

Why building capacity is a necessary but insufficient condition for improved waste management in South Africa: The knowledge – behaviour relationship

L. Godfrey. CSIR Natural Resources and the Environment, South Africa, lgodfrey@csir.co.za

D. Scott. University of KwaZulu-Natal; School of Development Studies; Durban, scottd@ukzn.ac.za

ABSTRACT

One of the main reasons given for the current state of waste management in South Africa includes human resource capacity constraints, in particular the difficulty in recruiting suitably qualified or skilled people, and the high turnover of staff within government. Local government, in particular, faces serious challenges with regards to available skills and capacity. The need for education and capacity development in the field of waste management has been recognised in a number of recent studies as a way of addressing these challenges. This paper explores whether building capacity in the field of waste management in South Africa is sufficient to improve the way that waste is currently managed in the country. The Theory of Planned Behaviour (Ajzen, 1985) one of the most frequently applied and empirically proven action theories in environmental behaviour research, provides a basis to evaluate this research question. The theory proposes that a combination of behavioural, normative and control beliefs form behavioural intentions which result in behaviour. Findings show that building capacity, which support control beliefs, while certainly a necessary condition, is insufficient to change waste behaviour. Consideration needs to be given by the waste sector to how behavioural and normative beliefs can be strengthened, by addressing issues of consequence and outcome and the importance given to pollution and waste issues, as a means of converting behavioural intentions to action.

1. INTRODUCTION

The environment outlook for South Africa for 2006 showed that levels of municipal waste service delivery improved by only 2.7% between 1996 and 2001, with almost 50% of the South African population not receiving a regular waste collection service (DEAT, 2006b). In addition 59.7% of the 231 local municipalities indicated that they could not perform their waste management functions (Godfrey & Dambuza, 2006). While it is acknowledged that there are many well operated sanitary landfill sites in South Africa in line with international best practice, of the 1203 known public and private landfill sites in the country, only 43.6% are authorised through permits (DEAT, 2006a). Of those permitted, compliance with permit conditions is seldom audited and often unknown. While pockets of compliance exist, waste is currently not being duly managed in South Africa. This results in a negative impact on the environment which requires the improvement in the effectiveness of current waste management practices (Bosman & Boyd, 2008; DEAT, 2006; DEAT, 2006b).

The Department of Environment Affairs (DEA) (formerly Department of Environmental Affairs and Tourism) suggests capacity constraints as one of the main reasons for the decline in the management of waste (DEAT, 1999; DEAT, 2006b; DEAT, 2006c). Difficulty in recruiting suitably qualified or skilled people into government positions has been further compounded by the high turnover of staff within all three spheres of government (Godfrey, 2007). Local government, in particular, faces serious challenges with regards to available skills and capacity, both in terms of the number of staff as well as expertise (DEAT, 1999a; DEAT, 2006b; COGTA, 2009). The DEA (DEAT, 2007) recognise that the primary intervention in support of municipalities running a sustainable waste management service is the strengthening of municipal human resource capacity. This is supported by research findings which suggest that capacity building is one of five mechanisms to address the current challenges facing municipalities with regards to waste service delivery (Oelofse and Godfrey, 2008). This is in line with Keating (1993) who noted:

“A country's ability to develop more sustainably depends on the capacity of its people and institutions to understand complex environment and development issues so that they can make the right development choices” (Keating, 1993).

National waste policy, such as the White Paper on Integrated Pollution and Waste Management (IP&WM) (Republic of South Africa, 2000) and the National Waste Management Strategy (NWMS) (DEAT, 1999a) identify the need for further capacity building in South Africa. This suggested capacity building would support government, industry and civil society in better managing waste and reducing the impact of pollution from waste on the environment. According to Department of Environmental Affairs (DEAT, 1999b:8), the "*level of knowledge, skills and competencies relating to waste management varies significantly between the different implementing agencies at national, provincial and local government level*". It is recognised that government will only be effective in the implementation of the NWMS and its corresponding Action Plans if it has both qualified and competent personnel in national, provincial and local government (DEAT, 1999a). The DEA recognises the importance of building, as well as retaining, technical waste management capacity within government. It is acknowledged that government has promulgated extensive environmental legislation and regulations since the promulgation of the Environment Conservation Act (Republic of South Africa, 1989) (Godfrey & Nahman, 2008), to address threats to environmental and human health. However, a "*lack of capacity to implement*", is identified in the NWMS (DEAT, 1999a:7) as one of the limitations.

There are many definitions in the literature for capacity and capacity building. These definitions vary from simply increasing knowledge or skills (human resource capacity) through education, training or awareness programmes, to more extensive definitions that include not only this aspect of human resource development, but also organisational and institutional development. The World Customs Organization (WCO) defines capacity building as "*activities which strengthen the knowledge, abilities, skills and behaviour of individuals and improve institutional structures and processes such that the organization can efficiently meet its mission and goals in a sustainable way*" (WCO, 2003). According to The Urban Capacity Building Network (GDRC, 2007), capacity building is more than just training and includes:

- *Human resource development*, the process of equipping individuals with the understanding, skills and access to information, knowledge and training that enables them to perform effectively.
- *Organizational development*, the elaboration of management structures, processes and procedures, not only within organizations but also the management of relationships between the different organizations and sectors (public, private and community).
- *Institutional and legal framework development*, making legal and regulatory changes to enable organizations, institutions and agencies at all levels and in all sectors enhance their capacities.

Many definitions for capacity and capacity building are also evident in South African literature. The Municipal Structures Act (Republic of South Africa, 1998:14) defines capacity as the "*administrative and financial management capacity and infrastructure that enables a municipality to collect revenue and to govern on its own initiative the local government affairs of its community*." The DEA in their action plan for capacity building, education, awareness and communication (DEAT, 1999b:51) define capacity building as "*the developmental processes, which enable an organisation and its people to confidently and competently, undertake their organisational responsibilities*." To undertake such organisational responsibilities requires having the appropriate knowledge to manage waste. This implies both a skill of knowing what needs to be done, as well as an enabling environment to support the behaviour.

For the purposes of this research, the authors focus specifically on the development of human resource capacity, i.e. the appropriate qualifications and skills, developed through education, training and experiential learning, as a means to strengthening organisational capacity. The paper does not address aspects of capacity such as equipment and infrastructure.

This paper aims to address the role that human resource capacity, considered here to be specific knowledge, has on the management of waste in South Africa. This research question is explored in relation to the theoretical framework, which outlines the linkages between knowledge and behaviour and uses this theoretical framework to assess whether capacity development in a developing country context such as South Africa, can result in the improved management of waste.

2. MATERIALS AND METHOD

The findings presented in this paper are based on the observations made by the first author over the past 15 years of being involved in the South African waste sector. These observations are supported by primary data collected from numerous research projects undertaken by the first author. Such supporting research projects include the piloting of the South African Waste Information System (SAWIS) (Godfrey, 2008; Godfrey & Scott, in press); the assessment of economic instruments in South Africa (Godfrey & Nahman, 2008) and a systems approach to waste management (Godfrey & Oelofse, 2008). Further supporting data

was obtained from technical reports prepared for government departments responsible for the management of waste in South Africa.

3. THE GENERATION OF KNOWLEDGE

Knowledge of how to effectively manage waste in a changing environment comes about through the learning process (Miller & Morris, 1999). Such a learning process involves the “*integration of information derived from data, plus theory that puts the information in the proper context, plus experience of how things work in the real world*” (Miller & Morris, 1999:77) (**Figure 1**). In the context of waste management, knowledge is dependant upon three aspects, accurate and reliable waste data and information; waste training and education programmes (the “theory”) and opportunity for experiential learning.

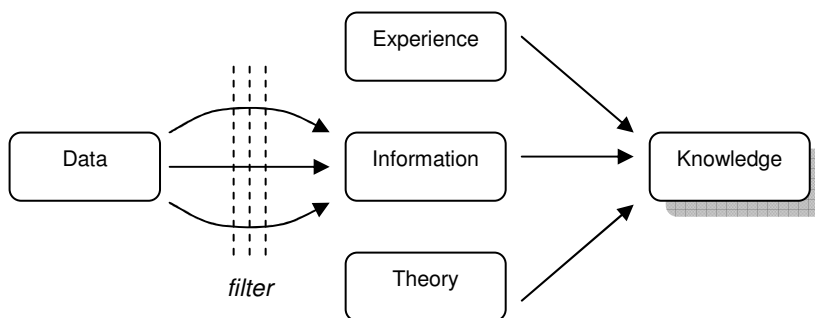


Figure 1. Process of learning (from Miller & Morris, 1999)

According to Allee (1997:62) “*information becomes knowledge when it is analysed, linked to other information, and compared to what is already known*”. Knowledge is considered as the ‘*capacity to act*’ (Allee, 2003:264) and as such, is seen as being an important component of attitude formation and of behaviour change.

4. THE THEORY OF PLANNED BEHAVIOUR

Perhaps the most frequently applied and empirically proven action theory in environmental behaviour research, and certainly in understanding waste recycling behaviour, is the theory of planned behaviour (Ajzen, 1991; Ajzen, 1985), referred to by Kollmuss and Agyeman (2002:243) as having been “*the most influential attitude-behaviour model in social psychology*”. The theory of planned behaviour has been used to understand behavioural change in numerous fields, including health studies, in particular behavioural change with respect to HIV/AIDs (Fishbein *et al.*, 2001) and in waste recycling studies (Barr, 2007; Mosler *et al.*, 2008).

The theory of planned behaviour (**Figure 2**), suggests that action (behaviour), represented by means of behavioural intention, is a function of three factors, attitude toward the behaviour or **behavioural beliefs**; subjective norms or **normative beliefs**; and perceived behavioural control or **control beliefs**. A person's *attitude* towards a specific behaviour is seen as a function of the perceived positive or negative outcomes or consequences of performing the behaviour and the desirability of these consequences. A good correlation was found between attitude and behaviour where there was a high awareness of consequence (Fransson & Gärling, 1999). The subjective norms relate to the social environment or social pressures, i.e. the person's perception that an individual or group important to them, e.g. family, colleagues, employers or government; expects them to perform (or not perform) the given act. This is influenced by the person's motivation or desire to comply with the perceived expectations of that reference group or the reference groups perceived power or authority over the person (Oom Do Valle, 2005; Weiss, 2002; Ajzen & Fishbein, 1973). According to Ajzen (1985:12), “*generally speaking, people intend to perform a behaviour when they evaluate it positively and when they believe that important others think they should perform it*”.

The theory of planned behaviour maps out the causal links from personal and social beliefs, through attitudes and intentions, to overt behaviour, i.e. behaviour over which a person has full control or the power of determining outcome. Pfeffer & Sutton (2000:157) refer to this as an ‘atomistic view’ which assumes that “*individual outcomes and individual behaviour are under the control and discretion of those individuals, so that results and decisions can be reasonably attributed to individuals*”. Research has shown, however, that

while actions are controlled by behavioural intentions, intentions may not always manifest as action, even if the personal intention or willingness is there (Chung & Leung, 2007; Ajzen, 1985; Ajzen & Fishbein, 1973). A number of factors impact upon the manifestation of intention as behaviour; including degree of *volitional control* (Ajzen, 1985). Perceived behavioural control has been described as the ease with which the behaviour can be performed; a person's perception of the difficulty of performing a behaviour, or the presence and extent of factors which either facilitate or hinder performance, i.e. a person's beliefs about available resources, opportunities and specific knowledge (Oom Do Valle et al., 2005; Ajzen, 1991). What van Birgelen *et al.* (2009:130) refer to as the "extent to which a person thinks his or her own actions will have an impact on the situation as a whole". A person is more likely to act if they are confident in their *ability* to perform it or if strong *barriers* are removed (Ajzen, 1991; Gardner & Stern, 1996).

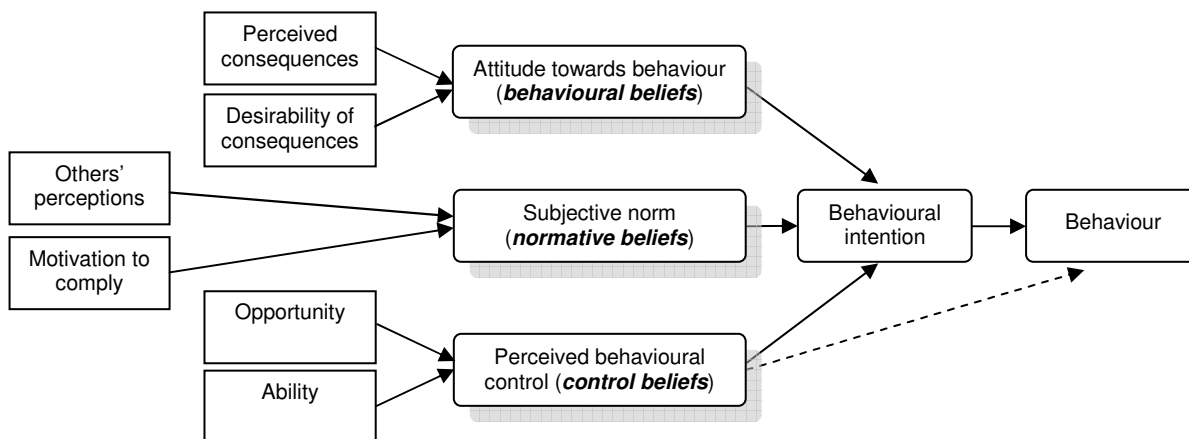


Figure 2. Theory of Planned Behaviour (from Ajzen & Fishbein, 1973; Ajzen, 1985; Ajzen, 1991)

5. DISCUSSION

The theory of planned behaviour provides a structured framework against which to gauge the influence of human resource capacity, and in particular knowledge, on resultant waste behaviour. The following section focuses on the three main constructs of the theory of planned behaviour as they relate to waste management in South Africa, namely control beliefs, behavioural beliefs and normative beliefs. Each is discussed below in further detail, with the aim to assess key trigger points in improving the way that waste is currently managed in the country.

5.1 Control beliefs

Perceived behavioural control has been described as the ease with which the behaviour can be performed; a person's **ability** to perform and the **barriers** or obstacles that may stand in the way of such performance.

The theoretical framework put forward in **Figure 3**, is a combination of two theories, the theory of planned behaviour (Ajzen, 1991) and the process of learning (Miller & Morris, 1999). The theoretical framework suggests that building new knowledge (or human capital development) through a process of learning, has the potential to impact upon behavioural, normative and control beliefs, and in so doing, influence behavioural intention and ultimately action (Gardner & Stern, 1996; Ajzen, 1985). Knowledge may raise a person's awareness regarding the outcomes or consequences of a behaviour (or non-behaviour), thereby altering the person's attitude towards the behaviour. Knowledge may alter a referent's awareness regarding the outcome of a behaviour, thereby placing more or less pressure on the person conducting the behaviour (change of subjective norms). Finally, increasing a person's knowledge (through a process of learning), can make them more capable of completing the behaviour, thereby giving them more control over their behavioural intention. The theory therefore suggests that knowledge has the ability to influence behavioural intentions and resultant action.

However, according to Pfeffer and Sutton (2000), while knowledge is 'crucial to performance', knowledge of an issue is often not sufficient to cause action: "*there is only a loose and imperfect relationship between knowing what to do and the ability to act on that knowledge*" (Pfeffer & Sutton, 2000:25). This frequent inability to transfer knowledge of what needs to be done into action or behaviour which is consistent with that knowledge, is referred to by Pfeffer & Sutton (2000) as the 'knowing-doing gap' or the 'performance paradox'

(Cohen, 1998 in Pfeffer & Sutton, 2000). While it was believed that the 'knowing-doing gap' was due to a lack of personal knowledge or skills, research conducted by Pfeffer & Sutton (2000) suggests that while personal knowledge is important in ensuring action, it is not as important as having management systems and practices in place. According to Pfeffer & Sutton (2000) the gap between knowing and doing is more significant than the gap between ignorance and knowing. This is due to the fact that considerable knowledge already exists, which is either already known to an individual, or can be readily sourced, yet lack of implementation persists.

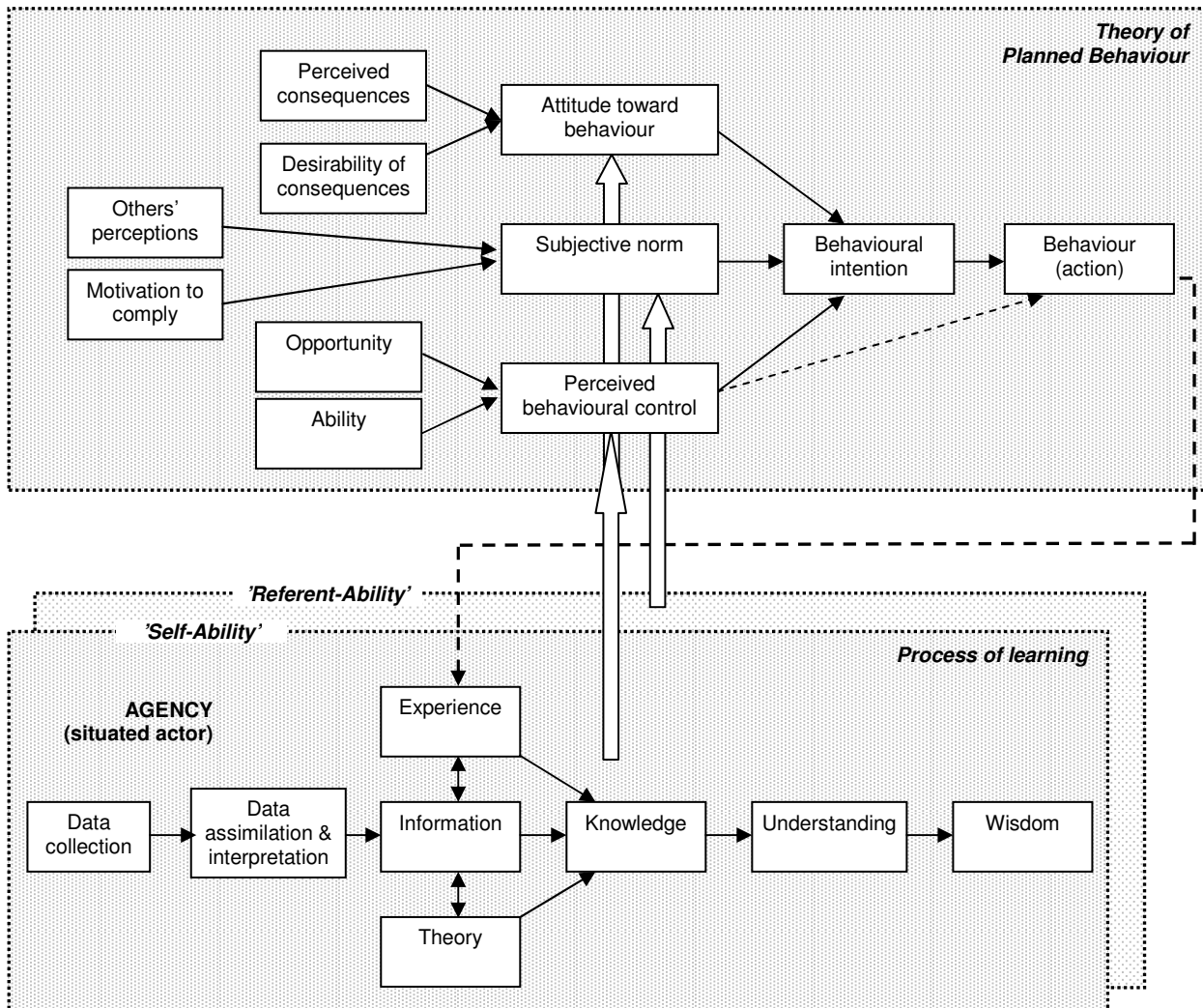


Figure 3. Learning and behaviour (adapted from Miller & Morris, 1999 and Ajzen, 1991)

“While a municipality which has sufficient capacity [knowledge] should be viable, this is not always the case. A number of internal and external factors can easily affect municipal viability. Certainly, municipal capacity cannot and should not be equated to municipal viability” (MDB, 2008:107).

Research conducted as part of the implementation of the South African Waste Information System (Godfrey & Scott, in press) showed that certain persons interviewed have assimilated and interpreted the waste data collected for SAWIS, utilising this knowledge to inform and manage the organisations operations, i.e. through a learning process build new knowledge. However, when it came to converting this knowledge to impact, little evidence was found for resultant change in waste practices as a result of this new knowledge. The desire may exist within individuals to implement change based on this new knowledge and raised awareness around waste management practices. However, it was found that the point of knowledge generation may be removed from the point of decision-making within organisations. This could be due to a break in communication, or it may be constrained by organisational bureaucracy and administrative procedures. These external factors have made it difficult for persons, particularly within municipalities to implement the necessary changes within their organisation. It was found that these external factors hinge largely around governance (Godfrey & Scott, in press).

“...the *Municipal Structures Act* defines capacity in relation to a municipality as ‘the administrative and financial management capacity and infrastructure that enables a municipality to collect revenue and to govern on its own initiative the local government affairs of its community’. The definition does not reflect the external economic and social conditions in which the municipality is found but rather the municipal institutional requirements for delivering services.” (MDB, 2008:108)

Behavioural and normative beliefs must therefore also play an important role in formulating behavioural intentions and resultant action.

5.2 Behavioural beliefs

A person's *attitude* towards a specific behaviour or behavioural beliefs is seen as a function of the perceived positive or negative outcomes or **consequences** of performing the behaviour and the **desirability** of these consequences. With regards to behavioural beliefs, the authors have specifically identified current perceptions regarding consequences of legislative non-compliance, and the desirability of these consequences.

South Africa has one of the most advanced constitutions in the world in terms of the protection of human rights, including the right to a safe and healthy environment. In addition, it has some of the most progressive environmental legislation in the world (UNDP, 2003). However, government has typically been perceived to be unwilling and/or unable to enforce pollution and waste-related legislation (Lukey et al., 2004; Seeliger et al., 2003; Republic of South Africa, 2000; London & Rother, 2000). A public perception exists that government is unwilling and/or unable to “*come down hard on polluters*” (Lukey et al., 2004). A review of landfill data collected by the national Department of Water Affairs and Forestry (DWAF) and the Department of Environmental Affairs and Tourism (DEAT) in 2005, shows that only 43.6% of the 1203 landfill sites in South Africa are known to be permitted (DEAT, 2006a), and of those permitted, little to no information exists on their compliance with permit conditions. Of the non-permitted/unknown permit status landfill sites, in excess of 90% are thought to be municipal landfills. It would therefore appear that the biggest culprit of non-compliance in the landfilling of waste is local government (Godfrey, 2008). Unpermitted municipal landfill sites are a problem in terms of implementation of environmental legislation in South Africa (SabinetLaw, 2009).

This lack of enforcement against municipalities is largely due to South African legislation which recognises the importance of co-operative governance across the three spheres of government in waste management matters. However, co-operative governance effectively means that legal action cannot be taken by one sphere of government, e.g. the national DEA, against another sphere of government, e.g. a municipality, without first having exhausted “*all other remedies before it approaches a court*” (Republic of South Africa, 1996:14). According to Bosman and Boyd (2008:856), “*cooperative governance principles are preventing the implementation of legal proceedings*” with the result that command-and-control policy instruments are not ensuring environmental compliance in South Africa. This lack of consequence, particularly with regards to non-compliant municipal waste operations and facilities, is currently a governance challenge facing South Africa with the potential to create inconsistencies in enforcement (Bosman and Boyd, 2008; Engledow and Groenens, 2008) and dual enforcement standards for public and private waste facilities. The result is often a difference in approach to waste management practices between public and private entities. A perception has therefore developed, certainly amongst municipalities, that there is little to no consequence of legislative non-compliance.

“A lack of government capacity means that the enforcement of existing legislation is frequently unfocused, especially with regard to waste disposal” (Republic of South Africa, 2000:23).

Ineffective enforcement of waste legislation has also resulted in the improper management of landfills that are not designed and operated according to Minimum Requirements (DWAF, 1998). The result is that landfilling is still too cheap in South Africa, creating price distortions in the waste system, which makes landfilling the preferred means of waste disposal. Such price distortions have resulted in a largely, unsustainable recycling sector, which remains a relatively more expensive alternative. This is in conflict with national policy which supports the waste hierarchy of waste avoidance, reuse, recycling, treatment and landfilling (Godfrey & Nahman, 2008). The result is a perceived lack of consequence for non-compliance with waste legislation in many areas of the waste sector. This behaviour has entrenched and institutionalised many practices which now hinder integrated waste management, and in instances conflict with national policy, e.g. the White Paper on Integrated Pollution and Waste Management and the issue of salvaging from landfills.

The recent promulgation of the Waste Act (Republic of South Africa, 2008) however, provides for hefty fines and imprisonment for contravention of the Act. For example, in terms of Section 68 (1) of the Waste Act, a person convicted of an offence referred to in section 67(1) (a), (g) or (h) of the Act, is liable to a fine not exceeding R10,000,000 (approximately US\$ 1,250,000) or to imprisonment for a period not exceeding 10 years. These penalties are considerably more onerous on the waste sector than the previous Environmental Conservation Act and if successfully enforced by government, will provide a platform for addressing consequence for legal non-compliance.

5.3 Normative beliefs

Subjective norms relate to the social environment or **social pressures**, i.e. the person's perception that an individual or group important to them, e.g. family, colleagues, employer or government; **expects them to perform** (or not perform) the given act. This is influenced by the person's motivation or **desire to comply** with the perceived expectations of that reference group or the reference groups perceived power or authority over the person. With regards to normative beliefs, the authors have identified the current perceptions regarding the importance placed on waste management by both the South African government and society, and the resultant sense of pressure to comply with good waste management practices.

The Department of Environmental Affairs highlighted, as one of the key issues relating to pollution and waste in the White Paper on Integrated Pollution and Waste Management, the:

"Lack of priority afforded to waste management: In the past, waste management was not afforded the priority it warrants as an essential function required to prevent pollution and protect the environment and public health. Consequently, insufficient funds and human resources were allocated to this function. In many instances this neglect has resulted in a lack of long-term planning, information, appropriate legislation and capacity to manage the waste stream." (Republic of South Africa, 2000:23)

This low priority afforded to waste in South Africa was noted by government in both the White Paper on Integrated Pollution and Waste Management (Republic of South Africa, 2000) and the National Waste Management Strategy (DEAT, 1999a, 1999b). There is little evidence however, to suggest that this situation has changed over the past decade (DEAT, 2009; Godfrey & Oelofse, 2008; Godfrey & Scott, in press). Research undertaken in selected municipalities in South Africa showed that the current lack of political will (Godfrey & Oelofse, 2008; Ball, 2006) given to waste management still results in a low priority being afforded to waste, particularly within municipalities. Ultimately, this low priority for waste, when combined with other factors, results in e.g. insufficient funding being assigned to waste services which impacts further on issues such as equipment management, labour (staff) management and institutional behaviour (management and planning) (Godfrey & Oelofse, 2008). The Community Agency for Social Enquiry note in their 2003 report on municipal cost recovery: *"waste is viewed as being a low expenditure priority"* (CASE, 2003:42). This is confirmed by the Department of Environmental Affairs (DEAT, 2007:67) in their assessment of the status of waste service delivery and capacity at the local government level: *"Waste is not recognised as a priority service and typically gets allocated the left over budget after electricity, water, roads etc. Waste management is not recognised as a priority service by Municipal Councils who are responsible for budget allocations."* This lack of priority is resulting in failing waste management services which impacts negatively on both environmental and human health (Oelofse and Godfrey, 2008).

"The level of governmental capacity in the field of waste management is generally extremely limited. This lack of capacity within government, and (to a lesser extent) within the private sector, has resulted in waste management generally being regarded as a low priority issue." (DEAT, 1999b:6).

Waste management was also found to be of generally low priority by society. Research undertaken by Phiri (2007) showed that waste management ranked eighth out of 11 quality of life aspects, with factors such as education, employment, health, accommodation, public safety, energy and transport seen to be of higher priority. This priority is confirmed by Ball (2006) who noted that basic needs such as water, food, shelter, roads, material possessions, electricity, and sewage typically precede the human need for waste management. *"Waste management seldom has a priority of higher than fifth place. Consequently, waste management is also usually relegated to a relatively low priority with regard the attention it receives"* (Ball, 2006:3).

This low priority afforded to waste creates little incentive for waste companies or municipalities, to perform or comply with the requirements and expectations of important stakeholders, such as national government.

6. CONCLUSIONS

A lack of capacity, and in particular human resource capacity, is recognised as a current challenge to waste management in South Africa. Building South Africa's knowledge base through training and education programmes has been identified as a mechanism to improve the way in which waste is managed, by changing the behaviour of those persons responsible for managing waste within municipalities and private waste companies. This paper reviews whether building capacity can lead to an improvement in the way that waste is managed in South Africa. The Theories of Planned Behaviour and Process of Learning provide a theoretical framework against which to evaluate this research question. According to theory, building new knowledge (human resource capacity) through a process of learning has the potential to impact upon behavioural, normative and control beliefs, and in so doing, influence behavioural intention and ultimately action. The main aim of capacity building is to increase a person's knowledge (ability) so as to make them more capable of completing the behaviour (control beliefs), thereby giving them more control over their behavioural intention.

There is no doubting that building the capacity of those individuals responsible for the management of waste in South Africa, through training and education programmes, is imperative to improved levels of service delivery. However, research conducted in South Africa shows that building knowledge is not always sufficient for resultant action. While a person may want to apply their newly acquired knowledge through improved waste management practices, their behaviour is subject to societal and organisational factors, which may make it difficult for them to translate behavioural intention into action. Behaviour is not always completely under a person's volitional control. Building capacity is only one of three necessary components of behavioural intention. As such it is a necessary but insufficient condition for changing the way in which waste is managed in South Africa.

Evidence suggests that much can still be done by government, the waste sector and society to address the other two components of the Theory of Planned Behaviour – behavioural beliefs and normative beliefs. The current perception of there being a lack of consequence for legislative non-compliance (behavioural beliefs) and the low priority afforded to waste, particularly within municipalities, (normative beliefs) is believed to impact significantly on the way in which waste is managed in South Africa. Weakened behavioural and normative beliefs in this way undermine the behavioural intentions of those persons tasked with managing waste, ultimately impacting upon the desired behaviour (**Figure 4**). While the recently promulgated Waste Act provides a legislative platform from which to do this, focusing on improved capacity alone will not have the desired outcome of improved waste behaviour in South Africa.

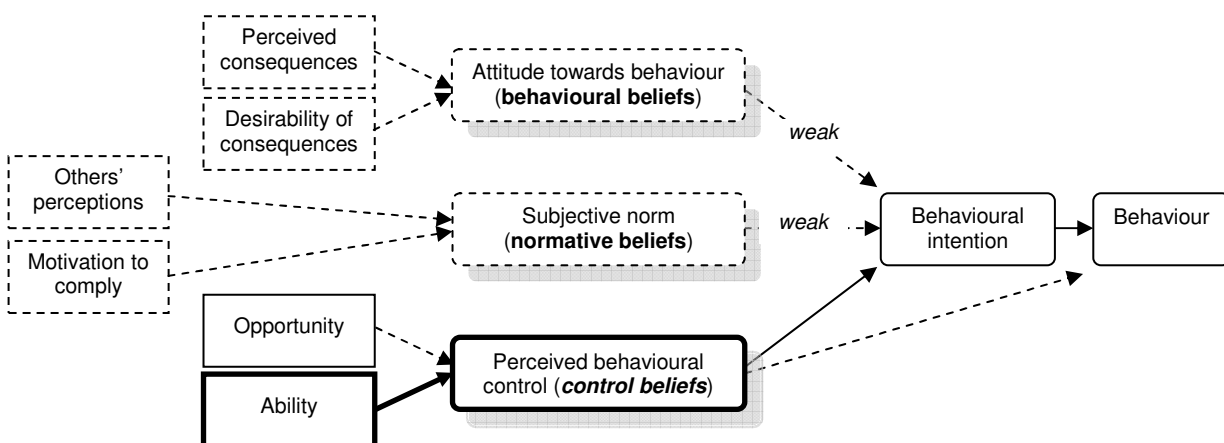


Figure 4. The impact of weakened behavioural and normative beliefs on desired behaviour

Strengthening behavioural and normative beliefs which provide a sense of consequence, importance and social pressure to comply, can be achieved by government taking a strong position on the importance of waste management and non-compliance. This could be achieved through strong policy statements and increased waste awareness, which would be further supported by ongoing development of human resource capacity.

ACKNOWLEDGEMENTS

The authors would like to thank the representatives of all municipalities and private companies who gave of their time to participate in this study. The CSIR is acknowledged for financially supporting this research.

REFERENCES

- Allee, V. (1997). *The knowledge evolution: Expanding organizational intelligence*. Boston: Butterworth-Heinemann.
- Allee, V. (2003). *The future of knowledge: Increasing prosperity through value networks*. New York: Elsevier Science.
- Ajzen, I. and Fishbein, M. (1973). Attitudinal and normative variables as predictors of specific behaviours. *Journal of Personality and Social Psychology*, 27(1):41-57.
- Ajzen, I. (1985). *From intentions to actions: A theory of planned behavior*. In Action control: From cognition to behaviour. Edited by Kuhl, J and Beckman, J. Heidelberg: Springer-Verlag.
- Ajzen, I. (1991). *The theory of planned behaviour*. *Organizational Behaviour and Human Decision Processes*, 50:179-211.
- Ball J. (2006) *Waste management in developing Countries: seven characteristics and seven principles* In: Proceedings WASTE 2006. Sustainable Waste and Resource Management pp 687-96.
- Barr, S. (2007). Factors influencing environmental attitudes and behaviors. A UK case study of household waste management. *Environment and Behaviour*, 39(4): 435-473.
- Bosman, C. and Boyd, L. (2008). *Environmental compliance for local government – challenges and solutions for the South African situation*. WasteCon 2008, Durban International Convention Centre, South Africa, 7-9 October 2008.
- Chung, S.S. and Leung, M.M. (2007). The value-action gap in waste recycling: The case of undergraduates in Hong Kong. *Environmental Management*, 40(4): 603-612.
- Community Agency for Social Enquiry (CASE). (2003). Municipal cost recovery in four South African municipalities. CASE: Braamfontein
- Department of Cooperative Governance and Traditional Affairs (COGTA). (2009). Local government turnaround strategy. Pretoria: Government Printers.
- Department of Environmental Affairs and Tourism. (1999a). National waste management strategy. National waste management strategies and action plans, South Africa. Strategy formulation phase. Version D, 15 October 1999.
- Department of Environmental Affairs and Tourism. (1999b). National waste management strategies and action plans South Africa. Action plan for capacity building, education, awareness and communication. Pretoria: DEAT.
- Department of Environmental Affairs and Tourism. (2006a). Implementation plan for the transfer of the waste permitting function. Final report, February 2006. Pretoria: DEAT.
- Department of Environmental Affairs and Tourism. (2006b). South Africa Environment Outlook. A report on the state of the environment. Pretoria: DEAT.
- Department of Environmental Affairs and Tourism. (2006c). National Waste Management Strategy Implementation. Overall Capacity Development Report. October 2006. Pretoria: DEAT.
- Department of Environmental Affairs and Tourism. (2006d). National Waste Management Strategy Implementation. Employee Induction Programme for the Chief Directorate: Pollution and Waste Management. October 2006. Pretoria: DEAT.
- Department of Environmental Affairs and Tourism. (2007). Assessment of the status of waste service delivery and capacity at the local government level. Pretoria: DEAT
- Department of Environmental Affairs and Tourism. (2009). Addressing challenges with waste service provision in South Africa. Waste sector challenges and vision report. Pretoria: DEAT
- Department of Water Affairs & Forestry (1998). Waste Management Series. Minimum Requirements for Waste Disposal by Landfill, Second Edition. Pretoria: DWAF.
- Engledow, S. and Groenens, E. (2008). Provincial integrated waste management plans and cooperative governance. In: Proceedings of the WasteCon 2008, Durban International Convention Centre, South Africa, 7-9 October 2008.
- Fishbein, M., Triandis, H.C., Kanfer, F.H., Becker, M., Middlestadt, S.E. and Eichler, A., (2001). Factors influencing behavior and behavior change. In: Health Psychology. Edited by Braum, A., Revenson, T.A. and Singer, J.E. Mahwah, Lawrence Erlbaum Associates.
- Fransson, N. and Gärling, T. (1999). Environmental concern: Conceptual definitions, measurement methods, and research findings. *Journal of Environmental Psychology*, 19: 369-382.
- Gardner, G.T. and Stern, P.C. (1996). *Environmental problems and human behaviour*. Boston: Allyn and Bacon.
- Godfrey, L. and Dambuza, T. (2006). Integrated Waste Management Plans – A useful management tool for Local Government or a bureaucratic burden? WasteCon 2006 Biennial International Waste Congress and Exhibition, Somerset West, Cape Town, South Africa, 5-8 September 2006.
- Godfrey, L. (2007). *Ecosystem governance and the triologue debate: An overview of the triologue relationship and the engagement along interfaces*. In Governance as a Triologue: Government – Society – Science in Transition. Editors: Turton, A.R., H.J. Hattingh, G. Maree, D.J. Roux, M. Claassen, and W.F. Strydom. Berlin: Springer Verlag.

- Godfrey, L. (2008). Facilitating the improved management of waste in South Africa through a national waste information system. *Waste Management*, 28(9): 1660–1671.
- Godfrey, L. and Nahman, A. (2008). *Are economic instruments the solution to sustainable waste recycling in South Africa?* Proceedings of the WasteCon 2008 Biennial International Waste Congress and Exhibition, Durban, South Africa, 6-10 October 2008.
- Godfrey, L. and Oelofse, S. (2008). *A systems approach to waste governance – unpacking the challenges facing local government.* Proceedings Waste 2008: Waste and Resource Management – a Shared Responsibility, Stratford-upon-Avon, Warwickshire, England, 16-17 September 2008.
- Godfrey, L. and Scott, D. (in press). Improving waste management in a developing country through a process of learning: The South African Waste Information System. *Journal of Waste Management and Research*.
- Global Development Research Centre (GDRC) (2007). Defining capacity building. Available from <http://www.gdrc.org/uem/capacity-define.html> (Accessed 7 May 2010).
- Keating, M. (1993). Agenda for Change: A Plain Language Version of Agenda 21 and Other Rio Agreements. Centre for Our Common Future, Geneva
- Kollmuss, A. and Agyeman, J. (2002). Mind the gap: why people act environmentally and what are the barriers to pro-environmental behaviour? *Environmental Education Research*, 8(3): 239-260.
- London, L. and Rother, H-A., 2000. People, pesticides, and the environment: Who bears the brunt of backward policy in South Africa? *New solutions: A journal of environmental and occupational health policy*, 10(4):339-350.
- Lukey, P.J., Brijlall, A. and Thooe, M., 2004. Gearing-up for efficient and effective pollution and waste management enforcement. Biennial Congress of the Institute of Waste Management of Southern Africa, WasteCon 2004, 11-15 October 2004, Sun City, South Africa.
- Miller, W.L. and Morris, L. (1999). Fourth generation R&D. New York: John Wiley & Sons Inc.
- Mosler, H.J., Tamas, A., Tobias, R., Rodriguez, T.C. and Miranda, O.G. (2008). Deriving interventions on the basis of factors influencing behavioral intentions for waste recycling, composting, and reuse in Cuba. *Environment and Behavior*, 40(4): 522-544.
- Municipal Demarcation Board (MDB). (2008). National report on local government capacity: District and Local Municipalities. MDB Capacity Assessment Period 2007/2008, March 2008, Version 2. Available from http://www.demarcation.org.za/powers_functions2007/index_new.html (Accessed 22 August 2008).
- Oelofse, SHH and Godfrey, L. (2008). Towards improved waste management services by local government – A waste governance perspective. CSIR Conference 2008.
- Oom Do Valle, P., Rebelo, E., Reis, E. and Menezes, J. (2005). Combining behavioural theories to predict recycling involvement. *Environment and Behavior*, 37(3): 364-396.
- Pfeffer, J. and Sutton, R.I. (2000). The knowing-doing gap: How smart companies turn knowledge into action. Boston: Harvard Business School Press.
- Phiri, A. (2007). *Quality of life*. Draft unpublished PhD Thesis. Pretoria: Tshwane University of Technology.
- Republic of South Africa. (1989). Environment Conservation Act, Act 73 of 1989. Pretoria: Government Printers
- Republic of South Africa. (1996). Constitution of the Republic of South Africa. Act 108 of 1996. Pretoria: Government Printers.
- Republic of South Africa. (1998). Local Government: Municipal Structures Act, Act 117 of 1998. Pretoria: Government Printers.
- Republic of South Africa. (2000). White paper on integrated pollution and waste management for South Africa. A policy on pollution prevention, waste minimisation, impact management and remediation. Government Gazette Vol. 417, No.20978, 17 March 2000. General Notice 227 of 2000.
- Republic of South Africa. (2008). National Environmental Management: Waste Act, Act 59 of 2008. Pretoria: Government Printers.
- SabinetLaw. (2009). Municipalities a problem on waste sites, says DEAT. Parliamentary Portfolio Committee on Water and Environmental Affairs. Available from: <http://www.sabinetlaw.co.za/environmental-affairs-and-water/articles/municipalities-problem-waste-sites-says-deat> [Accessed 15 October 2009].
- Seeliger, L., van der Westhuizen, C. and van Zyl, A., 2003. Budgeting for long-term sustainability of the economy: Building capacity in the Department of Environmental Affairs and Tourism. Available from: <http://www.essa.org.za/download/papers2003.htm>. [Accessed 31 March 2006].
- United Nations Development Programme (UNDP) (2003). National human development report 2003. Available from: www.undp.org.za/Nhdr2003/chap06.pdf. [Accessed, 10 March 2006].
- Van Birgelen, M., Semeijn, J. And Keicher, M. (2009). Packaging and proenvironmental consumption behavior. Investigating purchase and disposal decisions for beverages. *Environment and Behavior*, 41(1): 125-146.
- Weiss, J.A. (2002). Public Information. In: The Tools of Government. A guide to the new governance. Editor: Lester M Salamon. Place: Oxford University Press, 2002.
- World Customs Organization (WCO). (2003). 'Capacity building in customs', June, WCO, Brussels, Belgium.