

**EXPLORING SUPPORT FOR USING FCA
IN SOLID WASTE MANAGEMENT IN MALAYSIA**

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ABSTRACT

The need for effective solid waste management that includes awareness of external costs, such as social and environmental costs, is a problem faced by all countries. There is, however, little evidence that Full Cost Accounting (FCA) is in use in Newly Industrialised Countries (NICs). The research study discussed in this paper focuses on exploring this issue in a solid waste management entity within the municipality of Kuching, Malaysia. This research study contributes to knowledge by exploring participants reactions for the adoption of FCA in the solid waste management. The perception that senior management would not support FCA because of lack of resources is identified as a barrier to introduction of FCA. Lack of expertise was also raised as a barrier to adopting FCA by the case study entity. Limitations of resources and government funding were also identified as barriers to building the expertise needed.

1. INTRODUCTION

The need to integrate social and environmental costs into the accounting management system is widely recognised across a range of industries including solid waste management. FCA is regarded as one of the most comprehensive approaches to achieving this objective. Solid waste management entities in developed countries have adopted FCA as a way to help them achieve sustainable development. While there is growing awareness of the importance of sustainable development in NICs, solid waste management entities in NICs have yet to adopt FCA. As much of the research concerned with FCA in solid waste management is drawn from organisations in developed countries, such as the United States of America and Canada, there is limited knowledge about this issue in NICs such as Malaysia.

There is a gap in the literature as to *why* FCA has not been adopted by solid waste management entities in NICs to the same extent that it has in developed countries. The aim of this research study is to explore the participants' reactions for the adoption of FCA in the solid waste management entity. This research study uses an exploratory case study methodology to address this gap. The case study entity was a government owned solid waste management entity in Kuching, Malaysia.

The structure of this paper is as follows: section 2 discusses the focus of the research study and briefly undertakes a literature review. Section 3 presents the research method used, followed by section 4 that reports on the analysis of results. Section 5 provides conclusions and suggests possible future research questions arising from the results of the study.

2. LITERATURE REVIEW

The purpose of this section is twofold. First, it reviews the literature relating to solid waste management with the aim of providing an understanding of the issues that are inherent in the solid waste industry. Second, it briefly presents a brief literature review of related FCA research.

The volume of total waste generated in cities and urban areas across the globe is steadily increasing due to rapid industrialisation and population growth. This trend is also evident in solid waste (Ogawa, 2007). Specifically, solid waste arising from human domestic, social and industrial activities is increasing in quantity and variety as a result of growing population, rising standards of living and the development of technology (Achankeng, 2004). Achankeng (2004) identified the need to manage this trend and the Consumers' Association of Penang (CAP, 2001) suggested that governments are increasingly concerned with finding methods to address this challenge. Waste management lacks glamour but is vitally important to the survival of communities (Ogawa, 2007; Kaseva and Gupta, 1996; Achankeng, 2004). Solid waste management is becoming increasingly complex and important. It is now a priority activity for achieving a clean and healthy country.

The problems of solid waste management are well documented. As explained by Saeed, Hassan and Mujeebu (2009), modification of the environment and an increase in population are the main causes of the many processes of deterioration which have altered the ecosystem or our planet, including the generation of municipal solid waste. Solid waste is becoming a major public health and environmental concern in many developing countries due to rapid urbanisation and this has gained increased political awareness (Goh, 2007; Henry, Yongsheng and Jun, 2006; Ogawa, 2007). The costs of municipal solid waste management services have risen steadily over the past decade (Macve, 2000). Local governments are trying to control solid waste management costs through a variety of measures, including restructuring waste services and encouraging waste reduction. However, making effective decisions and developing cost-effective waste management strategies can be difficult without complete cost information (USEPA, 1998; USEPA, 2006). The research discussed in the USEPA studies recognises the need to obtain complete cost information by incorporating environmental and social costs into traditional accounting tools. This enables informed decisions about solid waste management, the identification of opportunities for streamlining services, facilitating cost-saving efforts, and improving future planning.

Movement toward an integrated approach for measuring economic, social and environmental factors in policy and decision-making has taken a number of different pathways over the past 20 to 30 years (Gale and Stokoe, 2001; Jasch, 2003; Hung, Ma and Tang, 2007). Sustainable development is perhaps one of the most universally known of these paths, having been accepted and adopted by many influential international bodies (Joseph, 2006; Morrissey and Browne, 2004; Achankeng, 2004; Kerr, 2004; Wong, 2004). This is consistent with Bebbington's (2009) view that sustainable development could be argued to be the unifying theme/normative ideal that is being used to motivate and integrate social, environment and ethical concerns within corporate social responsibility and social accounting.

For that reason, it is crucial to recognise that concerns about sustainable development and economic prosperity are interconnected. Historically, the environmental and social effects of solid waste management have been treated as external costs that have not been incorporated into standard managerial and financial accounting practices. It has been claimed that values arising from transactions, beyond commercial transactions, are excluded from the decision tools advocated within conventional management accounting (Bebbington and Gray, 2001b; Milne, 1996). The shift by corporations and governments towards sustainable development has led to increasing recognition of the need for a measuring system and accounting tool which integrates economic value, environmental value and social value. These shifts supports Tanaka's (2006) view that globally, in keeping with the UN initiative, most countries are aware of the transition toward a sustainable society and are seriously attempting to attain it. Achieving sustainable development means considering all of the dimensions of economic, environmental and social costs as a whole. In this way, the damaging trade-offs between them (which have resulted in unsustainable development) can be identified and avoided.

Failure to develop adequate cost data can have serious consequences. For example, agencies might reject potentially cost-effective options or overlook opportunities to expand recycling and waste reduction programmes (USEPA, 2006). The Malaysia Country Report (CAP, 2001) states that organisations have been asked to undertake a detailed study of economic valuation of environmental externalities, cost benefit analysis and social impact assessment. This is yet to occur in a comprehensive way. Medley (1997), argued from an accounting perspective, that how to identify and measure the environmental costs and benefits will become clearer with a better understanding of how environmental issues interact with management processes and control within an organisation.

The adoption of FCA as a way to implement sustainable development was one of the suggestions to emerge from Agenda 21, a significant document arising from the Earth Summit (Bebbington, Gray, Hibbitt and Kirk, 2001a). To help municipalities improve the cost-effectiveness of their solid waste systems the U.S Environmental Protection Agency (EPA) promotes the use of FCA, which Kerr (2004) argues is a comprehensive form of incorporating economic, social and environmental costs into a reporting system. FCA can help prevent misconceptions that arise from a simple lack of cost information and supports effective and informed judgements by citizens and clear management decisions (Florida Department of Environmental Protection, 1997).

FCA is an accounting methodology which allows environmental considerations to be incorporated into decision-making for any kind of business (USEPA, 1996; USEPA, 1998; Bebbington et al., 2007). It is a tool through which environmental impacts on factors such as stratospheric ozone layer depletion, air pollution, waste for cooling and land for waste disposal together with social impacts, such as freedom from diseases and quality of life, are considered. It enables decision-makers to consider the external impacts and cost/benefit data associated with environment and human health. FCA also allows for more thorough qualitative analysis when some impacts cannot be monetised. For example, impacts such as health care costs from specific air pollution events require a more thorough analysis to assign monetary value (Kerr, 2004).

Further, FCA embraces economic, environmental and social dimensions, and strives to address all three dimensions at the same time. The simultaneous progression of economic, environmental and social goals is essential if development is to be sustainable (Gale et al., 2001; Bebbington et

al., 2001a; Bebbington, Brown and Frame, 2007). The overriding principle is to integrate and involve all the concerned sectors in solid waste management so as to achieve sustainable goals. Bebbington et al. (2001a, 2001b) argue that there is little evidence of stewardship of sustainability among the actions of humankind. Tanaka (2006) specifically identified the major cause of the continued deterioration of the global environment as the unsustainable pattern of consumption and production, particularly in industrialised countries.

In addition, there is growing awareness of the benefit of public participation in environmental management (Achankeng, 2004; Jasch, 2003; Gale, 2006; Srinivas, 1997). If local governments desire to promote good relationships with residents in the community, data generated by FCA systems can be used to address specific concerns voiced by the community about the cost and quality of solid waste management.

According to Herbohn (2005) there have been a limited number of past attempts at full cost environmental reporting and approaches have been varied. Research regarding the use of FCA has been widely concerned with developed countries such as the United States and Canada (USEPA, 1998; Boone and Rubenstein, 1997; Bebbington et al., 2001b). In developed countries regulation exists that supports the need for annual disclosure of the cost of solid waste management impacts. For instance, Florida law requires that local governments disclose annually to the public and to the Florida Department of Environmental Protection (FDEP, 1997) the full cost of solid waste management. The law addressed concerns on the part of the legislation that the public was largely unaware of the substantial cost associated with the solid waste management services provided to communities by local governments (FDEP, 1997).

There are significant pressures on solid waste management entities to shift towards sustainable development. Waste management is now seen as part of the broad global concern for sustainability and it clearly overflows national boundaries in terms of problems and possible solutions (Morrissey and Browne, 2004; Bovea and Powell, 2006). Further, there is urgent need for integration of waste management into strategies for sustainable development (International Atomic Energy Agency (IAEA), 2005). However, the degree of success with which developed countries and NICs cope with the problem differs. Achankeng (2004) has argued that developed countries are far more able to cope with the problem than other countries because they have sought effective solutions to help them move up the solid waste hierarchy¹. Most NICs are still in the early stages of addressing the concept of sustainable development. Therefore, practices have been slow to emerge, even though there appears to be initiative within the solid waste management industry to implement such a concept (Ogawa, 2007; Diaz and Golueke, 1985; Newly Industrialised Countries (NICs), 2007).

Reviews of the literature concerned with FCA (e.g Bebbington, 2007; Herbohn, 2005) in developed countries reveals that there may be certain conditions that must be in place before FCA can be successfully adopted. These include factors that favour the implementation of FCA in the United States or Canada such as regulation, moral commitment by organisations and community awareness and participation (Gale et al., 2001). In Herbohn's (2005) full cost

¹ It is an internationally accepted and recommended prioritised ranking of waste handling using an ascending order of preference: landfilling and incineration without energy recovery, combustion with energy recovery, recycling/composting, and source reduction and reuse.

environmental accounting experimentation on public sector forest management, she stated that the limited case study evidence from prior full cost environmental accounting experiments suggests reporting objectives often are not met due to both practical implementation problems and resistance from managers. As no study has explored why FCA has not been adopted by solid waste management entities in NICs, it is unclear whether these factors have a significant influence. This gap in knowledge led to the concern of this research study to consider the justification for lack of adoption of FCA in the NIC of Malaysia.

3. RESEARCH METHODS

This section discusses the research design and methodology used for this research study. Section 2 identified that there is a gap in existing knowledge about practices in solid waste management in relation to the adoption of FCA in NICs. It was established that FCA would be useful in incorporating social and environmental costs into solid waste management decision-making. As there has been lack of attention to this issue in the accounting research filed and the accompanying lack of currently available and well developed theorisations, an exploratory case study is the most suitable methodology for this research study. The exploratory case study allows inductive processes to be used to develop concepts and theories relevant to the case (Yin, 1994, 2003; Rahim and Baksh, 2003; Brownell, 1995; Trueman, 1998; de Weerd-Nederhof, 2001; Eisenhardt, 1989; and Wong, 2004). This is particularly appropriate to this research study as such a study has not been conducted before and there is limited knowledge about FCA in the context of solid waste management in NICs. Therefore, an exploratory case study enables the in-depth research necessary to resolve the research problems and meet the research aims and objectives. A qualitative approach to data collection and analysis was taken so that the specific objectives of the research study could be attained.

In this research study the case-study entity is the solid waste management department of the Kuching local government council and was selected because this is an exemplary NIC solid waste management operation that does not use FCA.

The data gathered for this research study is qualitative interview data. Thematic analysis is used because the researcher aims to obtain an in-depth understanding about the lack of use of FCA in solid waste management in Malaysia. As the research study is exploratory it is preferable to let the identified codes to emerge from the primary data gathered rather than restrict the coding to what could be determined from existing literature prior to beginning the interviews.

This research study involved participants from the solid waste management entity in Kuching and from the local community. Based on the University's policy, an ethics report was prepared by the researcher outlining the research design and addressing the ethical considerations involved. Only after obtaining approval from the University ethics committee, was the research study begun. This research study used informed consent and confidentiality to ensure the research study met ethical standards.

To ensure that the interview participants were fully informed about the aims of the research study, the researcher prepared a package of information that included an overview of the research study, the aims and objectives, and the value of any contribution made by individuals to

the research study. Confidentiality was ensured through the use of pseudonyms. Physical records of all data collected were assigned a code to ensure anonymity.

This research study used purposive sampling in keeping with the argument from Miles and Huberman (1994) that random sampling is inappropriate because, when the sample is small, the findings can be biased. They identified purposive sampling as an appropriate alternative. In keeping with exploratory case study research, the participants recruited for this research study had the experience and expertise necessary to address the research questions (Yin, 1994, 2003). Two potential solid waste management entities were approached. The researcher sent a package of information detailing the proposed aims and objectives of the research study to key decision-makers in each the two municipalities in Kuching. The solid waste management entity from one of the municipalities agreed to participate in the research study. More detailed information was then sent to the participating solid waste management entity. This included the background to the research study, the interview questions, and the steps taken to ensure confidentiality.

The researcher enlisted the help of the key decision-maker in the solid waste management entity in identifying the most suitable interview participants for the research study. The package of information detailing the research study and the obligation of the potential interviewees was then sent to these people. Appointments were then organised with those who agreed to participate and a copy of the interview questions was forwarded to them prior to the interview.

The researcher also sought to interview residents of the local community. Participants from this group were obtained through the key decision-maker's contacts in the community. Information packages were sent to potential participants and appointments were made for interviews with those who agreed to participate. A copy of the interview questions was forwarded to them prior to the interview.

In keeping with Yin (1994, 2003), the researcher sought to identify and contact participants who could address the research questions. This was confirmed during the interviews when a brief history was obtained from participants regarding their understanding of the environmental impacts of solid waste management and their degree of concern with this.

3.1 Interviews

The researcher undertook in-depth, semi-structured interviews with the participants². This approach has been used successfully by many qualitative case study researchers (Trueman, 1998; Twigg, 1998; Woodcock, Mosey and Wood, 2000; Goffin and New, 2001; Jensen et al., 2001; Rahim et al., 2003). The interviews focused on exploring issues relating to the perceived importance of reporting social and environmental costs in solid waste management.

The researcher used open-ended questions to allow the interviewees the flexibility to expand on their experience and volunteer further useful information. According to Punch (1998, 2000, 2003) open-ended interview questions can provide rich sources of knowledge and data in relation to a research study. Each interview took between three and four hours to complete. All interviews were conducted by the researcher and were audio taped with the permission of the interviewee. These were subsequently transcribed by the researcher. This enabled immersion in

² Sample of interview questions available upon request

the data, which is consistent with the argument put forward by Braun and Clarke (2006). Each transcribed interview took nearly ten hours to analyse. Therefore, it was necessary to restrict the research study to a relatively small number of participants. As a consequence, statistical generalisations cannot be derived from the findings.

The participants involved in this research study are employees from a local council responsible for solid waste management in city of Kuching and residents of the local council area. In total, twelve individuals participated in this research study; six from the local council’s solid waste management entity and six local residents.

Table 1 provides a brief profile of the participants. It includes the participants’ work roles, gender, age, tenure in the council or duration of residency in Kuching, and the codes generated for each participant to ensure anonymity. The lack of specific details provided for the participants from local council about their roles is to protect these individuals from being identified.

Table 1: Descriptive variables of the participants

DESCRIPTIVE VARIABLES OF THE PARTICIPANTS				
SOURCE	SEX	AGE	TENURE/RESIDENCY	CODE
Council				
Environmental Officer	M	41- 50	> 25 years	C1
Environmental Officer	M	31-40	> 15 years	C2
Environmental Officer	M	31-40	< 5 years	C3
Environmental Officer	F	41-50	> 5 years	C4
Environmental Officer	M	31-40	> 5 years	C5
Environmental Officer	M	21-30	< 5 years	C6
Resident				
Executive Officer	F	31-40	> 30 years	R1
Senior Manager	F	41-50	> 45 years	R2
Engineer	M	41-50	> 40 years	R3
Teacher	F	41-50	> 40 years	R4
Housewife	F	41-50	> 40years	R5
Sales Representative	M	21-29	> 25 years	R6

3.2 Coding and analysis of interviews

The approach to data analysis was influenced by Yin’s (1994, 2003) argument that it should be clear how the analysis was undertaken and how the researcher made sense of the data to arrive at conclusions. Data were obtained through in-depth, face-to-face interviews and the qualitative data were analysed using the steps of thematic analysis identified by Braun and Clarke (2006).

Each participant was assigned a code to ensure anonymity. All the interviews were tape-recorded with the consent of each participant. The researcher also kept field notes of her thoughts as the interviews were completed. All taped interviews were transcribed by the researcher. In many instances, the tapes were played back several times to assist the researcher with accurate transcription of the data. The researcher read through each transcript and its associated field

notes several times. This is in keeping with Braun and Clarke's (1996) argument that repeated reading of transcripts ensures familiarisation with the raw data before coding of data extracts begins. Once the concepts emerging from the data were comprehensible, the researcher became more comfortable with the process of coding and category generation and the coding process began.

The transcripts were grouped into two categories; namely, local council and local residents. This assisted the researcher with the sorting of data from the two different source groups. The two groups were differentiated by the use of code 'C' to indicate the source as the council and 'R' to indicate the source as a resident. The researcher then utilised the process of highlighting key phrases, sentences or paragraphs that appeared to be important. The highlighted concepts or impressions were then labelled with a word or short phrase that reflected the concept.

The researcher coded as many data extracts as possible that referred to issues relating to solid waste management, FCA and NIC. These coded data extracts were then compared. Similar data extracts with different codes were reviewed and, when suitable, the code was renamed to more accurately reflect what was contained in the extract. In order to keep a record of how and why the choice was made to re-code the data extracts the researcher kept memos. The memos took the form of a written dialogue of the researcher's thoughts about how the codes fit together.

At this stage of the analysis coded data were sorted into themes based upon how similar or different the codes were to each other. Once again the researcher kept memos as this process was undertaken.

As there were still a large number of categories to manage, the researcher kept a visual data base of them by arranging them as labelled boxes. Keeping a database that can be easily accessed and understood by the researcher is in keeping with Yin's (1994, 2003) case study method. To further assist in managing the database of initial codes the researcher numbered each theme.

To identify the dominant themes in the data, all data extracts were re-read with a view to seeking the story within the data. The researcher considered how each code may relate to each other code so that the story could be identified. For example, when the data extracts relating to the initial codes of *transparency*, *awareness of external costs*, *awareness of environmental costs* and *lack of knowledge* were re-read it became clear that each was part of a larger category concerned with participants' support for FCA. These were then grouped under the category label *Support for FCA*. The researcher sought to make the category labels as descriptive as possible to retain the meaning.

3.3 Reviewing Themes

During this stage of the analysis, the themes were refined with the aim of achieving clear and identifiable categories that fit together to tell the overall story contained within the data. At this stage, some coded data extracts that did not fit overarching themes were set aside but not discarded.

The researcher reviewed each category and the data within it. Category labels were refined to ensure they reflected the dominant theme. Sub-themes within the data were reviewed and became sub-categories.

To ensure that the category and its related sub-categories did fit the data and had not been forced to fit any preconceptions by the researcher about what should be emerging from the data, the researcher went back to the original data extracts for confirmation. Working definitions were developed for each category to retain the meaning of the category label. This further ensured the analysis remained true to the story within the data. Once satisfied, a concept-map was created for each category.

The researcher then reviewed the categories and the working definitions associated with them. It was determined that the categories and the sub-themes within them adequately encapsulated the relevant data extracts and were, therefore, retained.

The concept-map (Figure 1) the researcher created was for the category *Support for FCA* which contained two themes: *Reasons why supported* and *Barriers*.

The working definition for this category was: the support for a system that would allow for transparency of social and environmental costs associated with solid waste management.

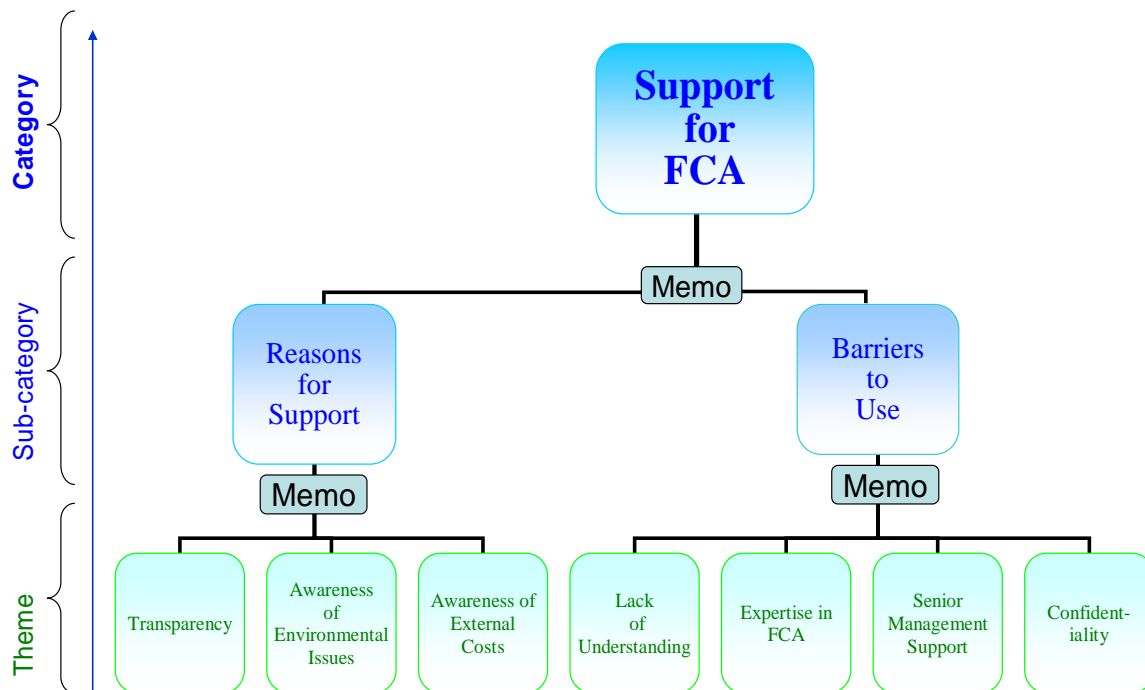


Figure 1 Concept-map: Support for FCA

4. RESULTS AND FINDINGS

This section provides the categories and their sub-themes and the data extracts through which they were revealed. The definitions of each category and sub-theme are also included to retain the integrity of the story and provide enough clear and compelling evidence to support the findings. The researcher aimed to provide enough extracts to demonstrate prevalence and the best extracts capturing the essence data.

Support for FCA was defined as the appreciation of the need for the council to track and report on external costs associated with solid waste management in the City of Kuching. It includes the sub-categories of *reasons for support* and *barriers to use*.

4.1 Reasons for support

This sub-category is defined as the explanation provided by participants as to why they wanted a system that would track and report on external costs associated with solid waste management. The reasons offered were the desire for *transparency*, *awareness of external costs* and *awareness of environmental issues*.

The code of *transparency* refers to comments made by participants about their concerns for the lack of publicly available information and limited access to details in relation to solid waste management. Most participants identified the need for transparency and made comparisons between Malaysia and developed countries. One resident said:

My understanding is that in local councils in developed countries such as the United States, there is regulation for the waste management to be made available to public. ... since there is no publicly available information on such issue [in Malaysia], and public have no access to details such as these, hence this will always remain as a 'secret'. (R4)

An absence of transparency was identified by several participants. They argued that the public do not seem to know what is on the government agenda in relation to environmental issues. One resident specifically stated the importance of transparency which would enable the community to feel that they are part of the society.

The findings provided by the interviews are that, from local council and local residents' perspective, the need for a tool to assist the case study solid waste management entity in creating reports of the social and environmental costs of their practices, as well as the financial ones, is well understood among council members. They argue that such a tool will assist them in informing residents of the cost of the low level of recycling and waste separation that occurs in the City of Kuching and that this transparency will have a direct impact upon the residents' solid waste management behaviour.

The code of *awareness of environmental issues* refers to comments made by participants about the value they placed on environmental issues. Participants acknowledged that environmental issues have increasingly played an important part in life and this was evidenced by the council activities and programmes. Several participants expressed their concerns about social values and

environmental aspects. It was noted that there is a need for these to be taken into consideration to achieve a better standard of living and environment. This is illustrated in the comment below.

... council would not want to be just concerning on dollar and cent, how would visitors from overseas perceive our standard of protecting the environment and also how our society would be if the council only consider the financial aspects. (R1)

We need to start thinking about our environment, does it mean that once the new landfill has been filled we go and start up another one? (C2)

Comparisons were made between Malaysia and developed countries and participants identified concerns with environmental issues such as illegal dumping and the need to consider waste minimisation. One resident said that she has seen in the city (Kuching) the increasing cases of illegal dumping. Further, as this participant travels to developed countries such as Australia, USA and Europe, she sees the importance of minimising waste by recycling or choosing to use products made by recycled material. She stated ... I know that in Australia, since about 3 or 4 years ago, residents have started using the green bags [for grocery]. (R5)

Other participants identified that it is essential for Kuching to be more environmentally sustainable by considering recycling and waste minimisation. Several participants pointed out that there is lack of knowledge and understanding among local residents in relation to waste minimisation and recycling. Further, as there is currently no requirement for waste separation, waste generated including recyclable waste is collected and transported to the landfill. One participant (R5) pointed out that the experience she gained while living in Australia had enabled her to understand the process and the purpose of separating waste.

The link between environmental management and reducing costs was identified by a council member to be an important issue as once the amount of waste generated by the public could be reduced; the cost that the council incurs would be reduced significantly.

The code *awareness of external costs* refers to comments made by participants about the value they placed on information about external costs. Overall, participants expressed their views on external costs by identifying environmental and social costs as dominant components. One participant who supported the incorporation of external costs into a system expressed her views on the most important external cost drivers. The lack of knowledge and participation from the public has been identified as the most significant external cost drivers. It was pointed out that if residents have the understanding on waste minimisation, the council would have less waste to collect and hence would reduce the waste quantity to the landfill hence fees paid to the contractor would be reduced. This is consistent with the view from other participants that resident ignorance on recycling and waste minimisation was a contributory factor to the lack awareness of external costs. However, participants who were aware of the broader issue of external costs noted the difficulties in measuring them.

I think the most significant would be environmental costs, however, how would this be measured? My understanding is that environmental values are difficult to measure. However, when we think about it, we can always base it on the activity for example, how much does it cost to clean up waste dumping. I suppose when it

comes to impact on the environment, it would be difficult to measure, not to say social values. (R3)

Several council members pointed out that reporting external costs such as environmental and social costs is a good initiative for achieving the goal of sustainable development. One of the council members said that incorporating external costs into the reporting system helps protect the environment which would directly contribute to the Healthy City programme³, which is to achieve sustainable development.

4.2 Barriers to Use

This sub-category is defined as the factors participants identified as possibly hindering the use of FCA. These barriers were identified as *lack of understanding*, *lack of expertise* and *limited senior management support* and *confidentiality*. The code *lack of understanding* refers to comments made by participants about barriers they perceived in implementing FCA as a tool to incorporate external costs in solid waste management. Participants perceived the lack of understanding of accounting as one of the barriers to adopting FCA as a tool to incorporate external costs in solid waste management.

Expertise in FCA is the code used to refer to comments made by participants about the lack of expertise in FCA being a barrier to reporting external costs. It was identified by a participant (R5) that there is a need for the council to consider the issue of expertise before a tool such as FCA is implemented and the option of outsourcing would be beneficial. This is consistent with council members' view that expertise from other countries that have implemented FCA is essential.

The code *senior management support* refers to comments made by participants about their perception that senior management do not support implementing a system to report external costs. This perception was based on past experience in which other campaigns and projects had only received minimal support.

This will not take a long time if the top management come to know about what is Full Cost Accounting. To get this working, the most important thing to do is to get the senior management to understand how FCA can contribute to the council and to the city. There is a lack of understanding from senior level where everything they do is about cost cutting. (C1)

³ Kuching was officially invited by the World Health Organisation to participate in the programme in 1994. The programme is deliberately aimed at fundamental change in local government and its relationship with communities. The Kuching Healthy Cities programme focuses on various projects. Among the major areas of concern was creating a Clean and Green City.

The code *confidentiality* refers to a comment made by a participant about her concern that some information required confidentiality. This theme was retained due to the importance of the issue to the participant and its link to the related theme of transparency.

... I doubt that this [information] is available for public access due to the confidentiality issues involved. Perhaps it is a good way of showing transparency if this is made available for public. (R2)

In general, council members felt that FCA can contribute to senior management's understanding of the need to provide enough resources to support initiatives such as the House Talks⁴ and other informational campaigns. The perception that senior management would not support FCA because of lack of resources is identified by council members as a barrier to introduction of such accounting tool. Lack of expertise has also been raised as a barrier to FCA being used by the council and the limitation resources and government funding are identified as barriers to building the expertise needed. This is consistent to Herbohn (2005) and Bebbington et al. (2001a, 2001b) who found that implementing FCA required resources and expertise. The issue of confidentiality was raised by one council member as a potential barrier to disseminating such information.

Residents vary in their understanding of the concept but are, like the council members, aware of the need to track the social and environmental costs of current solid waste management practices. The need for such a tool is most often identified as necessary to achieving environmental sustainability in the City of Kuching specifically, and across Malaysia in general. This support also stems from the belief that awareness of external cost would emphasise the importance of the environment and therefore increase recycling and waste separation among residents. They argue that they could obtain a greater understanding of the impact of their solid waste management behaviour if they had access to the information contained in reports about the external cost of solid waste management in the City of Kuching. Confidentiality was also raised by a resident as a barrier to the availability of such information.

In summary, environmental sensitivity did emerge as an issue in this research study. Residents and council members showed their awareness of the need to change their solid waste management behaviour and expressed their concerns for the need to protect the environment by engaging in more environmentally sustainable practices. Hence, this shows the high level of environmental sensitivity among participants. According to Herbohn's (2005) research finding, state government legislation has been identified as one of the factors that has an influence on environmental sensitivity within an industry. This author explains that introduction of an external cost reporting tool such as FCA would provide assistance in decision and policy making with further contribution towards more understandable and transparent results. In developed countries, governments have created agreements and legal frameworks designed to reduce the generation of waste (Gale, et al., 2001). However, this has not achieved priority in developing countries. The first priority is for organised collection of waste and effective management (Achankeng, 2004). This is consistent with the finding of this research study as legislation did not emerge as contributory factor.

Further, FCA is a new concept for many of the participants. However, the principle of tracking and reporting external costs is strongly supported by them. The need for environmentally

⁴ House Talks is a programme run by the council to educate residents about recycling and waste minimisation.

sustainable practices is of great concern to participants but few felt they are in a position where they can influence this. This sense of helplessness may account for the desire for regulation in the solid waste management industry that is prevalent among both residents and council members. In addition, some authors have found that resistance to adopting FCA is based in the level of discomfort among decision-makers about the transparency of external costs. For example, Bebbington et al. (2001a, p.120) found that managers believed that FCA was unlikely to tell a comforting story, rather, that it would “generate ‘bad news’ about those organisations undertaking FCA”. Specifically, they identify two important reservations. The first was that disclosing external costs would create perceived responsibility for them and secondly, that disclosing them would highlight the extent of the environmental problem. They argued that implementing FCA would enable the size of fuller costs to be identified and would contain uncomfortable messages. This is consistent to the finding of this research study where participants identified the issue of confidentiality.

Several authors have identified other barriers. Herbohn (2005) found that FCA failed when managers were overly optimistic about what could be achieved and did not provide adequate resources for FCA implementation. She found that this was aggravated by a high level of staff turn over. Bebbington et al. (2001a, 2001b) found that the cost of gathering the information needed was a barrier to the use of FCA as was the inability to identify the impacts of some activities, particularly long term impacts.

The need for a tool such as FCA is recognised even among those who are not yet in a position to adopt such a tool. Fear of the consequences of utilising a tool that would highlight unsustainable practices is a common finding within the literature and this is consistent with the finding for this research study and this was well summarised by Bebbington et al. (2001a):

A number of interviewees, however, did note that FCA would provide uncomfortable information of the current level of business unsustainability. For example, interviewees for that project notes that the ‘answer [to a sustainable cost calculation] is likely to be horrifying.

5 CONCLUSION

The management of solid waste has been of concern for almost 40 years and is an integral part of the urban environment. The end goal of solid waste management is to reduce the quantity of waste and the environmental pollution associated with it. The emergence of the concept of sustainable development has heightened awareness of the need to consider social and environmental costs. The need for effective solid waste management including awareness of social and environmental costs is a problem faced by all countries. This research study explored why FCA is not in use in the case study solid waste management entity in Malaysia.

In summary, it is concluded that although the Kuching community is environmentally sensitive, it is not yet at the stage where FCA could be effectively supported. It is concluded that the case study solid waste management entity is not ready to adopt FCA as there are several barriers in place. The main barrier is perceived to be the lack of FCA expertise within the organisation. Participants’ concerns with the conditions of existing accounting system, comfort with transparency and the need for senior management support suggest that these would necessary

considerations for successful adoption of FCA within a Newly Industrialised Country (NIC) solid waste management entity. Therefore, future research should seek to examine these conditions for adoption of FCA in practice in a NIC setting.

This research study contributes to academic elaboration through examining conditions that influence the successful adoption of FCA in the NIC of Malaysia. It contributes to professional practice through the identification factors that facilitate and hinder the adoption of FCA and the importance of FCA expertise within the solid waste management entity. These contributions are a key strength of this research study. With the aim of contributing towards closing the gap in the existing research in the area of FCA in NICs in the solid waste management industry, this research study included residents' awareness and knowledge in relation to the solid waste management. Residents' perspectives have been largely overlooked in many previous research studies.

The scope of the research study is confined to the case study solid waste management entity, however, it is likely that the findings will have relevance to other solid waste management entities in Malaysia. The research study is not an evaluation of full cost accounting and is therefore limited in the conclusions that can be drawn about the importance of the conditions.

Future research should seek to examine FCA in practice in the NIC setting. The focus of this research study is on one solid waste management entity within a single industry and this limits the generalisability of the findings. The finding of the research study cannot as yet be directly applied beyond the solid waste management entity studied as data collected were about that particular solid waste management entity. Further research would be required to confirm and extend the results. Another area for future research is to examine the efficacy system in a setting where FCA is in use.

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