency may be far away from a person’s inner experience. Lefebvre draws attention to ‘micro-scale’ events taken by ‘ordinary people’, ‘common people’ or the ‘grassroots class’. In general, it involves the whole process of people’s lives, including their activities, practices, strategies and perception in space and time (Simonsen, 1997).

[Insert Figure 5 about here]

In some old public housing estates, the residents placed bags of waste in the corridor in front of their door to wait for door-to-door collection by the cleaners twice a day – a very convenient method. In the evening, the common collection time was around 8:00 pm. If the residents missed the collection time, most of them did not put their waste in the corridor due to hygiene concerns. Instead, they walked through the corridor and dropped their bag into the large rubbish bins. Many people arrived home late in the evening. Their ‘subjective’ collection time was different from the ‘objective’ time. Recently, in some housing estates, property managers have removed the rubbish bins on each storey for more effective waste collection. However, the traditional disposal behaviour has been formed over a long period and removal of the rubbish bins has led to significant irritation. As a result, some residents were found to dispose of their waste in the same place even though the bins had been removed (Figure 5). Over the course of our in-depth study within six families, the researchers noted that the traditions of waste disposal behaviour were well-formed, long-ingrained habits. The daily schedule that embodies the stability of the temporal structure of everyday life is difficult to change (Jackson, 2005). In many double-income families without domestic helpers, women still assume the key role with regard to the domestic household chores. Women’s daily routines contain not only full time and high-pressure work but also a high proportion of the domestic chores. They have a clear understanding of the workload of source separation; thus the women studied showed less interest in source separation than other family members. For example, Mrs Poon, a saleswoman married to a builder, began her description of an ordinary weekday:

7:55 Wake up and remind son of time
8:35 Leave home and go to work
18:00 Get off work and go to wet market
19:30 Arrive home and prepare for dinner
20:30 Have dinner and watch the soap opera (20:30-21:30) with family
21:30 Do some cleaning – wash the dishes, throw away the rubbish, sweep the floor, etc.
22:30 Take a bath and get ready to sleep

I'm very busy, you know, every day when I go home ... it is very late. I have to prepare for the dinner for my family. After finishing dinner, it is over 9 o'clock. I don't have adequate time on household chores. I just need to walk within 30 second to the rubbish bin near the elevator to dispose of waste. So why not choose such a convenient and easy way? (*Mrs Poon*)

In the interviews, the participants often used the Cantonese term '*maa faan*' (i.e., inconvenient, troublesome) to express their view towards recycling.

Many local people like us are afraid of '*maa faan*' things. It is so '*maa faan*' to separate recyclables. Disposal is so convenient ... why should we spend time on source separation? (*Mrs Chow*)

During the ethnographic study, the researchers also found a gap between what people said and the way they behaved. For example, Mrs Lee emphasised that she was a non-recycler; however, she collected materials from her house and then sold them to recycling centres to subsidise her family's income. She did not regard this as recycling because she did not regard it as a conventional means of recycling, such as the use of public facilities. Even when the recycling centre was located farther away than were the separation bins, some participants chose the former due to economic incentives. For another example, the researchers noted that Mrs Poon brought outdated clothing to the collection point when the seasons changed; however, in her description, she told the researchers that she never recycled. Mrs Poon further explained that it would be a pity to throw the clothes away and she mentioned that the collection point was not far away because she passed it when she went to work. In these cases, people were willing to allocate time on recycling because they found it worthwhile.

In four families, the participants had an interest in recycling and most of them were willing to allocate time on it. However, the participants' actual behaviour was far from their intentions and their enthusiasm decreased after several weeks.

The separation bins are located on the podium. From time to time, I bring along some bottles and paper when I go to work, if I remember to bring them along when I leave home. Delabelling takes time ... honestly, I recently put them into separation facilities without delabelling and washing. (*Mr Lau*)

By the end of the study, the researchers had found that many of the participants were not able to articulate which other materials besides paper and bottles could be recycled, even though there

were illustrations of these materials on the top of the separation facilities. In practice, they threw a large amount of recyclable material into the rubbish bins because they did not realise that these materials could be recycled. Some residents also put non-recyclable materials into the separation facilities because they mistook these materials for ones that were recyclable.

The challenges of achieving convenience of recycling

A dilemma: safety or convenience?

Jackson (2005) points out that the identification of barriers within a specific context is the first step in the encouragement of pro-environmental behaviour. In practice, policies and legislation have some effect on the design of public facilities. The demands of standardisation make it difficult for recycling facilities to accommodate the living situations in densely populated high-rise buildings. After the *Shek Kip Mei* squatter-camp fire destroyed thousands of houses in 1953, fire legislation was fortified (Smart, 2006). Security related to fire legislation takes priority over convenience and accessibility, especially in high-density housing estates. For example, recycling facilities must be installed in refuse storage rooms or corners to avoid hindering people's movement. According to the policy framework provided by the EPD, public spaces such as refuse storage rooms, lift lobbies and entrances are preferred over corridors for the implementation of recycling facilities. In some cases, the installation of a recycling facility cannot be approved on every floor. In general, the recycling facilities are installed in one of the so-called '*preferred*' locations, namely, the entrance of the building on the podium (Figure 6). The locations of these facilities are neither visible nor preferred by the residents. The appearance of these recycling facilities meets government expectations rather than the residents' perceptions.

[Insert Figure 6 about here]

Moreover, to prevent people from throwing cigarette butts into the recycling bins and to prevent fires from spreading if the recyclables are ignited (EPD, 2005), each of the recycling bins is designed with a self-closing lid that hinders improper disposal behaviour, but the lid also discourages people from throwing their recyclables into the bins. Given the aforementioned hygiene concerns, most people are not willing to touch the recycling facilities, even if the lids are clean, and some bin designs cause recyclables to become stuck in the opening because the lids are difficult to open.

Both governments and individuals have a strong sense of public health. The proper recycling of food waste, which accounts for a large proportion of domestic waste, can reduce the stress on landfills, but the recycling or storage of food waste in housing estates can be a real challenge. People are not willing to store many recyclables, especially putrescibles (e.g., food waste), because they want to keep their houses clean. Waste is deemed a threat and in both public and private spheres people are urged to dispose of it as quickly as possible. Waste removal practices are conducted in a fast and invisible manner to support the ideal of an absolutely pure and clean society. In practice, cleaners collect the waste from buildings once or twice a day, which increases the convenience of refuse disposal without sorting.

Limited space?

According to the field study, there are some physical limitations in the implementation and management process. Regarding recycling practices, the residents and property management officers studied mainly focused on:

- a) Limited public space
- b) Limited private space

As previously mentioned, most of these facilities have a low-priority status and therefore have little effect on people's sustainable behaviour. Research has shown that many high-rise buildings have only one set of recycling bins located on the ground floor. The residents must bring their recyclables downstairs if they want to participate in recycling. In the old-style public housing estates, the residents must walk down a long corridor and then take the elevator to the ground floor to the recycling bins. The resulting level of participation in recycling is obviously unsatisfactory, as people seldom bring their recyclables to the separation bins or collection points. When they find that other residents in the neighbourhood dispose of their materials without any classification, their enthusiasm further decreases.

(a) Limited public space

The building environment in Hong Kong is quite different from that in other cities. Due to the high population density, most of its residents live in high-rise buildings with more than 20 storeys. Consequently, the recycling practices in these environments differ greatly from those in neighbourhoods with single-storey or low-rise buildings. Hong Kong has a variety of building and housing estate types with stratified living environments and accommodations. Some high-rise buildings have relatively large communal spaces such as refuse storage rooms, whereas some walk-up buildings are too narrow to allow for the installation of any public facilities. The following options for collection systems illustrate the variety of living conditions and waste separation systems in Hong Kong.

1. Waste separation facilities are available on each floor or provided in various common-area locations (e.g., refuse storage rooms, material recovery rooms, cleaner rooms, water-meter rooms, lobbies or staircases), subject to the approval of housing and fire services authorities.
2. A refuse-chute/waste collection bin is provided, with a central waste-collection area on the first floor or basement and waste separation facilities on the ground floor.
3. A refuse-chute/waste collection bin is provided, with facilities for waste separation located in the neighbourhood.
4. No chutes are provided. Rubbish bins are placed on each floor, with waste separation facilities on the ground floor.
5. No chutes or separation facilities are provided. Rubbish bins are placed on each floor.
6. No chutes, separation facilities or rubbish bins are provided. Waste is packaged and placed directly outside doorways in the corridors every day to wait for door-to-door collection.
7. No chutes, separation facilities or rubbish bins are provided. A collection station is located in a nearby public area.

Such complexity and variety of living conditions makes the systematic or effective implementation of collection facilities difficult. In many other buildings, recycling facilities are unavailable due to the particular living situation (EPD, 2010). Studies have indicated that the levels of participation in recycling decrease when residents are required to bring their recyclables to separation bins on the ground floor (SITA, 2010). Given that rubbish bins are provided everywhere, many residents choose convenience over sustainability and throw away their recyclables and waste without separating them. Some of the residents reported that inadequate facilities discouraged them from disposing of recyclables and that increasing the availability of such facilities would make it more convenient for residents to participate in recycling.

(b) Limited private space

In Hong Kong, most flats are very small, high-efficiency dwellings, especially in the public housing estates. The limited space in people's homes makes the storage of a large quantity of recyclables difficult and inconvenient. In the old society, some people collected recyclables such as paper, magazines and bottles at home and sold them to subsidise their limited household income. Due to the scarcity of commodities at that time, residents made the best use of their available resources. For example, they used biscuit tins to store photos. Over time, materials have become easier and more convenient to attain and thus sustainable practices are rarely seen in households. People throw away their recyclables with other waste every day to avoid hygiene and safety issues. However, some of the respondents, especially those who lived in public housing estates, collected recyclables and sold them to recycling centres to subsidise their family's income.

Our flat is so small. It is inconvenient to store a large quantity of recyclables at home. Besides, it may cause some hygiene problems. So I throw them away with other waste every day. (*Mrs Kwok*)

Due to the limited interior space, it is impractical to set out different types of bins or bags for different recyclables. However, space is still available, if people learn how to make the most of it. Even in a flat of no more than a few hundred square feet, one resident was still able to find effective ways to store certain types of recyclables (Figure 7).

My 200 feet house is quite suitable for me. Normally, I put all types of recyclables into a bag, including cans, bottles and paper, and then throw them into corresponding recycling bins every several days. Frankly speaking, I don't think that recycling facilities are inconvenient because I pass them every day. (*Miss Chan*)

[Insert Figure 7 about here]

Poor implementation and management

According to the EPD (2005), there are some guidelines for the placement of recycling facilities in the public spaces of domestic or composite buildings based on the requirements of the Fire Services, Housing, Food and Environmental Hygiene and Home Affairs Departments. However,

these guidelines have little consideration for convenience and accessibility from the users' perspective. Moreover, because housing estates are managed by property management companies or housing departments, the estates still have many options in placing the bins based on the guidelines. To encourage and assist housing estates to participate in recycling practices, waste separation bins are provided for free distribution. However, due to the limited quota of bins assigned to each building, the property management companies must apply for government subsidies if they want to install more recycling facilities on each floor (EPD, 2005). The process is expensive and time-consuming, and many property management companies are thus reluctant to increase the number of facilities in their housing estates even when the public space of each floor is sufficiently large.

There are 28,500 waste separation bins installed in public spaces, nearly two-thirds of which are placed in housing estates (EPD, 2008). Some of these facilities are made of poor-quality, nondurable materials with a low efficiency of function and appearance. However, replacement of the bins would not only require significant financial capital, but would also result in waste, particularly in relation to those bins that have not been used by residents. Although some of the older generation of three-coloured recycling bins are worn out and no longer suitable for their current situations, most of them are still in use. In the housing estates, cleaning workers are hired by cleaning service companies to collect the waste and recyclables, and it is impractical to rely on them to separate the recyclables from the waste stream because each of them must deal with the garbage from hundreds of households.

The implementation and maintenance of public facilities is quite different from their original design purpose. For example, refuse-chutes have long been provided for residents to dispose of their waste through the inlets on each floor (Chan & Lee, 2006). All of the waste drops into the central waste-collection area on the ground floor and cleaners are only needed to transfer the collection bins from the central waste-collection area. However, in order to minimise health risks and nuisance, the refuse-chutes in some buildings have been closed and replaced by bins as a preventative measure (Figure 8). The cleaners then manually transport the refuse from the bins into the refuse chutes. As mentioned above, the system in Singapore shows that the installation of an alternative refuse-chute for the collection of recyclables not only increases the rate of participation in recycling but also enables the cleaners to save time and energy. However, it requires long-term maintenance and self-discipline on the part of the users. It is necessary to ensure that recyclables are not mixed with putrescibles, otherwise, these facilities have to be closed if any potential health risks arise. Long-term education, clear indications and propaganda are thus necessary to assist people in the proper use of the facilities.

[Insert Figure 8 about here]

Recommendations

The design, implementation and management of the existing public recycling facilities do not effectively encourage public participation. It is imperative for researchers and policymakers to reconsider means to improve the design of the existing refuse collection system to encourage pro-environmental behaviour. Research into the motivation of sustainable behaviour can also provide insights into the design of recycling systems. Steg and Vlek (2009) emphasise that both

informational strategies (e.g., information, persuasion and social support) and structural strategies (e.g., availability of products and services, policies and financial strategies) are significant for the achievement of environmental sustainability. Lilley *et al.* (2005) indicate that eco-feedback, scripts and intelligent products can be applied towards more sustainable behaviour. Wever *et al.* (2008) also illustrate that ‘force functionality’ (designed with strong obstacles) can prevent unsustainable behaviour. Lockton (2013) further proposes three approaches that should be considered – ‘making it easier to do it (enabling), motivating users to do it, or constraining users so they have to do it’ (p. 127).

From the case study, it is obvious that unsustainable behaviour is not easy to change because people grow accustomed to their personal rhythms. They also have relatively high expectations of the convenience of public facilities. Therefore, informational strategies, ‘force functionality’ and ‘constraint’ should be taken into account in the design of a refuse collection system. The authors propose several recommendations for the motivation of household and community participation in recycling programmes. These recommendations are summarised in Table 1.

Table 1. Summary of recommendations

Recommendation 1	<p>Maximise the convenience of recycling</p> <ul style="list-style-type: none"> • Increase the number of recycling facilities • Ensure that the recycling facilities are convenient and accessible for residents to identify and approach • Ensure that people can bring their recyclables (except for food waste) to separation bins at any time • Provide an alternative refuse-chute for collection of recyclables along with clear indication and propaganda if these facilities are available in buildings • Provide some ‘scripts’ and visual affordances, and ensure that they do not bring any inconvenience for people when they are used • Provide containers such as recycling bags, with clear indications for households to facilitate them to collect recyclables indoors
Recommendation 2	<p>Decrease the convenience of refuse disposal without classification</p> <ul style="list-style-type: none"> • Decrease the number of refuse bins • Deploy a volume-based waste system, such as a food waste collection machine that can weigh the food waste automatically and charge a disposal fee as people deposit food waste into it • Deploy mandatory measures such as ‘pay-as-you-throw’ and ensure that people purchase the authorised waste bags for the disposal of general waste • Urge people to separate recyclables before disposal and provide warnings or punishment, if necessary • Provide designated times and accessible locations for waste disposal, as well as an alternative means for people to deal with the waste if they miss the time
Recommendation 3	<p>Increase economic incentives</p> <ul style="list-style-type: none"> • Provide some premium or commodity for recyclers as feedback

- for active recycling, especially in public housing estates
- Provide a simple method and financial support for property management officers to apply for customised facilities or maintenance
- Conduct some activities such as ‘deposit-refund’ to facilitate recycling
- Provide financial support for non-governmental organisations so that they can educate or help people to participate in recycling
- Ensure that cleaning contractors can benefit by selling recyclables
- Allow cleaners and scavengers to earn money by separating recyclables

Recommendation 4

Ensure safety and a high standard of hygiene

- Ensure that recycling facilities are provided conveniently in terms of availability and in locations without potential risk, especially when fire occurs
- Ensure that the facilities do not block people from passing
- Provide dryers or processors to assist residents in processing food waste in situ, if necessary
- Ensure that the food waste collection facilities are located in an open space and are sealed and collected on time
- Provide a way for users to open lids easily and quickly without touching them, if lids are necessary
- Ensure the cleanliness and maintenance of recycling facilities and their surroundings

Conclusions

Convenience is a prominent feature of a scheduled society. Enhancing the convenience of public facilities could motivate household and community participation in recycling. Today, policymakers, designers and property managers assume that they share a common understanding of convenience with users. They simply assume that the recycling network, including the facilities and recycling centres, are convenient and accessible for residents. However, residents may not consider them to be convenient from their point of view. It is thus important to understand the nature of convenience as well as the users’ responses and behaviour in the design of recycling facilities and programmes.

This paper identifies the nature of convenience that should be considered in recycling design and management: convenience is highly related to time and energy; money is interchangeable with time and energy resources; and an individual’s perception of convenience is closely related to his or her personal and institutional rhythms. Moreover, studies in other densely populated areas in Asia can provide insights and references for the improvement of recycling facilities and services in Hong Kong. Reducing the convenience of refuse disposal while increasing the convenience of recycling is an effective way to deal with the waste problem.

The case study further shows that the gap between recycling and not recycling in terms of

convenience is rather obvious. Many people consider the existing refuse collection system to be very convenient, but consider the recycling facilities to be much less convenient. The low rate of recycling is not only a result of the inadequate and inefficient recycling facilities, but also of the ease and convenience of disposal of waste without sorting. Furthermore, enhancement of the economic incentives could shift the degree of convenience and encourage public participation in recycling. In effect, people have grown accustomed to their institutionalised rhythm; thus it is not easy to change their behaviour. Many people find it 'maa faan' to separate recyclables. Thus simply increasing the convenience of recycling facilities would not be sufficiently effective to encourage public participation in recycling. Adjusting the difference in the degree of convenience between refuse disposal and recyclable collection is necessary and important. Clearly, a great effort in providing high-quality facilities, policies, management and economic incentives can induce people to achieve sustainable practice. However, there are some challenges to achieving recycling convenience in Hong Kong. Due to safety issues, security related to fire legislation takes priority over convenience and accessibility, especially in high-density housing estates. Many people do not prefer these so-called convenient locations. In addition, the limited public and private space make the systematic or effective implementation of collection facilities difficult. Moreover, the implementation and maintenance of these facilities are quite different from their original design purpose. It can be difficult to enhance their convenience and accessibility without considering these important issues.

In summary, this paper proposes several recommendations based on the findings and discussions. This is not a universal set of design guidelines for the design and management of recycling facilities at the global level. It is a potential approach for the design and management of public facilities for waste recycling that encourage household and community participation in accordance with specific living conditions and social contexts. To provide effective, high-quality recycling facilities, policymakers, designers and management must pay more attention to the specific challenges involved in recycling practices, such as different physical environments and social and cultural settings (Siu, 2005). Comprehensive, long-term and continuous studies should be conducted on the design and implementation process according to the constantly changing situations.

References

- Babbie, E. R. (2009). *The practice of social research* (12nd ed.). Cengage Learning Press.
- Brown, L. G. (1989). The strategic and tactical implications of convenience in consumer product marketing. *Journal of Consumer Marketing*, 6(3), 13-19.
- Brown, L. G., & McEnally, M. R. (1992). Convenience: Definition, Structure, and application. *Journal of Marketing Management*, 2(2), 47-56.
- Chan, E. H. W., & Lee, G. K. L. (2006). A review of refuse collection systems in high-rise housings in Hong Kong. *Facilities*, 24 (9/10), 376-390.
- Chang, Y. M., Liu, C. C., Hung, C. Y., Hu, A., & Chen, S. S. Change in MSW characteristics under recent management strategies in Taiwan. *Waste Management*, 28(12), 2443-2455.
- Chao, Y. L. (2008). Time series analysis of the effects of refuse collection on recycling: Taiwan's "Keep Trash Off the Ground" measure. *Waste Management*, 28(5), 859-869.
- Crilly, N., Moultrie, J. & Clarkson, P. J. (2004). Seeing Things: Consumer response to the visual

- domain in product design. *Design Studies*, 25(6), 547-577.
- Cross, G. (1993). *Time and money: The making of consumer culture*. Routledge.
- CSD, Census and Statistics Department. (2012). *Hong Kong 2011 population census: Summary results*. Hong Kong: Census and Statistics Department.
- Darier, E. (1998). Time to be lazy: Work, the environment and modern subjectivities. *Time & Society*, 7(2), 193-208.
- Denscombe, M. (2010). *The good research guide: For small-scale social research projects*. London. UK: Open University Press.
- EPD, Environmental Protection Department. (2005). *A policy framework for the management of municipal solid waste (2005-2014)*. Hong Kong: EPD.
- EPD, Environmental Protection Department. (2008). *Three-coloured waste separation bins*. Hong Kong: EPD.
- EPD, Environmental Protection Department. (2010). *Programme on source separation of domestic waste: Annual Update 2010*. Hong Kong: EPD.
- EPD, Environmental Protection Department. (2013). *Hong Kong blueprint for sustainable use of resources (2013-2022)*. Hong Kong: EPD.
- Evans, D. (2012). Beyond the throwaway society: Ordinary domestic practice and a sociological approach household food waste. *Sociology*, 46(1), 41-56.
- Foo, T. S. (1997). Recycling of domestic waste: Early experiences in Singapore. *Habitat International*, 21(3), 277-289.
- Gofton, L. (1995). Convenience and the moral status of consumer practices. In D. Marshall (Ed.), *Food choice and the consumer* (pp. 152-181). Glasgow, UK: Blackie Academic & Professional.
- Gregson, N., Metcalfe, A., & Crewe, L. (2007). Identity, mobility, and the throwaway society. *Environmental and planning D: Society and space*, 25(4), 682-700.
- Hage, O., Söderholm, P., & Berglund, C. (2009). Norms and economic motivation in household recycling: Empirical evidence from Sweden. *Resources, conservation and recycling*, 53(3), 155-165.
- Heidegger, M. (1977). *The question concerning technology, and other essays*. (W. Lovitt, Trans.). New York: Harper & Row.
- Hewitt, P. (1993). *About time: The revolution in work and family life*. London: Rivers Oram Press.
- Ho, Y. K. (1992). *Planning of community facilities in Hong Kong: A case study of Sha Tin New Town*. Hong Kong: The University of Hong Kong.
- Jackson, T. (2005). *Motivating sustainable consumption: A review of evidence on consumer behaviour and behavioural change*. University of Surrey.
- Kvale, S. (1996). *Interviews: An introduction to qualitative research interviewing*. London: Sage.
- Lam, W.W.T., Fielding, R., McDowell, I., Johnston, J., Chan, S., Leung, G. M., & Lam, T. H. Perspectives on family health, happiness and harmony (3H) among Hong Kong Chinese people: a qualitative study. *Health Education Research*, 27(5), 767-779.
- Lee, S., & Paik, H. S. (2011). Korean household waste management and recycling behaviour. *Building and Environment*, 46(5), 1159-1166.
- Lefebvre, H. (2004). *Rhythmanalysis: Space, time and everyday life*. (S. Elden, & G. Moore, Trans.). London, New York: Continuum.
- Lilley, D., Lofthouse, V., & Bhamra, T. (2005). Towards instinctive sustainable product use. *Proceedings of 2nd international conference, Sustainability: Creating the culture*.

Aberdeen, Scotland.

- Linder, S. B. (1970). *The harried leisure class*. Columbia: Columbia University.
- Lo, C. H., & Siu, K. W. M. (2010). Lifestyles and recycling: Living environments, social changes and facilities in a densely populated city. *The International Journal of Interdisciplinary Social Sciences*, 5(2), 439-449.
- Lockton, D. J. G. (2013). *Design with Intent: A design pattern toolkit for environmental & social behaviour change*. School of Engineering & Design Brunel University.
- Lu, L. T., Hsiao, T. Y., Shang, N. C., Yu, Y. H., & Ma, H. W. (2006). MSW management for waste minimization in Taiwan: The last two decades. *Waste Management*, 26(6), 661-667.
- Lynch, K. (1972). *What time is the place?* Cambridge, Mass., London: The MIT Press.
- Marcus, G. E. (1995). Ethnography in/of the world system: The emergence of multi-sited ethnography. *Annual Review of Anthropology*, 24(1), 95-117.
- Merriam, S. B. (1988). *Case study research: A qualitative approach*. San Francisco, CA: Jossey-Bass.
- Miller, D. (2001). *Home Possessions*. Oxford: Berg.
- Neo, H. (2010). The potential of large-scale urban waste recycling: A case study of the National Recycling Programme in Singapore. *Society & Natural Resources: An international Journal*, 23(9), 872-887.
- Norman, D. A. (1998). *The Design of Everyday Things*. Cambridge, MA: The MIT Press.
- Olsen, N. V. (2011). The convenience consumer's dilemma. *British Food Journal*, 114(11), 1613-1625.
- Oxford English Dictionary. (2014). *Oxford English Dictionary*. London: Oxford University Press.
- Pajo, J. (2008). *Recycling culture: Environmental beliefs and economic practices in post-1990 Germany*. University of California, Irvine.
- Pink, S. (2004). *Home truths: Gender, domestic objects and everyday life*. Oxford: Berg.
- Rutledge, A. J. (1985). *A visual approach to park design*. New York: John Wiley and Sons Ltd.
- Sanoff, H. (1992). Integrating programming, evaluation and participation in design: A theory Z approach. Aldershot, UK: Ashgate.
- Smart, A. (2006). The Shek Kip Mei myth: Squatter, fires and colonial rule in Hong Kong, 1950-1963. Hong Kong: Hong Kong University Press.
- Simonsen, K. (1997). Modernity, community or a diversity of ways of life: A discussion of urban everyday life. In O. Kalltrop, I. Elander, O. Ericsson & M. Franzen (Eds.), *Cities in Transformation-transformation in cities: Social and symbolic change of urban space* (pp. 162-183). Aldershot: Avebury.
- Siu, K. W. M. (2003). Users' creative responses and designers' roles. *Design Issues*, 19(2), 64-73.
- Siu, K. W. M. (2005). Pleasurable products: Public space furniture with userfitness. *Journal of Engineering Design*, 16(6), 545-555.
- Siu, K. W. M. (2007). Guerrilla wars in everyday public spaces: Reflections and inspirations for designers. *International Journal of Design*, 1(1), 37-56.
- Siu, K. W. M., & Lo, C. H. (2011). Environmental Sustainability: Public housing household participation in waste and implication for public design. *The International Journal of Environmental, Cultural, Economic and Social Sustainability*, 7(3), 365-376.
- SITA. (2010). Looking up: International recycling experience for multi-occupancy households. London: SITA UK.
- Southerton, D. (2003). 'Squeezing time': Allocating practices, coordinating networks and

- scheduling society. *Time & Society*, 12(1), 5-25.
- Steg, L., & Vlek, C. (2009). Encouraging pro-environmental behaviour: An integrative review and research agenda. *Journal of Environmental Psychology*, 29 (3), 309-317.
- Wever, R., Van Kuijk, J., & Boks, C. (2008). User-centred design for sustainable behaviour. *International Journal of Sustainable Engineering*, 1(1), 9-20.
- Yale, L., & Venkatesh, A. (1986). Toward the construct of convenience in consumer research. *Advances in Consumer Research*, 13, 403-408.
- Yau, Y. (2010). Domestic waste recycling, collective action and economic incentive: The case in Hong Kong. *Waste Management*, 30(12), 2440-2447.