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Informal waste collection and its co-existence with the formal waste sector: The case of Kampala, Uganda

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A B S T R A C T

We analyze how the informal collectors and the formal sector co-exist in solid waste collection in Kampala. We rely on household surveys and a small survey among the informal collectors in Kampala. Findings suggest that informal collectors play a substantial role in the first stage – collecting solid waste from the households, notably from poorer segments of the population. This is not the 'dualist' aspect of poor earnings but actually made possible by them escaping control on where to deposit the waste. Employing a simple technology, and bringing the waste no farther than the nearest unofficial 'collection point', they provide services at low cost to the households, but much less so to the community (environmentally of little use). If public provisions can be made for the second stage in waste collection, this may trigger even more supply of small-scale collecting services, a combination that may prove cost effective.

Introduction

Developing countries have so-called informal sectors, which are important forms of income activities providing employment to many people (ILO, 2002). The informal sector consist of small scale, often not state-registered or even illegal, industries and service providers that sell goods and services, and seem to form an economy of its own. This informal sector is distinct from the more formal industries and services that are larger, better organized, richer and officially recognized by state authorities.

Also within solid waste management (SWM) a formal and informal sector can be distinguished. The formal sector consists of public service providers and private companies, while the informal sector consist of individuals or small unregistered 'firms' that are active as waste pickers, waste collectors, itinerant buyers and recyclers (Furedy, 1995; Nzeadibe & Chukwuedozie, 2010; Wilson, Velis, & Cheeseman, 2006).

In this paper we focus on a specific group of informal SWM actors, namely the informal collectors. Their position is different from that of, say, waste pickers and recyclers, in that these latter groups often grow parallel to the quantity of waste collected by the formal sector. Informal collectors, on the other hand, are typically in a zero-sum game with (formal) private sector waste collectors for their clientele.

We will argue, however, that while this is the case for competition between informal collectors and formal private collectors, this may not be true vis-à-vis formal public collectors. The reason is that public waste collectors are not faced with the need to go from door to door to collect money (and waste), but typically employ a technology that involves collecting waste at some distance from the household door. They use containers or depots to collect household waste, which is then brought to an official dumpsite or treated otherwise. This leaves room for informal collectors, who take the garbage from the household to the container or collection point. The choice of this collection system then leaves room for informal collectors, who are then 'structurally' linked to a collective-container based system.

If private sector collection is introduced when free containers are still around, private companies must compete with a collective mode of collecting waste that brings lower fees for households, which could make formal private services unattractive. This has been the reason for Kampala to remove many of the collective containers (skips) in the city when private collectors were introduced.

So, this paper investigates the nature of and relations between formal and informal waste collectors, focusing on two questions: Does the informal sector in the SWM business only consist of poor

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workers that can find no other job and who serve only the poor households that cannot afford formal service providers? And do informal sector waste collectors function in close dependency with – rather than separation from – the formal sector, with which it competes for clients and to which it offers services and goods? In the next section, we explore the theoretical debates on the informal sector in relation to urban SWM in developing countries. Subsequently, the methodology of the study is outlined, followed by a presentation and analysis of the results. Finally, the paper ends with a conclusion.

Informal sector in urban solid waste management in developing countries

Klundert and Lardinois (1995) define the informal sector as the unregistered, unregulated or casual activities carried out by individuals or/and families or community enterprises that engage in value-adding activities on a small scale with minimum capital input.

The informal economy in developing countries has been a subject of theoretical debates dominated by the dualist school, the structuralist school and the legalistic school. The dualist school first popularized by International Labor Organization (ILO) in the 1970s argued that there are two distinct urban economies (the poor/informally/unemployed vs. the rich/formally employed). The ILO 1972 report on income and employment thus coined the marginal, poor, "informal" sector of the economy, which produced goods and created employment and income for the poor. Whereas formal enterprises were characterized by large-scale production, incorporation, and the use of capital intensive technology, the ILO indicated that informal enterprises involved small-scale production, family ownership and labor intensive techniques. The informal sector mainly articulates small-scale performance and is somehow isolated from the formal sector (Michael, 2011; Ngiba, Dickinson, Whittaker, & Beswick, 2009).

The structuralist school gives another view of the informal sector, but does not exclude or undermine the contributions of the dualist school (Michael, 2011). The structuralist school argues that formal and informal sectors are linked to one another and the informal sector is subordinate to the formal sector (Chen, Vanek, & Carr, 2004; Michael, 2011). The informal sector is an integral component of total national economies, rather than a marginal appendix to them (Beneria, 1989). Formal and informal firms are often dynamically linked as many informal enterprises have production or distribution relations with formal enterprises (direct production of goods and services), and supply them inputs, finished goods or services either through direct transactions or via subcontracting arrangements. Many formal enterprises hire wage workers under informal employment relations as a way of reducing labor costs (Chen, 2005; Michael, 2011). According to the structuralist school, the formal economy always enjoys a dominant power relationship over the informal economy (Ngiba et al., 2009), and can develop favorably because of and thanks to the informal sector.

The legalist school argues that the underlying reason why many citizens in emerging democratic, market systems do not participate in the formal economy is because the institutional structures or the rules of the game prevent them from doing so. The barriers to participation in the formal political and economic systems include: obtaining a business license, hiring employees, knowing and complying with applicable government rules and regulations, obtaining a loan, paying taxes, enforcing a contract, and so forth (Kuchta-Helbling, 2000).

These three theories help us to understand the situation of informal solid waste collection in Kampala and how the informal waste collectors co-exists with the formal waste collection sector.

The informal sector encompasses a wide range of areas of informality – economic and social, covering business activities, employment, markets, settlements and neighborhoods, each of which has implications for public policy (Furedy, 1995). SWM is no exception to this pattern. In fact SWM in many low- and middle-income countries is sometimes driven by the informal sector (Nzeadibe & Chukwuedozie, 2010; Scheinberg & Mol, 2010; Scheinberg, Spies, Simpson, & Mol, 2011) to the extent that in many cities more wastes are dealt with informally than managed formally (Furedy, 1995). Our application of "informal sector" is to the activities of unlicensed individuals or group of individuals who are engaged in collecting waste from the households, or what Medina (2005) refers to as "informal refuse collectors."

Little systematic knowledge exists of the actual role that informal providers play in collecting waste and on how they co-exist with formal private companies and the public sector. Most studies into the informal sector in SWM look at the roles of unregistered, unregulated and casual family/community enterprises and individuals in recycling of waste and in thus adding value to recovered waste materials (Baudouin, Bjerkli, Habtemariam, & Chekole, 2010; Fahmi, 2005; Nas & Jaffe, 2004; Nzeadibe & Chukwuedozie, 2010; Rogerson, 2000; Sudhir, Srinivasan, & Muraleedharan, 1997; Taylor, 1999; Wilson, Araba, Chinwah, & Cheeseman, 2009; Wilson et al., 2006). Accordingly, few studies have been devoted to the analysis of the actors in the informal sector involved at the primary level of solid waste collection (Medina, 2005). The few studies available don't provide details on the characteristics of informal collectors and why they exist despite the presence of formal collectors. We highlight the contributions of these few studies below.

Informal initiatives play an important role in the collection of solid waste, the primary sub-system of waste management (Afon, 2007; Van Horen, 2004). Informal waste collection from households is a source of employment for the operators and fulfills a demand for the residents. The collection technology used by the informal collectors is quite basic (Doan, 1998): they gather household trash in small buckets or baskets which they carry from household to household and they use either a wheel-barrow or a simple push cart to transport collected waste to the designated intermediate collection point built by the city in each neighborhood. At these intermediate collection points municipal trucks can then pick up the trash and transport it to the dumpsite or landfill, usually located outside the city limits (Doan, 1998). Chekole (2006) shows that in Ethiopia the informal solid waste collecting actors operate in their immediate geographical and social space and therefore have more chance to be competitive and retain their customers. This is not unlike what Tukahirwa, Mol, and Oosterveer (2011) find for Kampala. The informal waste collection does not impose any transaction costs on the formal system, nor does it represent any financial costs to the public sector (Van Horen, 2004). Though the direct household environment looks clean where informal collectors operate from, the outside environment is worse off as operators more than incidentally dispose collected waste at unofficial places, leading to the development of clandestine waste dumpsites (Afon, 2007; Oberlin, 2011). According to Van Horen (2004), the informal sector therefore exists not only as a survival strategy for the very poor, but it also fills gaps that exist due to the inefficiencies of the formal system (Wilson et al., 2009).

In other studies, the economic impact of the informal sector was found to be significant as the average waste picker earns much more than the prevailing minimum wage (Nzeadibe & Chukwuedozie, 2010). Privatization threatens the sustainability of garbage collector communities by removing access to their

economic asset, waste garbage (Fahmi, 2005; Fahmi & Sutton, 2010). As far as partnering with the formal sector is concerned, members of the informal sector may be reluctant to enter into formal arrangements with other MSW stakeholders and to comply with commercial registration requirements. According to Taylor (1999), many informal workers aspire upward professional mobility, looking upon their current waste related job as only transitional.

Setting and data

In Kampala, the capital city of Uganda, SWM is the responsibility of the Kampala City Council (since 2011 the Kampala Capital City Authority, KCCA) and its divisions. KCC is required to ensure that solid waste (garbage) is collected and conveyed to treatment installations or approved disposal sites (Auditor General, 2010). The resources committed to solid waste management (SWM) by KCC proved insufficient and in the 1990s privatization was introduced (among other reasons) to attract sufficient finances. Privatization is seen as important in the general process of improving and modernizing urban waste management systems.

In order to institutionalize the active participation of other, non-public service providers, regulations were formulated pertaining to SWM with a view of promoting and enhancing partnerships between the city council and other private service providers. A case in point is the KCC Solid Waste Management Ordinance (2000). However, none of these regulations considers the informal sector as an active and worthy actor and partner in SWM. In fact, section 20 of the KCC Solid Waste Management Ordinance (2000) defines as an offence for someone to collect, transport, remove or dispose refuse at a fee without a valid permit. Notwithstanding the absence of legal support, in Kampala the informal sector is active in the business of solid waste collection, supplementing the efforts of KCC and the formal private sector. And the World Bank recognizes the contribution of the informal sector as alternative service providers that can help to serve the poor (WDR, 2004). It is also important to note that the pilot refuse collection service implemented in order to test the feasibility of contracting services in Makindye division in 2001 with funding from the Uganda First Urban Project recommended having skip-less refuse collection service in communities, with skips only restricted to institutions (KCC, 2002). In order for the cost recovery to work in Kampala it was deemed necessary that "all community containers 'skips' be withdrawn so that communities are served by a skip-less mobile truck system" (KCC, 2002). The number of skips kept gradually falling and bad ones were not repaired by KCC.

In order to analyze why informal collectors keep in the business of solid waste collection, we examined the relationship and linkages between the informal refuse collectors and other (formal) actors in the solid waste collection business, namely KCC and private firms. For that we examined both the demand side (clients/customers) and the supply side (informal and formal collectors). On the demand side, we investigated: fees charged and income categories of clients served and client satisfaction of services. On the supply side, we investigated the earnings of informal refuse collectors, the future plans of informal providers, relationships between formal providers and informal providers, and the legal existence of the latter.

A survey of urban citizens of Kampala was carried out in the divisions of Kawempe and Nakawa. Kawempe is the poorest of Kampala's five divisions (Habyarimana, Humphreys, Posner, & Weinstein, 2007), while Nakawa is the biggest division with concentrations of rich neighborhoods. Given the difficulty of eliciting income and expenditure, we defined low-income households as those that reside in poor unplanned neighborhoods (parishes) characterized by high population densities; medium income households are those residing in unplanned or semi-planned neighborhoods with mixed densities. We classified high income households as those households situated in areas with low population densities, and where neighborhoods are well planned. We randomly selected respondents in selected parishes. If the targeted respondent was not available or not interested to be interviewed, we would move to the neighboring household. To capture the views of the people located in rich neighborhoods, we carried out interviews over the weekends when they are mostly at their residences. The sampling strategy chosen therefore may not allow us to claim that the data collected is fully representative of Kampala. In total, the questionnaire was administered to 475 respondents in Nakawa division (315 over 11 parishes) and Kawempe division (160 over 9 parishes) (details in Table 1). Among the 475 households who responded to the questionnaire, 21% indicated they are served by informal sector providers. The rest is served by KCC (12%), the formal private sector (44%), and community-based organizations (CBOs) (1%), or found themselves ways of disposing garbage (22% 'self-provisioning') (Fig. 1).

Table 1
Study areas.

Nakawa division ($N = 315$)			Kawempe division ($N = 160$)		
Parish	N	Income category	Parish	N	Income category
Bugolobi	25	Mixed	Mulago 1	34	Mixed
Kyanja	33	High	Mulago 11	14	High
Ntinda	43	High	Kikaya	27	Mixed
Banda	42	Low	Mpererwe	8	High
Naguru 1	14	Mixed	Komamboga	32	Mixed
Nakawa 1	29	Mixed	Kifumbira	8	Low
Bukoto	19	Low	Makerere 11	20	Mixed
Kiwatule	23	Mixed	Wandegeya	8	Mixed
Mbuya	31	Low	Kazo Angola	9	Mixed
Luzira	29	High			
Kiswa	27	High			

In addition, an interview guide with standardized semi-structured questions was used to conduct interviews with thirty (30) informal service providers in Nakawa division. It is important to stress that no information or estimation exists of the total number of informal refuse collectors and therefore we cannot claim representativeness. The informal refuse collectors were interviewed in 11 of the parishes where we carried out the study (Luzira, Naguru 1, Bukoto, Kiwatule, Kiswa, Ntinda and Kyanja parishes in Nakawa division, and Mulago 1, Mulago 11, Wandegeya and Mpererwe in Kawempe division). These interviews were especially carried out in the morning when informal waste collectors are bringing waste at the waste collection centers.

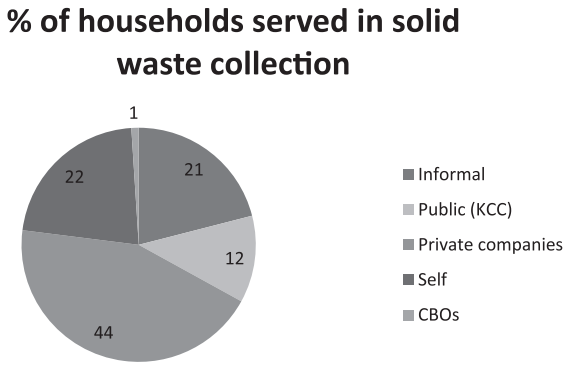

Fig. 1. Actors in solid waste collection. Source: Own survey.

KCC waste managers (5) and formal private sector providers (7) were also interviewed to find out whether they have any working relationship with informal refuse collectors. We also interviewed local council officials (5) in the areas we carried out the study from.

Results and discussion

Characteristics of informal waste providers in Kampala

As pointed out earlier, we carried out a small survey among 30 informal waste collectors. All the interviewed informal refuse collectors are males. This is not unlike what Nzeadibe and Chukwuedozie (2010) found out in Lagos Nigeria that informal solid waste activity is a predominantly male occupation. The average age of the informal refuse collectors is 32.3 years, with 45 being the eldest and 25 the youngest informal waste collector. 38% of the interviewed collectors had acquired secondary education ranging from standard one up to standard four, 19% with no schooling at all and 43% having completed primary (elementary) level. This is similar to the findings of Afon (2007) and Nzeadibe and Chukwuedozie (2010). The collection technology used by the informal collectors in Kampala is quite basic. Informal refuse collectors collect garbage in small buckets, loose containers, cardboard boxes, gunny bags and polythene bags and they carry garbage from household compound to the nearby collective center/dumping site using either a wheel-barrow or a bicycle that they own. Informal collectors don't provide containers to their clients. One respondent (informal refuse collector) had acquired a motorcycle. Most (90%) use their own startup capital as they don't need much capital to start-up business. Few borrowed money from relatives and micro finance institutions. All waste collectors have no disposal permit and they are not registered. There are several illegal dumpsites where they dump the garbage, mostly 50–300 m from the client's households. In fact, much of what is collected by the informal waste collectors ends up in illegal dumpsites. Their services amount therefore to moving the waste, rather than removing it. Informal refuse collectors have no standard method of charging fees on the waste collected and the respondents (clients) indicated that fees are collected mostly per service or per week. The amount of money collected from clients depends on the quantity of waste in question and the bargaining power of the informal refuse collector and the client. Informal collectors charge per service between UGX 300–2000, but most informal collectors charge UGX 500 per service, similar to what Oberlin (2011) found out in Dar-es-salaam Tanzania. Apart from 6 respondents who never answered the question, all informal collectors have been in the business of solid waste collection between 1 and 5 years. All view it as a weekly and year round activity, meaning there are no seasonal breaks.

Income category of service recipients

The dualist theory of informal sector claims that the informal waste collectors cater for a customer base that is not able to pay high prices for high quality services. In other words, the informal sector serves the poor. In order to ascertain this claim we asked respondents (clients) of all income categories which service provider collects waste from their household. By service providers we mean whether they are served by the formal sector (KCC and private companies) or informal sector (particularly informal collectors) or not at all (self-provisioning).

The results show that informal refuse collectors serve parishes of all income categories, similar to other service providers (Fig. 2). Therefore, informal service provisioning is not at all restricted to low-income areas. The results of an independent sample *t*-test indicate that there were no significant differences between KCC and informal refuse collectors, but there were significant differences between formal private sector and informal refuse collectors. These results suggest that there is no difference by income category between respondents served by informal refuse collectors and KCC but formal private companies clearly favor high income groups. Fig. 2 shows the shares of the 3 income categories for the 4 types of waste collection service provision.

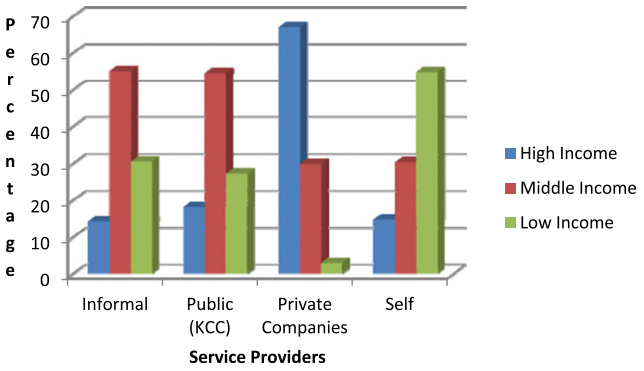

Fig. 2. Service providers and the percentage of households they serve in terms of income category.

While it is clear that informal refuse collectors serve the poor, surprisingly too some 14.3% serve the rich and 55.1% serve the medium income areas (Fig. 2). Through observation and interviews with informal refuse collectors and their clients, several reasons explain why informal refuse collectors serve also high income and medium income households. First, especially at the high and medium income households collection of waste is done in accordance with spontaneous needs. Clients know where the informal collectors stay and have their telephone numbers and call informal collectors whenever there is need. Second, informal refuse collectors use simple technologies like wheel-barrows and bicycles and therefore are able to navigate through the narrow roads and in difficult terrain in the unplanned and semi-planned settlements, where big trucks of the formal providers cannot easily come. In addition, informal collectors use cheap containers like wooden boxes and broken jerry-cans that can easily be accessed by their customers. Formal providers sometimes insist that customers possess metallic bins and polythene bags, which are either regarded as expensive or are not preferred.

The differences between clients served by informal refuse collectors and KCC on one hand and the formal private sector (companies) on the other hand might be due to costs (fees paid) involved. Fees paid by households to either KCC or formal private sector are significantly higher than those paid to informal collectors.[1] Mean values are 28 thousand shilling a month for private sector, over 13 thousand for KCC, and only 8 thousand for the informal collectors' services. Fig. 3 shows that most clients (53%) served by informal refuse collectors pay below UGX 5000 (USD 2) a month indicating that compared to other service providers, they provide services at lower rates.

From the above data on fees paid and income category of the service providers that collect waste from households it can be

[1] We had stated that an independent *t*-test indicates no significant differences between KCC and informal refuse collectors suggesting that there is no difference by income category between respondents served by informal refuse collectors and KCC. Yet we also state that the fees paid by households to KCC are significantly higher than that paid to informal collectors. This can be explained by the fact that the amount of money collected from clients by the informal refuse collector depends on the bargaining power of the informal refuse collector and the client and the level of competition between other players in the business.

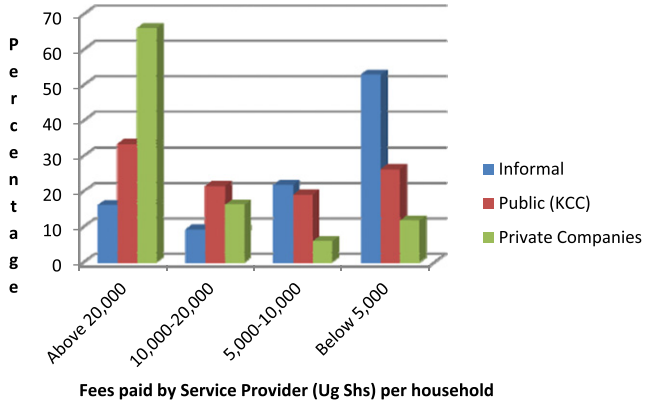

Fig. 3. Fees paid per month by service provider.

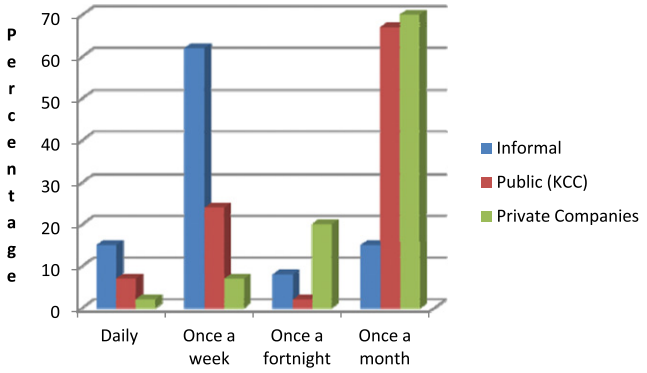

Fig. 4. Payment regimes per waste collection service provider.

Table 2
Average cost of solid waste collection services per provider, as rendered to clients in UGX per month.

Income category	Private sector	Public sector	Informal collectors	Overall
High income	126,275	40,789	14,250	42,805
Middle income	42,973	25,217	6664	22,593
Low income	6875	20,000	2710	5775
Overall	56,711	36,008	7021	31,349

concluded that the informal sector serves all income categories, but especially the middle income and low income. But they do not necessarily serve only the poor as the dualist theory may want us to believe. The fees charged for solid waste collection by the informal sector collectors on average are low compared to those of the formal sector as Table 2 below shows.

While the average fee charged by informal services is 7021 (see Table 2), in poor areas this is only 2710, against 14,250 in rich areas. But informal providers fees in rich areas are on average still below the private sector fees in poor areas.

It should be noted that the fees charged by informal collectors are low, not necessarily because the clients served are poor but because of other factors. Through observation and interviews with informal refuse collectors, several reasons explain why informal refuse collectors charge lower rates compared to other service providers. This is mainly related with the fact that the low rate charged by informal collectors is because they incur less in terms of expenditures compared to other collectors. First, informal refuse collectors are mainly paid for transportation service of waste to the collective collection centers because they don't have the capacity to transport garbage to the official dumpsite. Interviews with informal refuse collectors reveal that they mostly dump garbage in what they call "gazetted collection centers".[2] KCC trucks and sometimes trucks of formal private companies (paid by KCC) pick the garbage from these collective collection centers, especially after people in the neighborhood complain about nuisance. Second, informal refuse collectors don't provide containers to households for storing garbage unlike the private sector (66%) or KCC (16%). Third, informal refuse collectors work mostly in their own neighborhood or in familiar neighborhoods and they don't incur transport costs. This situation privileges them to be more accepted and competitive within their community rather than any other enterprise because they are known in these communities and they have knowledge on income levels and thus know what they can charge. This is what Oberlin (2011) refers to when she argues " … waste pickers have personal relationships with households. The personal relationship might be established as a result of being in the same neighborhood and thus they interact frequently which enables mutual understandings, and eases communication between households and waste pickers" (Oberlin, 2011: p. 126). This means that higher trust levels of a household in services of a provider, makes access to the services of that service provider more likely (Tukahirwa et al., 2011). Clients of informal providers also pay cash mostly on a daily or weekly basis, as compared to clients of KCC and formal private sector who have more long-term contracts (Fig. 4). This advantages informal refuse collectors as their payment schedules are more flexible for households with irregular incomes.

The flexibility in payment schedules is more significant when the frequency of garbage collection from households is taken into account. Fig. 5 reveals that the frequency of informal sector garbage collection at households is comparable to private sector garbage collection, but lower than public sector collection.

Quality of services provided

The assumption from informal sector theories, especially the dualist theory, stresses that there would be a marked quality difference between services provided by the formal sector compared to those provided by the informal sector. We used customer satisfaction (on a Likert scale of 1 (=not satisfied) to 5 (=very satisfied)) as a proxy for quality of services. We asked respondents (clients) to rate their satisfaction of the services

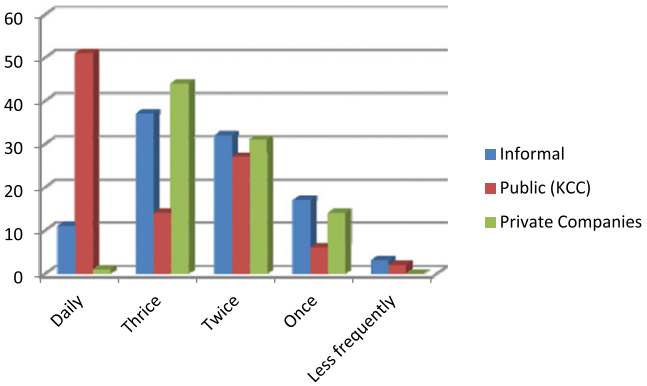

Fig. 5. Frequency of solid waste collection at households per service provider (per week).

[2] What they call gazetted collection centers, are illegal dumpsites mostly at places where communal containers popularly known as "skips" used to be placed before they were removed.

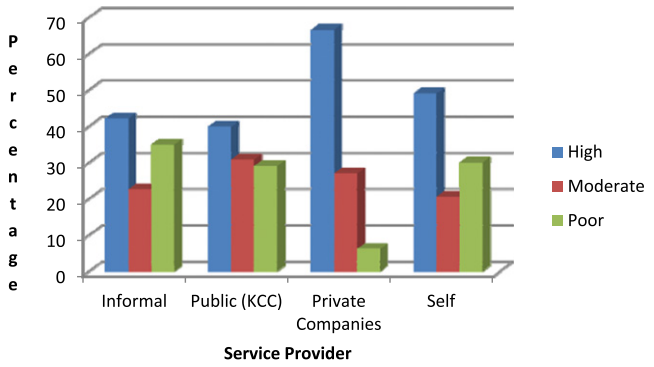

Fig. 6. Satisfaction with the service rendered by service providers.

rendered by service providers. An independent sample *t*-test was conducted to compare the satisfaction of respondents who receive the services of the informal refuse collectors and those of other service providers. There are no significant differences in the scores for KCC ($M = 3.13$, SD = 1.1)[3] and informal sector ($M = 3.04$, SD = 1.1) ($t = 0.472$, $P = 0.638$). However, there are significant differences in the satisfaction scores for private contractors ($M = 3.85$, SD = 0.86) and informal refuse collectors ($M = 3.04$, SD = 1.1) ($t = 6.7$, $P = 0.000$). The results suggest no big difference in satisfaction levels of respondents served by informal refuse collectors and KCC. But formal private companies/contractors seem to provide a superior[4] service to their clients, compared to other providers notably informal refuse collectors and KCC (Fig. 6). Note that these are user-scores, so there may be some degree of selection bias.

Incomes earned by informal refuse collectors

It is claimed in the dualist theory that informal sector workers earn low wages compared to those who work in the formal sector and that they will be looking for an opportunity to transit from the informal sector to join the formal sector for better working conditions. Our findings reveal that, in terms of incomes earned, informal refuse collectors who serve low-income and middle-income households earn in the range of UGX 105,000–140,000 (USD 40–70) a month. This figure is calculated based on the number of customers daily served (15–20) times the average monthly fee per household of UGX 7000. This payment received by informal refuse collectors is higher than what KCC and private companies pay their workers. KCC workers (truck loaders of garbage) are recruited to earn 3000 Uganda shillings per day and assuming they work daily, their total income is 90,000 Uganda shillings (USD 45). Workers for KCC are not always paid in time; sometimes they get to seven months in arrears.[5] Formal private sector companies pay their employees in the range of 3000–5000 a day, totaling to between 90,000 and 150,000 (USD 50–70) a month. Those employed in the formal sector and those in the informal sector do not receive additional benefits, such as insurance and medical care. But interviews reveal that employees in the formal sector enjoy some degree of job security. Informal refuse collectors spend little costs on collection equipment, only on bicycle repairs and on some occasions on buying sacks. This means that informal refuse collection is potentially an economically lucrative activity, at least compared to those who work in comparable formal organizations as KCC and private sector companies, contrary to what the dualist school hypothesizes.

While informal sector waste collectors do the job year round, they regard it as a part-time activity, mostly working in the morning and evening hours. The rest of the time is spent on other income generating activities to supplement their incomes from garbage collection. Around 30% of the interviewed respondents are involved in sorting of materials for reuse and recycling purposes. Sorting of garbage for material reuse and selling this to recycling companies is a major source of income outside the payment received for collecting and transporting material from household. The respondent who sort garbage earn UGX 50,000–100,000 per month (USD 35–50) from the sale of recyclable items, recovered from the collected household garbage but also from the dumpsites or communal collection centers operated by KCC or formal private companies. This finding contradicts results of earlier studies (e.g. Wilson et al., 2009) that income generated from sorting and recycling collected materials is more important to the informal sector than waste collection servicing.

While recycling is not a big business in Kampala, recently small-scale recycling companies have mushroomed and informal sector providers take advantage by supplementing their incomes from recyclable materials. This business is not exclusive to informal waste providers. Even those who work for the formal sector, especially for KCC, have time and opportunities for such additional income generating activities. For example, the sale of banana peelings is emerging as a business also for formal collectors in Kampala. The peelings are sold mainly to small-scale farmers who keep some cows to supplement their incomes by milk sales. Waste paper is mainly sorted to be sold to food vendors for charcoal stove lighting. Plastic recycling has picked up and is now a source of income for (in)formal collectors in Kampala with many recycling companies springing up to recycle plastics. Informal refuse collectors interviewed also were involved in "boda–boda" (bicycle taxi) business, brewing alcohol, shoe-shining, running a bar, running a kiosk and other casual work activities like compound cleaning and fetching. They revealed that they earn with these activities almost the same amount of money as with solid waste collection, except for *boda–boda* business and running a bar which earns more (but require investments).

Future plans of informal sector collectors

The dualist theory argues that the informal economy is seen as a labor reservoir and training facility in that workers were supposed to first enter the informal sector and then enter the formal protected sector after they had improved their skills. This is to some extent true with the situation of informal refuse collectors in Kampala city. For example, 76% of the informal refuse collectors are not sure of what the future holds, inevitably considering looking at informal refuse collection as a temporary pre-occupation. Some wish to work for established companies or KCC if the pay is right and there is an opportunity. Others say they are accumulating money to apply and go for further studies and acquire land in the villages for agricultural purposes. Other respondents see the job as too tiresome and dangerous at a risk of acquiring diseases like stomach aches, diarrhea, and malaria during wet season, body cuts and bruises, fever and constant back ache. The situation is compounded by lack of protective clothing's like gumboots and gloves. On the other hand, 36% of the respondents tended to talk about the freedom that their occupation gave them and to have settled into the business as a long-term career and would want to continue in the business of solid waste collection. They argue that solid waste

[3] M = mean; SD = standard deviation; t = difference between the mean or average scores of two groups; P = probability values.

[4] Measured on these Likert scales: poor (1–2), moderate (3), high (4–5).

[5] City council of Kampala – letter to the Senior Principal Assistant Town Clerk Kawempe division from the solid waste engineer, Monday, April 21, 2008.

collection is a permanent business with more and more people generating waste every day and therefore a sure business opportunity, the experience acquired and having established themselves in the business and to some it is the only source of income. Some talked of their future plans like forming an association or company with counterparts to purchase a truck to ease collection and transport garbage to the dumpsite and acquire more capital to expand as there no other jobs available. However, one principal limitation they face is the lack of access to credit services. While they indicated they don't need much money to start the business of solid waste collection, when it comes to considerations for expanding on the business informal refuse collectors borrow from their relatives and friends and some from existing micro finance institutions. Accessing loans from banks and micro finance institutions is a very complicated issue for informal refuse collectors. The standards set are high and informal refuse collectors cannot easily meet the criteria for consideration. These include, but are not limited to: having a business, belonging to loan groups, being identified and recommended by local council officials, ability of weekly loan repayments, the need of property as security. In any case some are semi-illiterate and find it difficult to understand the dynamics related to dealing with accessing and managing loans. We lack data to compare with the situation of formal sector as regards to their future plans but we can conclude as far as this point is concerned that, there is not so much in support of the dualist theory. The informal collectors are looking elsewhere for other job opportunities and not necessary to work with the formal sector providers or formalizing their business.

Links between the formal sector and informal collectors

The structuralist school of thought believes that the informal and formal sector are linked to one another with many informal enterprises, supplying inputs, finished goods or services to the formal sector, either through direct transactions or via sub-contracting arrangements. Our findings in Kampala indicate that there appears to be some linkages, mainly with KCC. For example, over 50% of the informal refuse collectors have some form of cooperation and contact with KCC. Collaboration with KCC takes the form of informal refuse collectors pulling funds for fuel to be used on KCC trucks to transport garbage to the dumpsite; KCC enforcement staff helping informal refuse collectors to recover their money from "stubborn" customers not willing to pay; and informal sectors collectors working with KCC or formal private companies on a part time basis in loading garbage on vehicles or transporting waste to the collection centers. Interviews with managers of private sector companies revealed that informal refuse collectors are also used by private companies, though on a rare basis. One third of the informal sector respondents revealed that they have little or no collaboration with formal sector providers. This is partly due to the perceived illegality of the informal sector activities by formal service providers. In a few instances informal refuse collectors have paid bribes to law enforcement officers and policemen for fear of being arrested for dumping in illegal sites. Informal refuse collectors are accused of being responsible for littering and illegal piles of waste. Informal refuse collectors accuse KCC and formal private companies to have taken advantage of their desperate situation because of the high unemployment rates to keep the pay at lower levels. Few cases of conflict were noted, especially in cases where private sector collectors encroach on the territory of the informal providers, much to the annoyance of the latter. The formal providers, especially private firms, also accuse informal refuse collectors of charging (too) low fees that make their services less competitive. In all, there is not much evidence in support of the structuralist view on the informal sector: although they may be collaborative at times, there appears to be little structural interdependency between informal and formal collectors. Sub-contracting arrangements are non-existent.

There is, however, a form of structural co-existence between public and informal service providers. The formal sector leaves room for the informal sector to serve households in those cases where physical collection is difficult for the formal sector or where it becomes economically unfeasible. In addition, the public service of collecting waste through collective containers (skips), the access to which cannot be charged, leaves room for informal service providers to take garbage from households to those collection points. As long as such free public services are provided, the informal service providers can make a decent living.

Legal recognition

The legalist school of the informal sector implies that formal businesses abide by the stipulated rules and regulations and that informal firms resemble their counterparts, the only difference being that they are not registered. However, solid waste collection in Kampala shows a more complex picture. Similar to the informal waste collectors formal operators sometimes work without licenses, but they are allowed to do their business including transporting garbage to the dumpsite, according to the report of Ugandan government Auditor General (2010). The report further says that KCC has also failed to establish a proper mechanism for regulating the operations of private collectors. Most of the private collectors have no capacity to adequately collect and transport refuse to the landfill, according to the National Environment (Waste Management) Regulations. For instance, most vehicles that transport garbage to the disposal site loose waste on their way, there are no approved scheduled routes from the collection point to the disposal site, and the personnel involved in the collection and transportation of garbage are not provided with adequate protective and safety clothing. In Kampala therefore, the definition of formal is quite different from what the legalist school suggests. In Kampala, formal collectors are defined as those that have in principle legal existence by being registered with a public body (KCC) and that transport waste to the final disposal site in Kitezi; informal collectors are those that have no legal existence through registration at KCC. The informal collectors take advantage of the lack of seriousness in enforcement of laws by KCC and the vagueness of who is legally allowed or not allowed in the business of solid waste collection. Clients may not easily distinguish formal and informal collectors as both are allowed to operate.

From the data and analysis made, there are two expected scenarios. First, if the formal private sector (private companies) is encouraged and facilitated, especially with the public sector withdrawing from solid waste collection, it is highly likely that the informal collectors will be pushed out of business. This observation is in line with the WDR (2004). Informal collectors are regarded as competitors and private collectors will demand stronger enforcement. In a push to maximize profits, private collectors will also try to employ their own staff to go door to door to collect waste, unless coverage targets are defined in such a way that they can be met with the services of 'small independent providers'. In this way, the private companies may have the incentive to encourage the involvement of 'small independent providers' typically the informal collectors. But if the public sector expands providing free services by placing public containers, it is likely that the activities of the informal sector will expand too. The public containers enable informal collectors to deposit their garbage in environmentally friendly places and ensure that they remain competitive vis-a-vis private sector collectors.

Conclusions

Informal collectors distinguish themselves from the formal waste collectors by providing 'first-line' services only, taking garbage away from households, but not taking this all the way to the landfill. The informal sector avoids regulation more than large formalized private firms and public organizations. Regardless of these differences, the informal sector is structurally linked to the formal public sector and it provides a cheaper, but lower rated level of service provisioning, and especially (but certainly not exclusively) to poorer households. The fairly large market share of informal collectors relative to the formal private sector is related to their competitiveness: their collection fees are substantially lower than private sector fees. Yet, the income that the informal collectors derive from their business is comparable to what they could earn in other occupations. The informal providers are able to ask lower fees because they provide less packaging material, have little equipment (and thus investments), and do not carry waste very far, thus reducing transport costs and time. In fact, informal service providers exploit the lapse in the enforcement of environmental regulation. The persistence of the informal collectors can be attributed to the poor enforcement of regulations by city officials, but also by the returns to the providers of the service and the fact that they are cheaper, often quite reliable, and they fill a niche for some households, where public and private service providers do not serve some neighborhoods. The persistence of the informal collectors is further attributed to the incomes they get from the business which is comparable to others who work in the similar business (both formal private and public). The findings of this study contribute to the debates on the desirability and relevance of the informal sector to SWM and on urban development policies (Nzeadibe & Chukwuedozie, 2010) in developing countries.

The findings underscore the importance of urban governments withdrawing from the primary collection service and putting containers in locations to facilitate the work of informal house-to-house waste collectors. This could also help the poor as they appear uncomfortable with the present system of door-to-door collection arrangement. This could be based on the *de facto* informal arrangement between the informal waste collectors and the urban authorities. Government officials could adopt this ad hoc and informal arrangement for three reasons. First, it is possible to reduce costs of waste collection operations by abandoning the door-to-door collection service by the public sector and concentrate only on transporting the containers to the final dumping site. Second, informal waste collectors are capable of collecting more waste from households than the municipal trucks operators using their simple technologies. They have better physical access to household in the unplanned areas and slums. Third, it is a possibility to create job opportunities for individuals who are engaged in solid waste collection on their own initiative. For these reasons it may trigger an increase in the number of informal solid waste collecting enterprises offering environmentally friendly services. Consequently, an appropriate mix of public and informal private services could be useful especially if public provisions could be strengthened for the second stage of waste collection (secondary collection points) among the low-income communities, to enable them to dispose of garbage cheaply and possibly eliminate illegal dumpsites. This may offer environmental benefits to the community. This kind of mixtures or partnership of formal and informal sector could be a solution to the solid waste problem facing many African cities, notably for the poor. Such systems could improve accessibility and could be ecologically sustainable, improving environmental performance of urban infrastructure in the long run and thus help in achieving the Millennium Development Goals (MDGs). This recommendation is akin to what is alluded to in the WDR (2004), which calls for recognizing 'independent service providers' and enabling them to partner with formal public and private operators. It is also important to ensure that the regulatory framework enables contracting and working arrangements with informal collectors.

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