



Qualitative Segmentation vs. Quantitative Segmentation in a Water Use Market: A Cost Benefit Approach

Author

Ibrahim, Ali

Published

2018-08

Thesis Type

Thesis (PhD Doctorate)

School

Dept of Marketing

DOI

[10.25904/1912/2280](https://doi.org/10.25904/1912/2280)

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Qualitative Segmentation vs. Quantitative Segmentation in a Water Use

Market: A Cost Benefit Approach

Ali Ibrahim

Master of Administration MPA, Kennesaw State University
Bachelor of Administration, Yarmouk University

Department of Marketing
Social Marketing @ Griffith
Griffith Business School
Griffith University

*Submitted in fulfilment of the requirements for the degree of
Doctor of philosophy*

August 2018

Abstract

Attention has been directed towards audience segmentation due to the added value that it may deliver to a social marketing program. Segmentation offers one means to better utilise limited resources to enhance reach in groups most at need in social marketing projects. While the importance of segmentation is well known, its application in social marketing practice remains limited, and research considering different segmentation approaches is inadequate. In this social marketing project, qualitative and quantitative segmentation approaches were specifically applied to the water use market of residents in the United Arab Emirates. In addition, this project critically evaluated qualitative and quantitative segmentation approaches using cost benefits analysis from the perspective of executive decision makers. Three studies were conducted. First, a qualitative study was conducted using focus groups with participants representative of the water use market of the UAE. The purpose of this study was to segment the water use market using a qualitative approach and generate insights into factors that influence water consumption behaviours. The qualitative study identified four distinct segments on two segmentation bases: participants' habits and beliefs. These segments were characterised as (1) comfort users; (2) careless users; (3) contradictory users; and (4) price sensitive users. This study further identified factors that influence residents' water consumption behaviour such as education, accessibility and restrictions, technology, and pricing. In the second study, survey data were gathered to segment the water use market using a quantitative approach. A sample of 1,350 respondents was obtained (875 online, and 475 paper survey). Two-step cluster analysis was employed to segment the water use market based on 19 segmentation variables drawn from demographic, geographic, psychographic, and behavioural bases. A new, augmented model of the Theory of Interpersonal Behaviour (TIB) was used to guide the quantitative segmentation study. This model incorporated newly identified constructs such as religiosity,

policy, price, and accessibility in addition to TIB's main constructs (awareness/knowledge, attitude, facilitating factors, social norms, emotions, habits). Three main segments were generated based on the main criterion of the participants' consumption habits, namely (1) normal users (25% of the total sample, who shared the characteristics of low income, single, living with family, good attitude, low emotional affect, and low water consumption habits); (2) conscious users (half of the sample, characterised by high income, high education level, living inside the campus, high attitude and emotion, religiosity, and average consumption habits); and (3) careless users, characteristically young single students living in campus dormitories, having good attitudes, influenced by friends, and consuming large amounts of water. In the third formative study, semi-structured interviews were conducted to capture executives' opinions on the more effective segmentation approach to the water use market in an assessment of the costs and benefits of qualitative and quantitative methods. Results indicated that decision makers found the quantitative, over the qualitative, segmentation approach offered greater accuracy in segmentation, and deeper insights about the characteristics of each segment, which, in generating segments for a larger pool of participants, justified its higher cost. This social marketing project makes several theoretical, contextual, and method contributions. It employed an augmented model of the TIB in the field of social marketing by adding new constructs, such as religiosity, and identified the degree to which the TIB constructs explained the variance in water consumption behaviour within a defined community. Furthermore, social marketing principles were utilised in a developing country (the UAE) applying and assessing a qualitative approach to market segmentation and empirically evaluating data-driven segmentation that provided insights into the influencing factors of water consumption behaviours for differentiated segments. Lastly, this research imported a managerial tool,

cost benefit analysis, to evaluate the efficacy of qualitative vs. quantitative segmentation approach contributing to executives' decision-making capabilities.

Statement of originality

I declare this work has not previously been submitted for a degree or diploma in any university. To the best of my knowledge and belief, the thesis contains no material previously published or written by another person except where due reference is made in the thesis itself.

Ali Ibrahim

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List of abbreviations:

- AASM: Australian Association of Social Marketing
- AED: “local currency” United Arab Emirate Dirham.
- CBA: Cost Benefit Analysis
- ESMA: European Social Marketing Association
- GCC: Gulf Country Club
- HBM: Health Belief Model
- ISMA: International Social Marketing Association
- NSMC: National Social Marketing Centre
- PMT: Protection Motivation Theory
- ROI: Return on Investment
- SEM: Structured Equations Modelling
- SEQ: South East Queensland
- TIB: Theory of Interpersonal Behaviour
- TPB: Theory of Planned Behaviour
- TRA: Theory of Reasoned Action
- UAE: United Arab Emirates
- UN: United Nations
- UOS: University of Sharjah
- WHO: World Health Organization

Acknowledgments

Successfully completing a PhD degree program is never a lonely endeavour. I would never have completed this long and incredible journey, with all its difficulties and hardships, without the blessing and the help of my Almighty God.

In this long journey, I have had many wonderful people in my life that supported and encouraged me in so many ways. These three years have also given me some of the happiest times and most precious memories of my life.

Firstly, heartfelt thanks go to my wonderful wife Wegdan, and my four beautiful children Samah, Hajar, Adam, and Nora for their support, encouragement, and love. I am forever grateful to all of them for supporting me emotionally. I would like to acknowledge my supervisors who have each in their own way played a significant role. My supervisors Professor Sharyn Rundle-Thiele and Dr. Kathy Knox both deserve enormous thanks for their roles in raising my research standards and skills and encouraging me always and especially when I felt discouraged. I hope that one day I will be able to assist and encourage students as she has me, and contribute in the academic area.

I would also like to acknowledge the other supervisors' Dr, Denni Arli, and my latent supervisor Dr, Bo Bang for their unlimited support and the useful discussions and comments with their research experience.

There are numerous other parties who deserve thanks and these include my colleagues and reviewers. Numerous reviewers of various submissions from my PhD research also deserve mention as their constructive comments assisted in the evolution of this dissertation. Thank you to Ms Penelope Ralph for editing and proofreading assistance.

Thank you all.

Acknowledgment of Papers included in this Thesis

PAPERS INCLUDED IN THIS THESIS ARE CO-AUTHORED

Section 9.1 of the Griffith University Code for the Responsible Conduct of Research (“Criteria for Authorship”), in accordance with Section 5 of the Australian Code for the Responsible Conduct of Research, states:

To be named as an author, a researcher must have made a substantial scholarly contribution to the creative or scholarly work that constitutes the research output and be able to take public responsibility for at least that part of the work they contributed. Attribution of authorship depends to some extent on the discipline and publisher policies, but in all cases, authorship must be based on substantial contributions in a combination of one or more of:

- conception and design of the research project
- analysis and interpretation of research data
- drafting or making significant parts of the creative or scholarly work or critically revising it so as to contribute significantly to the final output.

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- include in the list of authors only those who have accepted authorship
- appoint one author to be the executive author to record authorship and manage correspondence about the work with the publisher and other interested parties.

- acknowledge all those who have contributed to the research, facilities or materials but who do not qualify as authors, such as research assistants, technical staff, and advisors on cultural or community knowledge. Obtain written consent to name individuals.

Included in this thesis is the paper constituting Chapter 5 which is co-authored with other researchers. My contribution to each co-authored paper is outlined at the front of the relevant chapter. The bibliographic details (if published or accepted for publication)/status (if prepared or submitted for publication) for these papers including all authors, are:

Chapter five: Published 20/11/2017, Social Marketing Quarterly.

Chapter six: Under review 09/07/2018, Journal of Business Research.

Chapter four: Under review 05/08/2018, Journal of Strategic Marketing.

Appropriate acknowledgements of those who contributed to the research but did not qualify as authors are included in each paper.

Asi Ibrahim

PhD Specific Publications

Journal Papers published and under review.

Ibrahim, A., Knox, K., Rundle-Thiele, S., & Arli, D. (2017). Segmenting a Water Use Market: Theory of Interpersonal Behavior Insights. *Social Marketing Quarterly*, 1524500417741277.

Ibrahim, A., S., Rundle-Thiele., & Knox, K., (2018). The relative merit of two segmentation approaches: Executives views and a cost-benefit analysis. *Journal of Business Research*. (under review)

Ibrahim, A., S., Rundle-Thiele., & Knox, K., (2018). Working within resource constraints: A qualitative segmentation study. *Journal of Strategic Marketing*. (under review)

Conference paper

Ibrahim, A., Rundle-Thiele, S. (2016), International social Marketing (ISM). Water Consumption Behaviour in the UAE: A Social Marketing Study.

Scholarships

Griffith University International Postgraduate Research Scholarship for PhD.
Griffith University Postgraduate Research Scholarship for PhD.

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Chapter one: Introduction

1.1 Background

In recent decades protecting the natural environment from the damaging effects of human activity has become an increasingly important concern for governments, the scientific community, media, politicians, communities and individuals (Berry, 2013; Goudie, 2018). Serious attention has been given to environmental issues such as global warming, pollution, ozone depletion and scarcity of fresh water (Ehler, 2018; Omer, 2008). Since most forms of environmental damage result from human behaviour, new disciplines have taken an interest in promoting environmentally sustainable patterns of behaviour within societies (Fazey et al., 2018; Oskamp, 2000). Water security remains one of the world's greatest concerns with many countries facing the prospect of more severe and prolonged drought due to climate change and lower rainfall. More than a billion people around the world suffer from insufficient access to fresh water (Kahl, 2018). According to UN-Water (2013), by 2025, 1.8 billion people will be living in countries with water supply scarcity, and 70% of the world's population will be under fresh water stress.

Recent research suggests attention must be given to attitudes and behaviours towards water to increase social awareness of water conditions (Cheng, Kotler, & Lee, 2011) and to change individual behaviour (e.g. reducing water consumption). In Australia, for example, as a result of the efforts by government and local authorities, people are beginning to genuinely value water as a precious resource (Heltberg, Siegel, & Jorgensen, 2009). A large reduction in household water use in Southern/South East Queensland (Beal, Stewart, Huang, & Rey, 2011; Willis, Stewart, Giurco, Talebpour, & Mousavinejad, 2013), for instance, was achieved

through rebate programs established by both state and local governments in a time of severe drought to support household installations of water efficient fixtures and rainwater tanks, along with enforced water restrictions. Worldwide, demand management of water is based on strategies such as pricing, restrictions and water conservation education (Jorgensen, Graymore, & O'Toole, 2009), which have shown variable effects in terms of changing public behaviour towards water consumption (Arbués, Villanúa, & Barberán, 2010; Olmstead & Stavins, 2009). For example, Syme, Nancarrow, and Seligman (2000) identified a 10-25% reduction in water consumption following participation in educational programs. Randolph and Troy (2008) found that water use restrictions can deliver short term impacts.

The Arabian Gulf is one of the harshest environments in the world due to high temperatures and low precipitation (Haque, Al-Khaiat, & John, 2007). In the Gulf state of the United Arab Emirates, for example, the average rainfall varies from 60 mm to 160 mm per year; in 1999-2000 the country had only 7 mm of rainfall (Murad, Al Nuaimi, & Al Hammadi, 2007). Furthermore, high population growth in addition to strong economic development is, over the decade 2010-2020, increasing water demand by 50% (Cordesman, 2018; Mohamed & Al-Mualla, 2010). Therefore, in an attempt to deliver sufficient quantities of water to meet growing demand, the UAE government has increased the country's reliance on large-scale desalination plants, notwithstanding the high associated cost of US\$3.21B (Szabo, 2011a). Water restrictions and water saving measures have also been imposed by the state to manage demand and ensure the conscious use of water across residential, commercial and industrial sectors. Despite recent restrictions and water savings measures, however, the rate of water consumption in the UAE remains one of the highest in the world. The average consumption of water per capita is 550 litres a day, which is around 82%

above the global average (Reporter, 2016a; Szabo, 2011a). Szabo (2011a) found that 57% of residential water consumption can be attributed to luxury lifestyles, absence of conservation measures, and a lack of awareness of water scarcity in the country. Therefore, there is a need to understand residents' water consumption behaviour patterns, attitudes, knowledge/awareness, emotions, and beliefs relating to water. Furthermore, this study seeks to gain insights into the factors that might influence the water use market in a sample of UAE population. In order to segment the target audience, and to design an effective marketing mix to target each segment.

1.2 What is water conservation?

Atkins, Hamilton, and Swain (2003 p.45) define water conservation as “*activities designed to reduce the demand for water, improve the efficiency of its use, and reduce losses and waste*”. Similarly, the U.S. Water Resources Council (Council, 1983) defines water conservation as activities designed to reduce water demand; improve efficiency of usage and reduce losses and water waste; and improve land management practices for water conservation. Scholars have proposed that attention should be given to individual water conservation behaviour by increasing individuals' awareness of ways of saving water (Fazey et al., 2018). This understanding has a practical application in social marketing, and insights generated could be used to encourage individuals to change their personal consumption behaviour and help them to establish water saving as a habitual behaviour. Furthermore, individuals need to take personal responsibility for the use of water (Sarabia-Sánchez, Rodríguez-Sánchez, & Hyder, 2014).

The literature affirms that water conservation can be achieved through encouraging citizens to reduce their water consumption (Hurlimann & Dolnicar,

2010; Sáiz, Maldonado, & García, 2010). Since the UAE's population continues to grow, and is expected to become wealthier, one of the serious challenges for its government will be how to manage the scarce and diminishing water supply as demand continues to grow (Fishman, 2011). One of the UAE's strategic choices for achieving sustainable and long-lasting water conservation behaviour is to use social marketing. Lee and Kotler (2011) define social marketing as "*a process that uses marketing principles and techniques to influence target audience behaviours that will benefit society, as well as the individual. This strategically oriented discipline relies on creating, communicating, delivering, and exchanging offerings that have positive value for individuals, clients, partners, and society at large*". Application of strategic social marketing is, however, absent in the UAE in relation to water use market behaviour.

1.3 Rationale for the study

The need for reduced water consumption behaviour derives from the fact that excessive water consumption, combined with water scarcity, will cause manifest present and future problems. Research institutions and the literature recognise the need to adopt water reduction behaviours and water conservation measures (Fazey et al., 2018; Hurlimann & Dolnicar, 2010), given that promoting individual behaviour change can be cheaper than building expensive fresh water production infrastructure. To reduce consumption, residents' behaviour must change, and if residents adopt the most efficient conservation behaviour, this newly adopted behaviour will have benefits at both personal and community levels (Andreasen, 2002). Further, to gain insight into facilitators and barriers to the social marketing goal of changing behaviour, this social marketing project has been designed to answer RQ2: What are

the facilitators and barriers that might influence the water consumption behaviour of UAE residents? For example, the tough measures that were taken in drought-ravaged South East Queensland (SEQ), when the region was faced with having no or not enough water, highlight the impact that behavioural change interventions can have on reducing water consumption (Fazey et al., 2018; Goudie, 2018). Of further interest, the changes made from 2003-2007 during the drought have been shown to have endured in the long term with SEQ residents using less water still in 2010, by taking shorter showers, installing dual flush toileting systems, and changing clothes washing practices, providing a case study of social marketing's effectiveness in delivering change for the better that lasts over time (Dolnicar & Hurlimann, 2010).

Social marketing has been recognized as a credible behaviour change discipline and has been widely adopted to foster social change (Rundle-Thiele, Kubacki, Tkaczynski, & Parkinson, 2015; Truong, 2017). Social marketing programs have tackled societal issues in the range from condom use, malaria, child survival, maternal health, lifestyle-related health issues, smoking, alcohol and substance abuse, diet and physical activity (Kennedy, 2016; Lefebvre, 2011), to transport and environmental concerns (Beachcroft-Shaw & Ellis, 2018). Social marketing has similarly been used to tackle water consumption behaviour (Beachcroft-Shaw & Ellis, 2018; Whitmarsh & O'Neill, 2010). Jespersion (2005) indicated that a social marketing program in Florida, USA was able to convince people that they are part of the solution rather than part of the problem by using positive messaging. Research by Lowe, Lynch, and Lowe (2014) in South-Eastern Australia, has indicated that water consumption was reduced to a long-lasting, sustainable level through a successful social marketing campaign. Furthermore, Lowe, Lynch, and Lowe (2015) found in a regional city in Australia that in the absence of restriction mechanisms, social

marketing programs significantly reduced household water consumption. Social marketing studies have, as well, explored the influences on water consumption behaviour; an Australian study, for example, illustrated that law, education, public discourse, and marketing can shift water consumption behaviour to more efficient usage (Phipps & Brace-Govan, 2011).

All of the studies above dealt with their target market as one (a total market); according to Andreasen (2006), however, dealing with a target audience as one huge unit rarely makes economic or tactical sense. Moreover, doing so challenges the commercial marketing principles that social marketing is grounded upon. Treating the target market as one ignores the differences within the audience, and fails to address the interests and needs of each segment (Aaker, 2008; French, 2017). Further, failing to use segmentation, a core social marketing principle (Andreasen, 2002), may curtail the extent of behavioural change achieved (Carins & Rundle-Thiele, 2014; Xia, Deshpande, & Bonates, 2016).

In order to enhance the viability of social marketing programs, program developers should deliver their programs to directly meet the needs and wants of the target audience (Andreasen, 2012). By developing targeted strategies (marketing mix) that are closely aligned to different needs and wants, social marketers can increase their return on investment (ROI) (Hastings, Stead, & Webb, 2004). One of the most important strategies that can be used to optimise resources to reflect differences within markets is application of a market segmentation strategy (Andreasen, 2012).

Each stakeholder has expectations and goals to be achieved from a social marketing program (Andreasen, 2012), yet inclusion of stakeholders in social marketing practice is rare, limiting social marketing program outcomes (Buyucek, Kubacki, Rundle-Thiele, & Pang, 2016). To reinforce positive outcomes and

consequences associated with the behaviour change that, from stakeholder perspectives, is the aim of social marketing programs, social marketers need to present an evidence base to stakeholders that would demonstrate the extent to which available resources time, money, and expertise have been used efficiently (Hoeffler & Keller, 2002). Thus, managerial evaluation approaches such as cost benefit analysis (CBA), and calculating the ROI of social marketing programs can be used by social marketers to enhance program implementation for stakeholders (Maignan, Ferrell, & Ferrell, 2005). This thesis applied CBA to evaluate two segmentation approaches, namely qualitative and quantitative segmentation approaches, to understand the relative merit of two segmentation approaches from executives' perspectives and ascertaining the costs and benefits of each approach.

1.4 Social marketing and segmentation

The segmentation process helps to provide a clear understanding about target audience needs and wants, to refine resource allocation, and to increase social marketing program effectiveness (Dolnicar, Grün, & Leisch, 2016). French and Gordon (2015a) insisted that social marketers can add real value to programs by applying segmentation to better meet the needs and wants of the target audience. Compared to commercial marketing, however, social marketing may be considered backward in applying market segmentation. Several reviews, as summarised in Table 1, have indicated that segmentation is seldom applied. Kubacki, Rundle-Thiele, Pang, and Buyucek (2015), for example, found that only two (9%) of 23 of social marketing interventions aiming to minimise harm from alcohol consumption applied segmentation, while Fujihira, Kubacki, Ronto, Pang, and Rundle-Thiele (2015) reviewed seven physical activity social marketing interventions targeting adults aged 60 years and over and identified only three interventions (43%) of seven that had

applied segmentation. In Dietrich, Rundle-Thiele, and Kubacki (2017) umbrella review, a total of 93 social marketing interventions were considered, of which only 15 (16%) interventions had used segmentation.

Table 1: Social marketing intervention using segmentation

Review	Total number of interventions	Interventions reporting segmentation
Interventions aiming to minimise harm from alcohol consumption (Kubacki et al., 2015a)	23	2 (9%)
Interventions targeting children under the age of 12 years (Kubacki et al., 2015b)	23	2 (9%)
Interventions using digital channels for engagement (Kubacki et al., 2015c)	20	8 (40%)
Physical activity interventions targeting adults 60 years and over (Fujihira et al., 2015)	7	3 (43%)
Interventions to improve healthy eating behaviour (Carins & Rundle-Thiele, 2014)	20	0
TOTAL	93	15 (16%)

Source: (Dietrich et al., 2017).

Evidence from reviews of social marketing literature suggests that segmentation remains under-utilised. Therefore, this project directs attention to segmentation, applying qualitative and quantitative segmentation approaches in a water use market. Furthermore, this project applied cost benefit analysis to evaluate the two approaches to segmentation and compares CBA results with the views of executives (as key decision-making stakeholders). Finally, this project looked at the factors and facilitators that might influence water consumption behaviour among different segments identified in the study's sample. The better understanding of the

water consumption behaviours patterns and characteristics of these different segments reached as a result of segmentation could inform design of a subsequent water use social marketing program.

Limited use of segmentation is not the only social marketing principle that is under-represented in research and practice. The greater use of social marketing principles is warranted given that behaviour change is more likely when more of the social marketing principles are applied (Carins & Rundle-Thiele, 2014; Xia et al., 2016). The role of theory in social marketing practice is next discussed.

1.4 Social marketing and theory application

The National Social Marketing Centre (NSMC) (2011, p. 53) stated that theory provides “*a structure or a road map to guide your examination of the behaviours you are dealing with*”. In social marketing, theory should help to explain, predict, and guide intervention design and reporting processes. As Luca and Suggs (2013) argue, using theory in social marketing interventions should “*help social marketers identify whether a particular behaviour is determined primarily by attitude, normative, self-efficacy, environmental or other social considerations, or a combination of these and then to design the marketing mix to address there determinants*” (p. 21). The use of theory use is not, however, common in social marketing. Lefebvre (2011) found the evidence of using theory in social marketing interventions to be limited. Luca and Suggs (2013) systematic review of theory use in social marketing found insufficient reporting of theory and model application in social marketing programs. Similarly, Truong (2017) conducted a review of 143 social marketing interventions and of those found that only 33 (23%) reported theory or model use.

Social marketing is generally tardy in applying theory consistently (Truong, 2014). Luca and Suggs (2013) advocate for theory to be used as a framework for any scientific social marketing project, and to report theory used throughout the entire social marketing process. Theories applied in social marketing have mainly been grounded in sociology and psychology disciplines, (Dearing, 2009). Lefebvre (2001) found the Theory of Planned Behaviour (TPB) (Ajzen & Madden, 1986) to be the most commonly used theory in social marketing, with The Theory of Reasoned Action (TRA) (Fishbein, 1975) the second most frequently adopted. In general, social marketers used behavioural theories such as ‘cognitive decision models’ to predict outcomes and explain relationships (Donovan & Henley, 2010). Cognitive models have as their basis the original assumption that humans are rational, making decisions after assessing alternatives according to the available information and surrounding circumstances. Other theories and models that have been used, for example the Health Belief Model (HBM) (Rosenstock, 1966) and the Protection Motivation Theory (PMT) (Rogers, 1975), assume a conscious assessment of risk (severity and likelihood). It has been acknowledged that consumer rationality is bounded by various aspects of process and circumstances (Lee, 2011), which suggests that theories and frameworks acknowledging the limits of rational decision making are needed.

A review of the literature suggests the Theory of Interpersonal Behaviour (TIB) has not been applied previously in social marketing literature to explain relationships that pertain in water consumption behaviour (Truong, 2017). The advantage of using the TIB is that this model incorporates both cognitive and non-cognitive elements and assumes a role for habit in any behaviour (Berger & Calabrese, 1975). In this study, an augmented model of the TIB constructs were

introduced and applied to segment the water use market. Further, TIB was used to understand people's behaviour and explain the variance in the relationship between different variables and water consumption behaviour.

1.5 Research questions

Based on existing knowledge in the context of water use markets, consumption behaviours, and application of strategic social marketing, the main aims of this thesis were to:

- 1) Investigate the effectiveness of using qualitative segmentation vs quantitative segmentation approaches to generating distinct segments;
- 2) Identify the barriers and facilitating factors influencing the water consumption behaviour of UAE residents using the TIB model;
- 3) Apply cost benefit analysis (CBA) to compare qualitative and quantitative methods of segmentation; and
- 4) Examine decision makers' views on the costs and benefits of these two approaches to segmentation.

To pursue these objectives within the context of this research, the following research questions were developed:

RQ1: How can qualitative methodology be used to identify managerially useful segments in the context of sustainable water use in the UAE?

RQ2: What are the facilitators and barriers that might influence the water consumption behaviour of UAE residents?

RQ3: Can TIB inform the segmentation process, and explain characteristics of the different segments of the target audiences?

RQ4: What segments are evident in the UAE water use market as determined using two-step cluster analysis?

RQ5:

a- Which of each segmentation approach qualitative vs quantitative is perceived appropriateness more by executives?

b- What are the perceived costs and benefits respectively associated with methodological application of qualitative vs. quantitative segmentation approaches?

Three studies were conducted to answer these research questions developed to address knowledge gaps which together with their relationship to the research process, are set out in Table 2.

Table 2: Research questions rationales

Study	Gaps	Research Questions	Sample	Method
1. Qualitative Segmentation study	A lack of knowledge of the application of qualitative segmentation in social marketing	<i>RQ1: How can qualitative methodology be used to identify managerially useful segments in the context of sustainable water use in the UAE?</i>	UoS community	Focus groups
	A lack of knowledge of the facilitators and barriers that may influence water consumption behaviour	<i>RQ2: What are the factors that might influence water consumption behaviour of UAE residents?</i>	UoS community	
2. Quantitative market segmentation study	Scant application of behavioural theories in social marketing in general, and in market segmentation in particular	<i>RQ3: Can TIB explain and predict water consumption behaviour of the UAE residents?</i>		Survey

	Limited use of two-step cluster analysis to segment a water use market in a social marketing intervention	<i>RQ4: What segments are evident in the UAE water use market as determined using two-step cluster analysis?</i>		
3. Formative study	Limited application of a managerial tool such as cost benefit analysis to compare qualitative vs. quantitative segmentation approaches	<i>RQ5: a-Which of each segmentation approach qualitative vs. quantitative is perceived appropriateness more by executives? b-What are the perceived costs and benefits respectively associated with methodological application of qualitative vs. quantitative segmentation approaches?</i>	UoS executives	Minimax simple matrix approach Semi-structured interview

1.6 Contributions

This thesis makes contributions in three dimensions: the methodological, the contextual, and the theoretical. Methodologically, this thesis offers an application of the qualitative segmentation approach in a water use market within a social marketing context, examining its capacity as a generator of segments. In addition, this thesis provides an empirical evaluation of the efficacy of the quantitative segmentation approach, guided by the theory of TIB, in generating distinct segments. In doing so, this thesis provides insights into the evaluation of qualitative segmentation vs. the quantitative segmentation approaches. To add further rigour to the assessment, this thesis compares the two segmentation approaches from decision makers' perspectives

and applies a cost benefit analysis to contrast the two techniques. These methodological contributions extend the application of the four bases of segmentation – geographic, demographic, psychographic, and behavioural variables into a single quantitative social market segmentation study.

This thesis makes unique contextual contributions by providing insights into the facilitating factors that may influence the water consumption behaviours of this sample of UAE residents, offering a social marketing segmentation study whose aim is to generate distinct segments from a heterogeneous market in Middle Eastern country affected by water resource scarcity, such as the UAE, and gaining actionable insights into environmental perspectives that can be used to develop interventions to change water consumption behaviour, and promote sustainability in cultures outside of a Western context.

Finally, this thesis presents significant theoretical contributions to social marketing by extending the application of an augmented model of the TIB into social marketing. This is demonstrated in the inclusion of new influencer constructs such as religiosity, as well as by categorising facilitating factors in a water use market by price, policy, and restricted accessibility. The new constructs directly address the down-, mid-, and upstream levels of social marketing interventions. Finally, the study tests the efficacy of the augmented TIB model in explaining the variance in water consumption behaviour of UAE residents.

1.6 Summary

Chapter one has overviewed the research topic, identified gaps in the literature pertaining to the use of segmentation and theory in social marketing design and set out the motivations for research that will achieve insight into the water consumption

behaviours of a community in the UAE. The research questions prompted by the aims of the research were presented, and the contributions arising from the research described. Chapter two provides the background to the research, and undertakes a critical analysis of the literature pertinent to this study.

Chapter two: Literature review

2.1 Overview

Chapter two examines water consumption as the context of the current study, noting the limited application of social marketing as an instrument for informing water consumption behaviours apparent in the existing literature. This chapter's critical focus is on segmentation in social marketing, highlighting the importance of this criterion, and then moves to the limited application of behavioural theory in social marketing studies.

2.2 Social marketing objectives and associated measures of success.

Social marketing interventions rely on voluntary compliance rather than legal, economic or coercive forms of power (Kotler, Roberto, & Lee, 2002), in contrast to the methods of other behaviour change disciplines such as law and education. Social marketing has been shown to effectively influence behaviour change (McKenzie-Mohr, 2013). Social marketing may play a critical role in better understanding people's behaviours, beliefs, needs and in developing insights into targeted groups.

Therefore, a more holistic approach that takes account of all facets of the issue at play could improve social marketing program outcomes. Social marketing systems thinking, according to Domegan et al. (2016) is one such holistic view that is an aid to broadening social marketers' views. Systems thinking in social marketing reinforces the field of conventional behavioural change with new concepts and relationships, greater connectivity with target audiences, and deepened understanding of the role that the social and built environments exert on individuals (Domegan et al., 2016). The added value of systems thinking in social marketing arises from its potential to identify how person-environment interrelationships influence the perception of

benefits and barriers in behaviour change programs. Its merit should relate directly to creating a social value for communities and individuals by respecting citizens' views, needs, and willingness or otherwise (French & Gordon, 2015b).

This thesis emphasises the salience of using social marketing in a water use market to gain insights into the habits, beliefs, and behaviour influencing factors operating within each segment as identified. This understanding represents added value available to the design of any future social marketing invention targeting water consumption behaviour, contributing to increased return on program investment. Furthermore, based on the research undertaken for this thesis, recommendations to help social marketers overcome the challenge of gaining sponsors and decision maker support for future social marketing programs have been made. Social marketers can use cost/benefit analyses which include actual (quantified) benefits of social marketing programs, particularly their capacity to change targeted behaviour.

2.3 Implications of social marketing

The potential for social marketing to achieve behavioural change has been demonstrated in a range of fields that embraces complex health, social and environmental problems (Fazey et al., 2018; French & Gordon, 2015a; Grier & Bryant, 2005). The Truth Campaign, from the U.S. state of Florida, for example, succeeded in significantly reducing levels of youth tobacco use and created positive changes in attitudes to smoking and tobacco use susceptibility, compared to the outcomes of interventions in other American states (Peattie & Peattie, 2009). A major study in the UK found evidence that interventions adopting social marketing principles could be effective in reducing problem alcohol consumption (Stead, Gordon, Angus, & McDermott, 2007), and similarly so in promoting healthy eating

(van de Gaar et al., 2014). In the latter case, of 18 studies which sought to increase fruit and vegetable intake, ten had a positive overall effect, six had mixed or moderate effects, one had no effect, and one had negative effects.

Carins and Rundle-Thiele (2014) identified and analysed 34 empirical studies that reported the use of social marketing to address healthy eating. These authors distinguished two social marketing intervention subsets and categorised the studies based on the use of a full marketing mix, as opposed to campaigns that used promotion/communication only. Those studies comprising the first subset (which used a full marketing mix) more fully applied Andreasen's (2002) criteria and significantly, they reported achieving behavioural change more often than the studies in the second subset (Carins & Rundle-Thiele, 2014). A systematic review of 173 social marketing interventions addressing physical activity reported that 92 interventions utilised three benchmarks or social marketing principles. That review further identified that interventions utilizing more benchmarks were more successful than counterpart programs which employed fewer (Xia et al., 2016).

2.4 Social marketing benchmarks

The six-point set of integrated concepts to look for in a behavioural change intervention listed by Andreasen (2002) can be used to ascertain the extent to which social marketing principles have been employed. In the UK, the six points were later expanded into what were termed benchmark criteria by French and Blair-Stevens (2006), as outlined in Table 3.

Table 3: Social marketing benchmark criteria

Criteria	Explanation
1.Sets behavioural goals	Social marketing programs should have a clear focus on behaviour, based on a strong behavioural analysis, and with specific behavioural goals.
2. consumer research and pretesting	Developing a clear understanding of the audience, based on consumer research using data from a variety of source, helps develop a consumer-oriented approach.
3. Makes judicious use of theory.	Programs benefit from being behavioural theory-based, and informed by and drawn from an integrated theoretical framework.
4. Is insight driven	Focus is on gaining a deeper understanding of what moves and what motivates the consumer. Identification of key factors and issues relevant to positively influencing behaviour allows actionable insights to be developed.
5.Applies principles of segmentation and targeting.	Avoiding blanket approaches, segmentation and targeting allows interventions to be tailored to specific audience segments.
6. Makes use of the marketing mix beyond communications	Programs consider the best strategic application of marketing mix consisting of the four Ps – “products”, “price”, “place”, and “promotions”. Other Ps might include “policy change”, or “people”, for example in training intervention delivery agents.
7.Creates attractive motivational exchanges with the target group	Programs consider what motives people to engage voluntarily with the intervention and offers them something beneficial in exchange. The offered benefits may be tangible (e.g. rewards/incentives for participation or making behavioural changes) or intangible (e.g. personal satisfaction, improved health and wellbeing).
8.Addresses the competition to the desired behaviour.	Forces competing with the desired behaviour change are analysed and the intervention considers the appeal of competing behaviour. Strategies that seek to remove or minimise the competition are used.

Source: French and Blair-Stevens (2006)

This thesis will focus on the two major social marketing benchmark criteria of market segmentation and theory use, due to the limited application of these two benchmark criteria in social marketing projects.

2.5 Market segmentation

Market segmentation is the process of clustering individuals or objects with similar characteristics, needs, wants, and behaviours into homogeneous clusters or groups (Dibb, 2017). In the context of social marketing, segmentation involves identifying an understanding of population groups that share common characteristics and behaviour prerequisite to developing a social marketing project targeting specific segments (French, 2017). According to Andreasen (2006), dealing with a target audience as one huge unit rarely makes economic or tactical sense; treatment of a market as an undifferentiated entity challenges the commercial marketing principles upon which social marketing is grounded. Targeting the audience wholly, in a wide perspective, fails to acknowledge the different interests and needs of each unique target group (segment) (Andreasen, 2006). A successful comprehensive social market segmentation process ensures identification of homogenous segments within a larger heterogeneous population, so that one or more target segment(s) can be selected and evaluated. Then, a tailored social marketing program suitable to match the needs and characteristics of the targeted segment(s) can be formulated (Donovan & Henley, 2003). Andreasen (2006) stressed the importance of segmentation and considered it a crucial element in the success of social marketing program planning, implementation, and evaluation.

According to Dolnicar et al. (2016), there is no one best market segmentation approach. The most applicable approach in any given situation depends on at least two factors: (1) the strategic marketing goals of market segmentation that will inform the design of an effective marketing mix; and (2) the quality of the data needed as the basis for the segmentation study.

Segments can be based on one or more variables of demographic, psychographic, geographic, and behavioural categories (Kotler & Roberto, 1989; Tkaczynski, Rundle-Thiele, & Beaumont, 2009). Demographic segmentation bases include social characteristics such as age, ethnicity, income, and gender (Tkaczynski et al., 2009). Psychographic segmentation bases, which encompass geographic and demographic segmentation variables also include those describing individuals' attitudes, values, and their lifestyles (Tkaczynski et al., 2009). Geographic variables classify city, state and regional environments and refine urban, rural, and suburban divisions (Kotler, Armstrong, & Saunders, 2001). Behavioural segmentation bases denote variables such as the benefits sought from, and occurrence and level of behaviour (Dickson, 1982; Tkaczynski et al., 2009).

The market segmentation process is well understood in commercial marketing and, as stated previously, is considered to be a key marketing success factor in both commercial (French, 2017; Weinstein, 1994) and social marketing (Schuster, Kubacki, & Rundle-Thiele, 2015). As in commercial marketing, segmentation in social marketing is considered a necessary tool for intervention success (Donovan & Henley, 2010). The application of segmentation by social marketers can assist social marketers to deliver tailored messages to the differentiated segment(s) of the audience according to their unique needs and wants (Dibb, 2017; Donovan & Henley, 2010). The majority of social marketers segment the target group on the basis of objective or general measures that are readily available from secondary data (Raval & Subramanian, 2004).

The need to segment the target market on more specific measures to improve social marketing strategy effectiveness has been noted (Raval & Subramanian, 2004). Primary data collection efforts permit concurrent generation of audience insights, and

ensures audience-oriented understanding as well as inclusion of the targeted behaviour is included in segmentation analysis (Rundle-Thiele et al., 2015). Table 4 summarises selected social marketing studies that reported using the segmentation criterion based on one or more segmentation bases such as demographic, geographic, psychographic, and behavioural.” Table 4 also notes the theoretical basis of the study where applicable.

Table 4: Interventions & studies using the segmentation criterion

Interventions/studies	Behaviour	Target audience	Theory	Segmentation base			
				Demographic	Geographic	Behavioural	Psychographic
Kitunen, Rundle-Thiele, Kubacki, and Dietrich (2018).	Physical activities	Urban population	No theory	*		*	*
Warner, Chaudhary, Rumble, Lamm, and Momol (2017)	Grass irrigation	USA	**Exchange theory		*	*	*
Dixon-Gray, Mobley, McFarlane, and Rosenberg (2013)	Sexual health	Latinas, 18 to 29 years, born in the US	-	*	*		
Glik, Halpert-Schilt, and Zhang (2001)	Alcohol during pregnancy	Female African American and Latina teenagers	-	*	*		*
Glik, Prelip, Myerson, and Eilers (2008)	Alcohol during pregnancy	Pregnant women	-	*			
Harris, Novalis-Marine, Amend, and Surprenant (2009)	Intimate partner violence	California physicians	-	*	*		
Huhman, Bauman, and Bowles (2008)	Physical activity	Tweens	-	*	*		
Justice-Gardiner, Nutt, Rechis, McMillan, and Warf (2012)	Cancer support	Hispanic cancer survivors	-	*			

Interventions/studies	Behaviour	Target audience	Theory	Segmentation base			
				Demographic	Geographic	Behavioural	Psychographic
Kamada et al. (2013)	Physical activity	Adults (40-79 years)	TARPARE model	*	*		
Keihner et al. (2011)	Healthy eating (and later increased physical activity)	Children 9-11 years	Social Cognitive Theory*	*	*		
Levine et al. (2002)	Healthy eating	Children in kindergarten to 4 years	-	*	*		
Matsudo et al. (2002)	Physical activity	34 million inhabitants of Sao Paulo State	Social Cognitive Theory*		*		
Plourde (2008)	Flu prevention	Floridians	-		*		
Purdy (2011)	Sexual health	Young professionals in Turkey	-	*	*		
Reger-Nash, Bauman, Cooper, Chey, and Simon (2006)	Physical activity	35-65 y/o in McDowell County; 40-65 y/o in Broome County, NY;40-65 y/o in Morgantown; 50-65 y/o in Wheeling	-	*	*		
Rotblatt, Montoya, Plant, Guerry, and Kerndt (2013)	Sexual health	African American, Latina females aged 12 to 25 years	-	*			

Interventions/studies	Behaviour	Target audience	Theory	Segmentation base			
				Demographic	Geographic	Behavioural	Psychographic
Short, Surprenant, and Harris (2006)	Intimate partner violence	Community physicians	-	*	*		

*Theory use reported in the study. **Theory reported guide segmentation

Table 4 shows that only a limited number of studies have used theory, and that most segmentation studies target people according to geographic and demographic bases.

Regardless of the stated benefits of market segmentation, segmentation methods are underrepresented in social marketing programs (Dietrich et al., 2017). Nor, in the context of endeavouring to understand water use behaviour in a residential setting. This thesis tries to bridge this gap in the literature by using functionally different segmentation approaches, namely qualitative and quantitative, based on TIB constructs, and seeks to gain insights into factors that might influence residents' water consumption behaviour, to consideration of the different approaches is needed. Given the limited application of different segmentation approaches within a single social marketing context. For example, a qualitative study conducted in a multicultural Australian community interviewed 79 participants to segment volunteers based on the theory of planned behaviour. Findings indicated the existence of three segments in the volunteer market and that, as a whole, different cultural groups are significantly varied with respect to their attitudes, social norms and perceived behavioural control over volunteering. Non-profit organisations are unlikely to be successful in attracting volunteers from a range of different cultural backgrounds unless they account for heterogeneity among volunteers and customise marketing messages accordingly (Randle & Dolnicar, 2009a). In another quantitative study, an online survey of 848 participants was conducted in Australia with the same volunteer market as noted above. In that instance, two major segments were identified, each with detailed characteristics (Randle & Dolnicar, 2009b). This thesis uses the cost benefit analysis approach (detailed in Chapter 6) to distinguish the two segmentation approaches

qualitative vs. quantitative and then compare the resultant analysis with executives' views of the two approaches.

2.6 The Theory of Interpersonal Behaviour

The TIB is a multidimensional theory combining the internal and external elements that determine behaviour (Spitzberg, 1989), thereby providing insights into targeted behaviour. The theory of interpersonal behaviour was first defined by Triandis (1977), who acknowledged that there are key parts played by social factors and by emotions in forming intentions. TIB tries to explain how patterns of behaviour result from a combination of a person's intended, habitual responses and the situational constraints and conditions under which that person operates (i.e. facilitating conditions or external elements).

As shown in Figure 1, in the theory of interpersonal behaviour (and similarly in the theory of reasoned action) intentions are formed on the basis of immediate experiences of behaviour (Jackson, 2005). Individuals' intentions are influenced by social, normative and affective factors as well as rational thoughts. Triandis (1977) emphasised the significance of past behaviours or habits, in explaining present behaviour, and designated three separate intentional constructs: attitudes, or the perceived value of expected consequences of the attitude; social factors such as norms, self-concept, and role; and affective factors, or emotional response. Later, Jackson (2005) redefined the component social factors as follows: norms are the social 'rules' about what should and should not be done; roles are sets of behaviours that are considered appropriate for a particular person in a particular situation; and self-concept is one's own assessment of oneself and includes the activities one follows and engages in. Figure 1 presents the TIB diagrammatically.

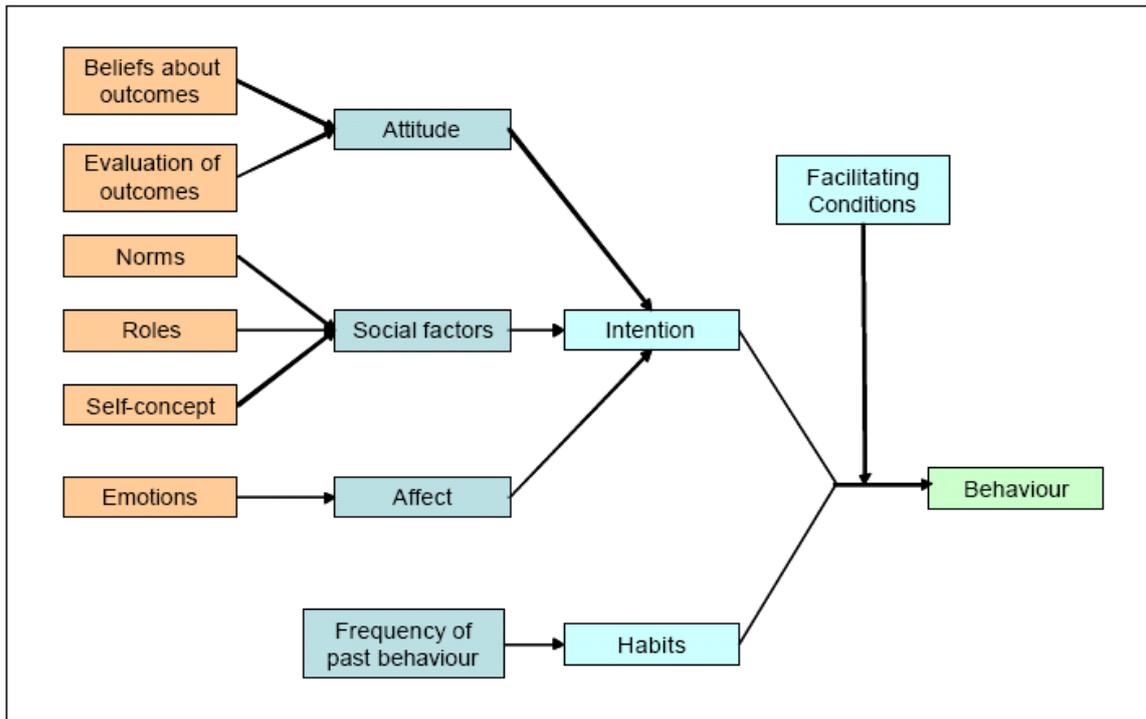


Figure 1: The original TIB model

Source: Jackson, Smith, and Conner (2003) p. 94

The TIB may be a suitable theoretical framework to support any pro-environmental behavioural change (Turaga, Howarth, & Borsuk, 2010). This behavioural theory is a comprehensive model, since it incorporates all aspects of the theory of reasoned action (TRA) and the theory of planned behaviour (TPB), as well as additional components that augment its predictive power, namely, habits, facilitating conditions, and emotions (Limayem, Khalifa, & Chin, 2004). TIB has a wider focus than other social behavioural theories owing to its inclusion of cultural, social, and moral constructs that are not accounted for by other theories (Triandis, 1979). and which supports calls to move social marketing focus upstream, or beyond individual behaviour to influence the surrounding environments (Dibb, Marylyn Carrigan, & Gordon, 2013).

A major construct of the TIB is previous behaviour, termed “habits”. To illustrate, a widespread study of Australian household water consumption behaviours

showed that household water meter readings were predicted by water-consumption habits, such as washing clothes and dishwashing; habit, however, was measured via subjective ratings of behavioural frequency (Dolnicar & Hurlimann, 2010). Another household study in the UK showed that low water consumption households tended to have habits consistent with lower consumption, for example, showering time was shorter among households identified as sustainable houses (Kurz, Gardner, Verplanken, & Abraham, 2015). Due to the importance of habit in water use behaviour, the *habits* construct in this thesis was incorporated as a segmentation criterion (as detailed in the quantitative study comprising Chapter five).

Furthermore, the TIB suggested *facilitating conditions* as a construct in the model. These are factors referring to the lack of environmental or situational constraints that may prevent the individual from performing the desired behaviour (Gagnon et al., 2003). In the example of Willis et al. (2013), a study set in the Gold Coast, Australia, sampled 151 households in a mixed method approach, for the purpose of evaluating the efficacy of using new technology to reduce water consumption. This study identified that by using technologies like showerheads and eco-friendly washing machines, water consumption rates were reduced by 33%. The authors insist that technology has a key part to play in facilitating behaviour change through enhancing individuals' control over the behaviour. The facilitating factors included in this study's augmented TIB model are price, water restrictions, and technology.

TIB acknowledges the role of social factors in the form of roles, self-concepts, and social norms. In the current project social norms was selected because of its relevance to the context. Social norms refer to the pressures and expectations of others that cause an individual to behave in a given manner or to perform, or not, the

behaviour (Ajzen, 2011). The theory posits that social norms increase the propensity of individuals to act in ways that maintain conformity within known social groups and the surrounding environment.

The use of an augmented model of TIB acknowledges that individuals whose behaviours are targeted for change are influenced by their social and physical surroundings. Simultaneous inclusion of internal (individual) and external (social and facilitating) factors ensures that the research lens captures a wider systems view (Adler & Kwon, 2000). As such, TIB theory recognises all three social marketing streams, the up-, mid- and downstream (Wu, Shi, Hasan, Shi, & Gibson, 2018), permitting exploration of wider influences on the water consumption behaviours of the target community. This thesis utilises an augmented model of TIB to guide the quantitative segmentation study, and to gain insights into the characteristics of differentiated segments as well as the facilitating factors that might influence participants' behaviours.

2.7 Studies targeting water consumption behaviour

There is a significant body of work in studies from around the world whose common purpose is gaining insight into people's behaviours in relation to water consumption, and into the means by which water use behaviours can be influenced (Hurlimann, Dolnicar, & Meyer, 2009). These studies have provided valuable information about water consumption behaviours, and have established that water use often varies from one location to another, depending upon a range of external factors such as climate, water restrictions, household ownership, social norms, and availability of appliances (Hurlimann et al., 2009).

Moore, Murphy, and Watson (1994) found, in their cross-sectional sample study in Australia, that there was a move toward greater water conservation when

different variables such as media and change in price were at play. In Canada, Syme et al. (2000) found that education programs were responsible for reducing water consumption by a range of 10% to 25% in a quasi-experimental evaluative study with 15,000 participants. In addition, researchers have emphasised the need to systematically research behavioural change models to better understand and improve the performance of persuasive water conservation campaigns. Fan, Wang, Liu, Yang, and Qin (2014) investigated perceptions of water consumption in 776 households in 14 villages in China and found that people usually lacked knowledge about their water consumption and subsequently underestimated their usage, leading to poor water use habits. Some studies suggested that if water consumption were to be reduced, people's knowledge and awareness about water scarcity, in general, must be raised, followed by education about their own consumption. Markus (2001) also indicated that in the absence of accurate information and awareness about the limits of water resources, the consequence is misuse of the available supply.

Askew and McGuirk (2004), in their survey study in New South Wales, Australia, found that 71% of the participants use a lot of water in the garden, and that people lack the comprehensive detail required to understand water conservation behaviour. A focus on educational programs only might not, however, lead to optimal results. For example, Watson, Murphy, Kilfoyle, and Moore (1999) used a quasi-experimental Australia-wide survey with 2,600 participants, finding no significant change in behaviour following a water conservation educational program. Other studies have reported no significant change in people's behaviours following a social marketing intervention. Howarth and Butler (2004) noted that despite an investment of £73,000, a collaborative social marketing campaign in the U.K. to educate people failed to produce any tangible water saving results. Therefore, depending solely on

education campaigns may not produce the desired reductions in water consumption, which indicates a need for the more comprehensive approach of social marketing. The current study gained the insight from participants that educational programs have value in helping people become aware of water scarcity and more conscious of their usage. Nevertheless, to achieve lasting behavioural change, other facilitating factors should be considered.

Other studies have researched attitudes to water conservation in communities where restrictions and pricing policies were imposed. These studies reported short-term effects, and in some cases, a negative impact on peoples' water consumption behaviours. The study conducted by Randolph and Troy (2008) in the Australian Capital Territory, using mixed-method research focus groups and telephone surveys with 2,179 participants, identified that stringent water restrictions and an increase in price acted to moderate demand. However, structuring approaches to shaping demand needs to be understood in the context of the demographic variables of household composition and type of dwelling. Similarly, Meinck and Leathersich (2003) found, from their survey of 975 participants in Perth, Western Australia, that while moderate water use restrictions were acceptable, the community perceived severe restrictions as unacceptable, suggesting that the voluntary appeal of social marketing approaches may be beneficial. In another U.S. example, Eike et al. (2014), reported that structured (involuntary) approaches such as a price increase or enforced restrictions, although having some short-term influence on changing people's behaviours, may sometimes have an unintended negative influence, termed a "rebound effect" (Lee, Jouravlev, & America, 1998). The potential pitfalls of coercive approaches to water conservation supports the application of approaches, such as those taken in social marketing interventions. Dolnicar, Hurlimann, and Grün (2012), collected data from

1,000 participants via an online survey in Australia to glean insights into Australians' attitudes toward desalinated and recycled water. Desalinated water was perceived by Australians to be environmentally unfriendly, and recycled water to be a public health hazard.

Other studies have given evidence of positive outcomes when incentives were offered, and new technology was implemented. For example, Brown and Clarke (2007) survey involving 2,600 participants in Melbourne, Australia, revealed that 6% had a rainwater tank, 52% had a water-efficient showerhead, and 5% reused their greywater; participants indicated these installations produced water savings. Willis et al. (2013) studied 151 Queensland Gold Coast households using a mixed method approach. Measuring the effectiveness of smart water meters and water-efficient devices in reducing water consumption, the study identified that the use of "green" technologies like eco-friendly showerheads and washing machines reduced water consumption by 33%.

In Iran, Keshavarzi et al. (2006) collected data on rural domestic water consumption behaviour in a survey of 653 households in 33 villages over a five-year period. This longitudinal study found that water consumption behaviour was significantly correlated with household size, the age of head of the household, garden size, and greenhouse size. Data collected from 10,251 participants in ten different countries (Australia, Canada, Czech Republic, France, Italy, South Korea, Mexico, Netherlands, Norway, and Sweden) produced the key finding that only the installation of a dual-flush toilet had an impact on water consumption. No evidence, however, that pro-environmental attitudes or concerns had an effect on water use behaviour is available in the peer reviewed literature (Grafton, Ward, To, & Kompas, 2011).

From this thesis's review of numerous studies of water consumption behaviours, the dominance of studies conducted in Western countries, a dearth of theoretical background, and limited application of segmentation to gain market insights to inform social marketing program planning were apparent. Therefore, this thesis tries to bridge the gap in the literature by conducting a study in a developing country (the UAE), scaffolded by an augmented model of the theory of interpersonal behaviour and applying audience segmentation to gain differential insights into the segments.

2.8 Social marketing targeting water consumption behaviour

Social marketing has been used to change water consumption behaviour. However, few studies of social marketing targeting water consumption behaviour are available. One example is a case study by Lowe et al. (2014) in South-Eastern Australia of successful water demand management using a social marketing approach. Their study identified the reduction to sustainable levels of water consumption achieved through a social marketing campaign. While the authors emphasised the application of Andreasen's (2002) social marketing benchmark criteria, they used the traditional geographic targeting method as the basis of targeting their audience. Furthermore, no scientific theory was used to guide the study.

In another study, Lowe et al. (2015) studied 909 households using a mixed method approach, with four focus groups and 2,041 survey participants. The target of the study was a large regional Australian city. The program aimed to reduce water consumption from 250 litres to 150 litres per person per day using social marketing. This study highlighted the role social marketing can play in influencing water consumption behaviour, in the absence of price as a restriction mechanism. While an

augmented model of the TPB clearly guided the study, its targeting basis was, again, geographic, and its focus on voluntary individual change was limited to the downstream of social marketing.

In an eight month social marketing campaign, Walton and Hume (2011) aimed to change the household showering behaviour of residents living in South East Queensland. This campaign demonstrated social marketing's ability to influence water consumption behaviour; water consumption was reduced from 140 litres per capita per day to 129 litres per capita per day. The study's target audience was segmented based on geographic variables, and its theoretical guide was the protection motivation theory.

Dolnicar and Hurlimann (2010) online survey study of 1495 Australians provided empirical data about water conservation behaviour and attitudes. Findings showed that while Australian residents have positive attitudes towards water conservation, these positive attitudes are not consistently translated into water saving behaviours. This study contributed insights for policy makers and social marketers targeting water consumption behaviour, finding that the main barrier to adopting water saving habits is the perception of inconvenience and impracticality. The study's market was targeted on demographic bases, but its segmentation process was not identified. Further, a clear theoretical background was not evident.

It is evident that the use of social marketing led to positive results in reducing water consumption. Silva, Pape, Szoc, Mayer, and Reekie (2011) investigated the relationships between water conservation behaviours, demographic factors, and effective communication campaigns in the U.S. Those researchers used a multimethod approach for data collection, drawing on telephone interviews, surveys, document analysis, and in-depth interviews. Findings indicated that participants were conserving

water for three main reasons: (1) to save money (2) because it is right thing to do, and (3) they were concerned about water availability. Silva et al. (2011) suggested that a high level of awareness of conservation practices, and saving money are the most frequently cited motivators. It is important, therefore, for social marketers to design their interventions targeting water use marketing using the full social marketing mix. Using the full marketing mix can increase the effectiveness of social marketing programs, ensure the relevance of the program, and, ultimately, optimise targeted groups' response to the program (French, 2017). and to focus on exchange criterion water consumption interventions. The findings of (Silva et al., 2011) furthermore focused on strengthening participants' current conservation habits and developing a long-term plan to influence the water use habits of the less-aware via a communication and social marketing mix. This study was neither guided by any theoretical framework nor based on social marketing benchmarking criteria, since it was a formative research study only.

Jespersion (2005) reported on a four years social marketing campaign targeting 700,000 residents in Florida indicated that with positive messaging, people were persuaded to believe they were part of the solution, not the problem. The purpose of that longitudinal study was to increase people's awareness of the importance of using water sustainably, through educational programs on water saving habits, creating a sense of social responsibility, and helping them to use water systems appropriately. The study did not report use of audience segmentation, but incorporated a guiding theory, a social marketing benchmark conferring scientific measurement of program outcomes.

The literature that has been reviewed indicates that only a limited number of studies designated as social marketing adopted social marketing benchmarking

criteria in their entirety; education-focused efforts dominated behaviour change techniques. Hence, this thesis will segment a water use market guided by the theory of interpersonal behaviour to gain insights into the characteristics of differentiated segments, and the factors that might influence each segment. The new generated segments and the insights gained from this study might help designing a future social marketing program targeted one or more segment, by adopting the full set of social marketing benchmarking criteria.

2.8 Summary

Chapter two discussed social marketing's position as an instrument of behaviour change, its application in social fields, and use of the strategic social marketing criteria of segmentation and theory use. The main studies targeting water consumption markets in different social fields other than marketing were recalled, with the last section focusing on social marketing studies seeking to change water consumption behaviour. Chapter three presents the research design and methods chosen for this project.

Chapter three: Methodology

3.1 Introduction

This chapter explains the approaches used to address the research questions. The research paradigm, the research design, sampling approach, data collection methods, and planned analyses are included in the discussion.

3.2 Research paradigm and researcher position

A research paradigm references the traditions shared by a group of researchers that provide a philosophical and conceptual framework for scientific effort in their field (Morgan, 2007). The research paradigm shapes the reasoning and arguments that guide the research work, and influences the research design and methods selected. Several paradigms are currently recognised in the field of social sciences, including but not limited to positivism, post-positivism, realism, criticalism, constructivism, logical empiricism, and advocacy/participatory (Brennan, Voros, & Brady, 2011; Denzin & Lincoln, 2011; Heron & Reason, 1997). Adopting a philosophical approach to social marketing research has been recognised as problematic because it involves tensions between a number of points of view (Brennan et al., 2011). However, there is apparent recognition of a variety of perspectives in marketing research in the emergent view that these perspectives exist on a continuum rather than operating in conflict (Brennan et al., 2011; Carson, Gilmore, Perry, & Gronhaug, 2001).

Tashakkori and Teddlie (1998) proposed a paradigm of “pragmatism” wherein the main concern is with application, or “what works” in finding solutions to problems. Pragmatism is concerned with actions, changes, and the connection between knowledge and action (Goldkuhl, 2012). The current project invokes the pragmatism paradigm, given that it seeks to use segmentation approaches to identify groups that can be differently characterised within the targeted market. Furthermore,

the current project seeks to determine the most practical segmentation approach for decision-makers to adopt, in consideration of the often-limited time and resources available to social marketers. A pragmatic approach suits this research since the focus is on "what works" and its main concern – to find the optimal segmentation solutions to the target market without a priori commitment to a particular method or single philosophical stance (Creswell, 2013).

In pragmatism, it is important to give close attention to a research problem in a holistic approach whereby aspects of different paradigms will drive the emergence of knowledge about the problem. The role of the researcher in this type of approach is to participate in changing the situation, not merely to describe and understand the case (Guba & Lincoln, 1994). Pragmatism is not concerned with cause-and-effect explanations; rather, this stance opens the door to logical and practical alternatives to help solve the research problem (Cameron, 2009).

The current project uses a combination of etic (deductive) theoretical concepts and measurement methods that are exported from the researcher's scientific field, and emic (inductive) insights about the water use market (Morris, Leung, Ames, & Lickel, 1999) in a complementary relationship providing a balance between subjective and objective views of the issue. In this project, the researcher is familiar with water consumption habits and practices of the community, because he has been living with his family and working at the site of research over the last ten years. The researcher has personal environmental concerns and supports pro-environmental practices. The emic and etic approaches captured the different views of people living and working at the University of Sharjah (UoS), in the United Arab Emirates, and contributed to maintaining the flexibility required to answer the questions posed by the research (Creswell, 2013). This flexible approach helped the researcher to

understand water consumption behaviour from the perspective of each segment that was identified, and to define the characteristics of each as well as the factors that might more specifically influence the water use behaviours according to segment characteristics (Malhotra, Agarwal, & Peterson, 1996). The etic and emic viewpoints are not contrasting, but rather layered perspectives that, used jointly, add richness to the analysis for achieving accurate, reliable, and bias-free results (Rich & Patashnick, 2002).

3.3 Methods

Since this research is based on the pragmatism paradigm, a mixed method approach to data collection is appropriate. A combination of qualitative and quantitative methods served to maximise the opportunities for answering the research questions, addressing the audience, and matching the researcher's experience and interest.

3.3.1 Target population

The UoS was chosen as the case study site owing to researcher's ease of access to the site and to potential participants, who included students, staff members, and faculty members as the target population of residents of the UoS campus. The participants were of different nationalities and backgrounds who were living and working inside the main campus. Accommodation on the main campus consists of different types of residences encompassing dormitories, and staff and faculty housing in which the water is free of charge. The university is one of the largest in the UAE, with 280,000 square metres of building area over six different campuses. Figure 2 shows a diagrammatic representation of the university's main campus.

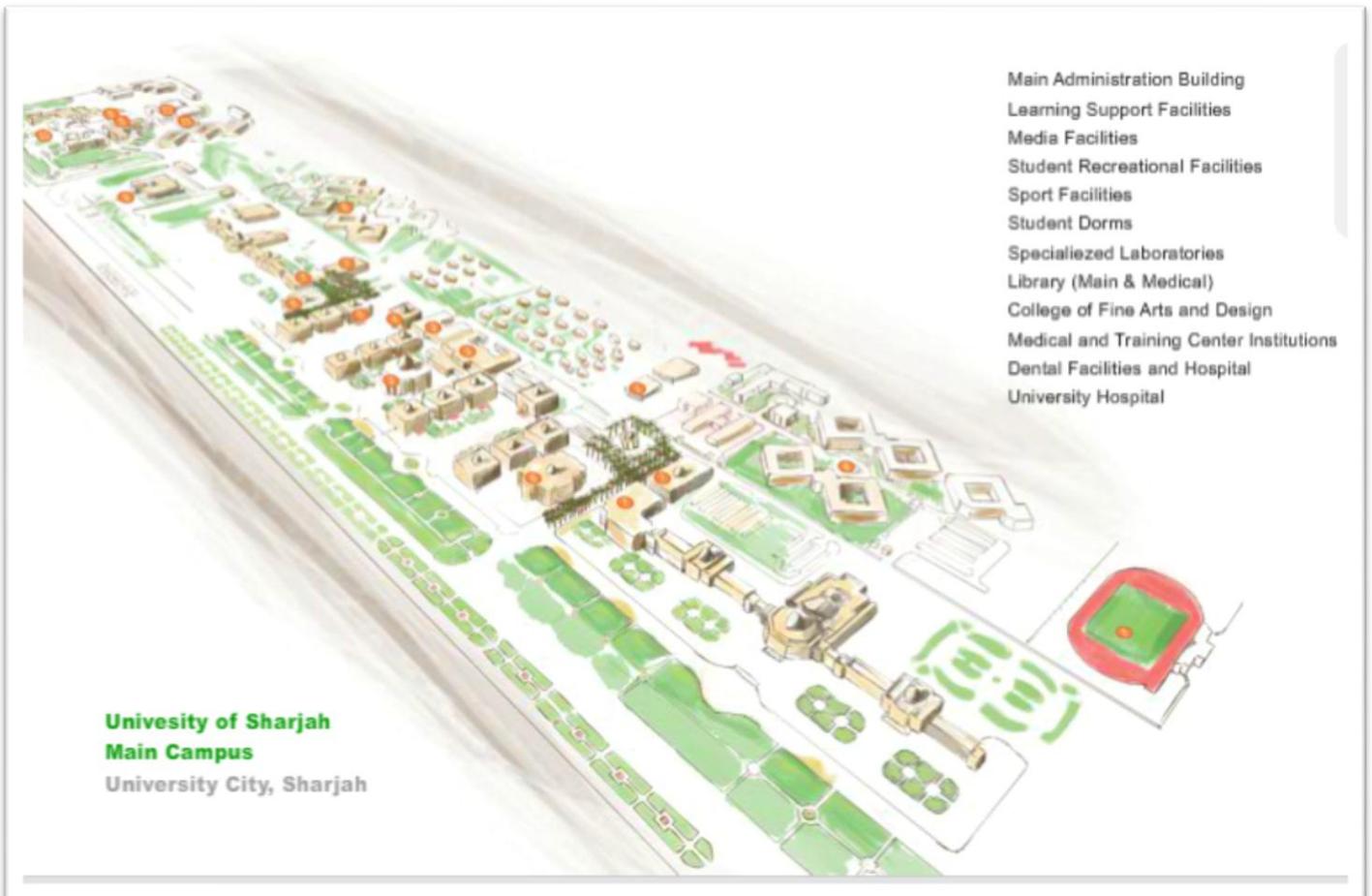


Figure 2: Map of the main UoS campus

Three of the major campuses of the UoS are located in University City comprising two identical single sex campuses and a mixed gender medical faculty building. The population of students, staff, and faculty members across the six campuses numbers more than 30,000.

3.3.2 Research design overview

Three studies were conducted to address the research questions and address the gaps in the literature (as set out in Chapter one, Table 2). Figure 3 summarises the research study flow as related to the research questions:

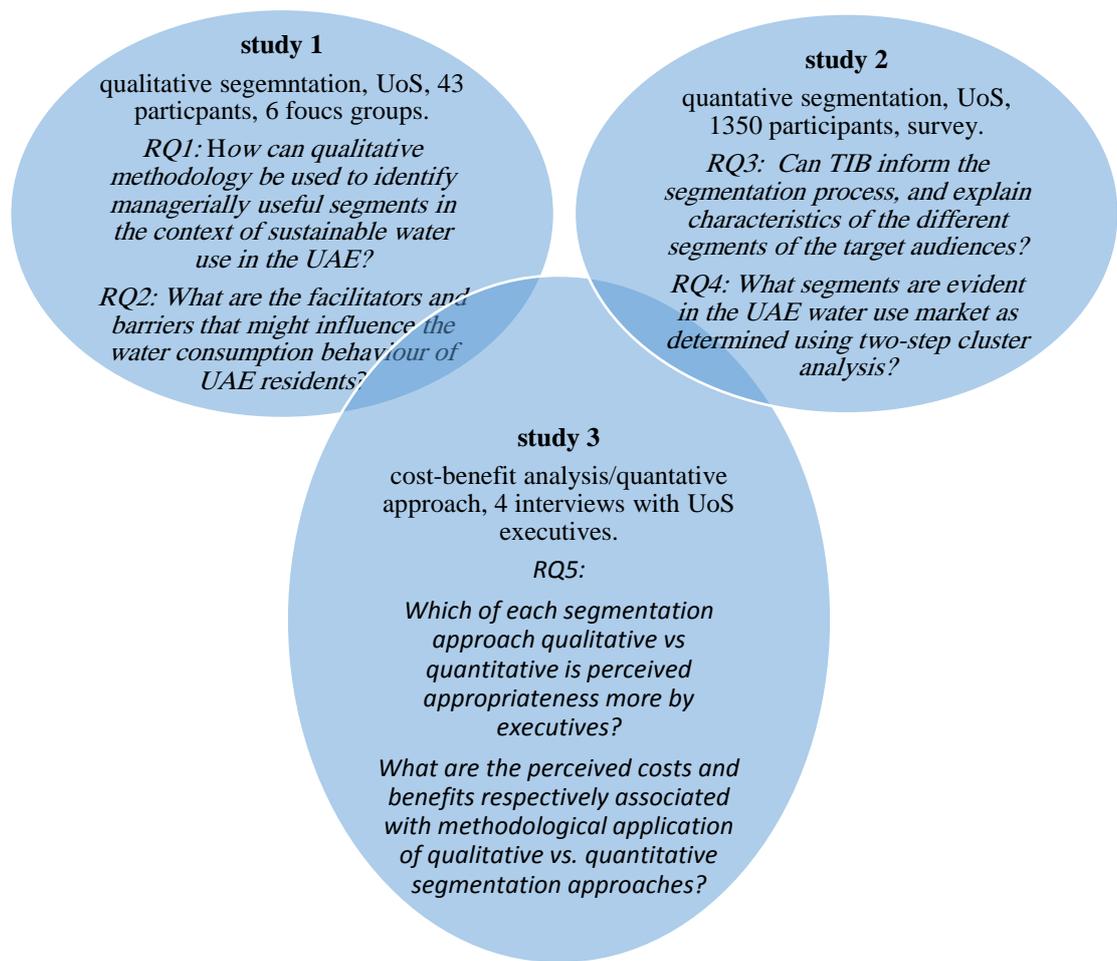


Figure 3: Study flow

Study one is a qualitative study utilising focus groups to counteract the lack of qualitative approaches to segmentation, and address *RQ1: How can qualitative methodology be used to identify managerially useful segments in the context of sustainable water use in the UAE?* Study one attempt to generate insights about factors that might influence current residents' behaviours, beliefs, attitudes, knowledge, habits and emotions, and the population in general, addressing *RQ2: What are the facilitators and barriers that might influence water consumption behaviour of UAE residents?* To achieve the aims of study one, six focus group sessions were held, and 11 open-ended questions were asked (replicated in Appendix 2). Chapter four of this thesis describes and reports the results of study one in detail.

Study two is a quantitative market segmentation study. Guided by TIB, this is a data-driven approach to segment identification. This study used an online survey, and a paper and pencil version to collect data. Its focus was on segmenting the water use market in the UoS using two-step cluster analysis to test the TIB constructs as informants of the segmentation process, and to explain water consumption behaviour. Study two addresses *RQ3: Can TIB inform the segmentation process, and explain characteristics of the different segment of the UAE residents?* and *RQ4: What segments are evident in the UAE water use market as determined using two-step cluster analysis?* The survey collected data about theoretically based constructs of awareness/knowledge, attitudes, habits, emotions, facilitating factors, and geographic and demographic data from the UoS sample (Appendix 3). The details and results of study two are presented in Chapter five of this thesis.

The aim of study three was to answer *RQ5a- Which of each segmentation approaches is perceived appropriateness more by executives?* and *RQ5b- What are the perceived costs and benefits associated with qualitative vs. quantitative segmentation approaches?*

The first section of this third study used a minimax simple matrix to analyse the costs and benefits of qualitative vs. quantitative segmentation approaches. The second section of study three focused on eliciting knowledge from executives (key decision-making stakeholders) about the two segmentation approaches used to segment the water use market within the UoS. Description and results and details of study three are presented in detail in Chapter six. The remaining sections of Chapter three provide an outline of and justify the methodological and data analysis processes of the three studies.

3.4 Study one overview

Qualitative segmentation involves applying qualitative data collection and analysis methods, approaches, and techniques to group or 'cluster' respondents according to their opinions, attitudes, behaviours, beliefs, emotions, and habits (de Visser et al., 2015). Qualitative segmentation can include experiences, obstacles, personal impressions, feelings, and opinions of the UoS residents (Hofmeister-Tóth, Kelemen, & Piskóti, 2011). Study one of this project answered research questions 1 and 2 utilising focus groups for data collection.

The focus group technique was selected as the most appropriate method for gathering the data for the qualitative segmentation, because focus group technique, enabled the researcher to get closer to the subject's perspective in order to drive the required data needed for segmentation process, through relatively unstructured and fairly free-flowing interview with a small group of people to explore their awareness/knowledge, attitude, emotions, facilitating factors, and their previous indoor, outdoor, and personal hygiene habits. (Stokes & Bergin, 2006; Zikmund, McLeod, & Gilbert, 2003). The focus group method enabled the researcher to modify the emphasis and the orientation of the questions during the session with the emergence of new ideas and themes. This was an ideal way to discover variables not previously mentioned in the literature and to add new features to the study. The focus group technique helped the researcher to obtain insights into informants' interests and solicit their opinions about water consumption behaviour (Berger, Bonime, Goldberg, & White, 2001; Garee & Schori, 1996). The main advantages of using the focus group method for the first study, , apart from groups being inexpensive to run, were their relative speed and ease of conduct (Zikmund et al., 2003).

A focus group protocol was designed to guide the data collection process to aid collection of rich qualitative data that would enable comprehensive answers to the research questions. In the discussions, focus groups of participants were asked open-ended questions designed to generate segments and gain insights about participants' attitudes, emotions, beliefs, opinions, facilitating factors and their consumption habits. The precise methodology and specifics of the data collection procedures and analyses for the first study, study one is described fully in Chapter four of this thesis.

3.5 Study two overview

The second study, study two was to determine quantitatively the different segments of the main campus residents of the UoS, and ascertain whether significant relationships exist between their water consumption behaviour and the constructs within the TIB, addressing questions *RQ3: Can TIB inform the segmentation process, and explain characteristics of the different segment of the UAE residents?* and *RQ4: What segments are evident in the UAE water use market as determined using two-step cluster analysis?*

To properly address the above research question using a statistical approach, and identify the segments and characteristics of each segment within the water use market, it is necessary to choose the correct data collection method. On this basis, besides the several advantages of the method, a survey tool (Limesurvey), as well as a paper and pencil version, were used to collect data from participants. The advantages of collecting data by survey were first, the ability of that method to extract data from the real world (Kelley, Clark, Brown, & Sitzia, 2003; Zikmund, Ward, Lowe, Winzar, & Babin, 2011). Second, data could be collected from many respondents in a short time and at a low cost from various UoS sites. Third, the online survey allowed participants to answer the survey at a convenient time and place. Finally, an online

survey allows participants freedom of response (Neuman & Baron, 1997), in that it helps overcome any biases that may come into play using a face-to-face method. On the other hand, there are some disadvantages associated with the survey method, such as the difficulty of obtaining a high response rate (Kelley et al., 2003), that surveys in most cases offer only a snapshot of a situation, providing insufficient evidence of cause and effect relationships (Gable, 1994), and that survey research can result in high levels of respondent bias (Weathington, Cunningham, & Pittenger, 2010).

Chapter five details the measures, procedures, and analyses undertaken for study two.

3.5.1 Measures

The survey design process began by identifying the essential constructs of TIB (more details see appendix 1). Table 5 provides a summary of definition of the constructs and their origins in the literature.

Table 5: Definition & origin of TIB constructs

Construct	Conceptual Definition	Origin in the literature
Awareness/knowledge	A mental state reached by an individual through their consciously accepting and processing information and cues	(Mathews & Mackintosh, 1998)
Attitude	A perceived value of expected consequences of holding the attitude	(Weber, Blais, & Betz, 2002)
Social norms	For a group or society, norms are what its members believe to be acceptable typical and/or appropriate group behaviours	(Paluck & Ball, 2010)
Religiosity	The realm of human emotional life that has been fundamentally important in shaping people's lives in all cultures, across time	(Belzen, 2010)

Facilitating factors	Conditions which permit, stimulate, or promote a fertile environment for water consumption behaviour change	(Peñuelas, Canadell, & Ogaya, 2011).
Habits	Self-reported frequency of past behaviour	(Donovan & Jessor, 1985)
Emotions	An affect deriving from a person's circumstances, mood, or relationships to other people and things	(Roseman, Spindel, & Jose, 1990)

3.5.2 Pre-test

During the first week of September, 2016, pilot testing of the survey took place with a convenience sample of 16 participants comprising of staff in the Marketing Department of UoS, friends and family. This pilot test allowed key revisions to be made to the survey, such as:

1. Adding an image to the survey (shown in Figure 4);
2. Spelling and grammatical revisions;
3. Shortening the survey URL so the link could be used on mobile devices; and
4. Resetting multiple response answer formats to a single answer.

Importantly, as part of the pre-testing of the online version, the survey was assessed for compatibility with PC, Mac, Android, ipad, iphone and tablet devices to ensure it was displaying correctly on all systems. The online version of the survey employed tokens which allowed only people with a valid token code to complete the survey (LimeSurvey Manual, 2015). Tokens allow researchers to invite a group of people to participate in a survey, as well as keep track of which respondents have completed the survey ensuring that those respondents are not recontacted (LimeSurvey Manual, 2015).

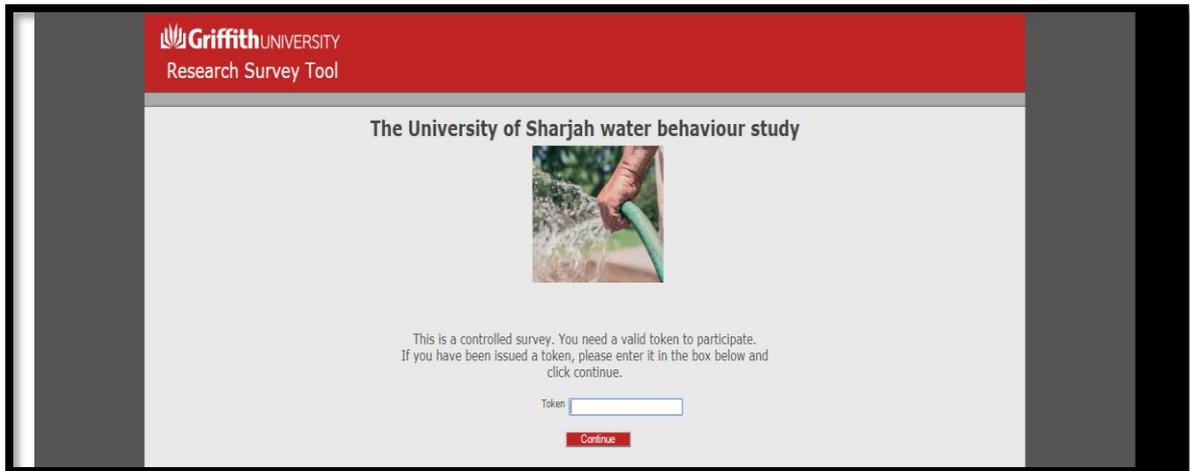


Figure 4: Survey front page

3.5.3 Timeline of the project

Figure 5 shows the timeline of the survey's data collection process.

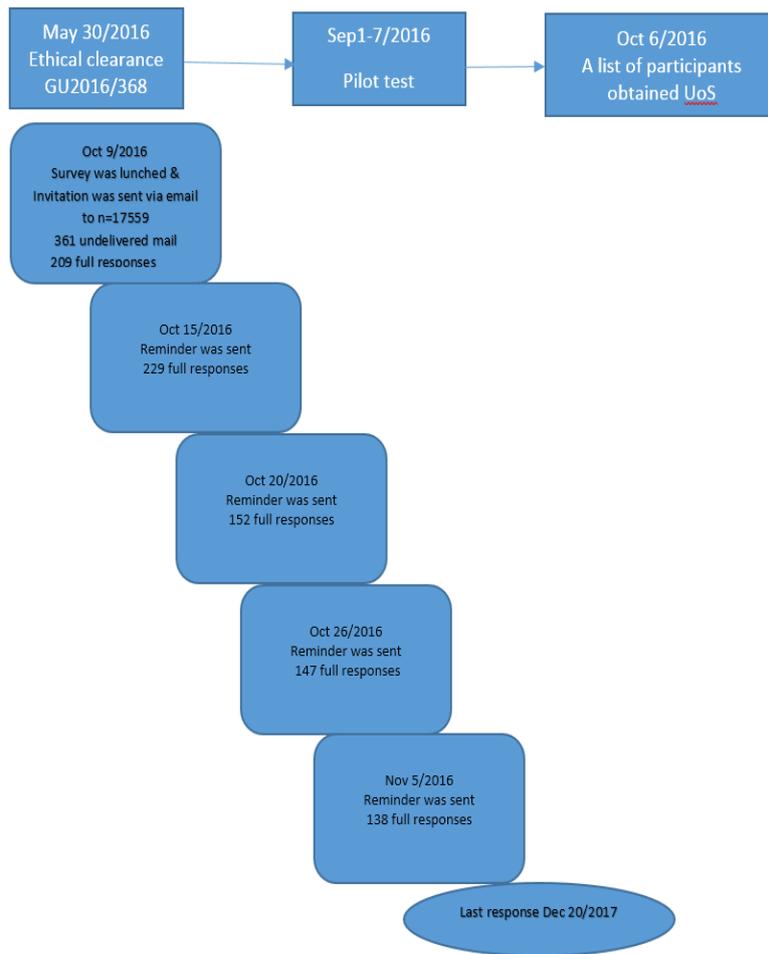


Figure 5: Data collection time-line

On May 30, 2016 ethical clearance was obtained from Griffith University (GU 2016/368). On October 6, 2016, a list of students, staff and faculty members was provided by the UoS, and the survey was launched October 9, when the flyer and the survey were sent to the email list provided by the UoS information Technology Centre. Reminders were emailed on October 15, 20, 26, and a final reminder on November 5, 2016.

The response outcome of the online survey was 875 completed/full responses received. From 2,000 pencil and paper copies that were distributed, the total of completed responses received numbered 475 paper copies. Final completed responses from both online and paper and pencil versions of the survey generated 1350 research participants.

3.5.4 Data preparation

Data preparation was conducted in SPSS-AMOS 24. A total of 2598 response were received online. Of these, 1,723 were, however, deleted due to 5% or more of the survey questions being missed by respondents. The length of the survey also presented another limitation of the study; in consequence, the average survey completion time was 45 minutes, and the use of English language, which may have resulted in the low completion rate of 7.8%. A total of 875 full responses received. Missing or incomplete data mainly related to the demographic details (Tabachnick, Fidell, & Osterlind, 2001). The total number of responses from the paper version was 589, with 114 copies being deleted due to respondents missing more than 5% of data, resulting in 475 useable paper and pencil-based surveys.

The data were tested to ensure a normal range of distribution through the assessment of normality tab in AMOS (Marcoulides & Schumacker, 2013). There were few incidents of outliers in the first part of the survey, where the respondents

were asked to estimate their usage of water per day, which was recognised using both visual detection and descriptive statistics. One case was deleted completely due to non-engagement error, and missing data points were replaced with the mean value for that variable.

3.5.5 Data analysis

Two-step cluster analysis was employed in study two to identify groups or clusters of participants within this single water use market. This analytic technique, in contrast to traditional clustering methods, gave the researcher the ability to keep information, and provide reliable and accurate explanation for any future strategic marketing purposes (Norusis, 2011). A further strength of two-step cluster analysis is its proficiency with large data sets, and categorical and continuous data (Norusis, 2011). Analyses and results are presented in full in Chapter five of this thesis.

3.6 Study three overview

The purpose of this third study was to compare qualitative vs quantitative segmentation approaches in segmenting the water market using cost benefit analysis. Study three was designed to gain insights into the UoS decision makers' opinions about segmentation approaches and the segments generated in the light of limited resources available for social marketing programs. Further, this study was conducted to point out the features and drawbacks of qualitative and quantitative segmentation approaches, and to identify the potential risks and gains of adopting either approach by in terms of its costs and benefits. The CBA technique was used to evaluate the two segmentation approaches and thus, the appropriate segmentation method from an executive viewpoint.

3.6.1 Data analysis

The first phase of study three involved analysis using minimax simple cost benefit analysis matrix for identifying the costs and benefits of qualitative vs. quantitative approaches. In the second phase, the researcher coded and indexed the collected qualitative data throughout the data collection and analysis process, looking for common agreement among participants on the selected segmentation approach, along with the relative perceived costs and benefits for each segmentation approach.

The analysis stage of this research began in January 2018, with the researcher paying attention to each step of the coding process. Immediate transcription of the recorded interviews, for instance, helped in filling gaps and clarifying ambiguities arising during transcription and analysis (Creswell, 2003). The data analysis and results for Study three are detailed in Chapter six of this thesis.

3.7 Summary

Chapter three has described the research paradigm and the design of the three studies comprising the research. The first study is a qualitative study employing a focus group approach (N=43) to identify water use segments. The second study is a quantitative study, guided by TIB using two survey methods to collect data from 1350 participants, and the two-step cluster analysis method to identify segments. The third and final study used the minimax simple matrix approach to cost benefit analysis, and semi-structured interviews to capture executives' perspectives of the more appropriate segmentation technique. The next chapter describes and reports the qualitative segmentation study, study one in its entirety.

Chapter 4 (study1): Working within resource constraints: A qualitative segmentation study

Funding

The lead author received financial support from Griffith University to conduct this research.

Contributors

The study was designed by Ali Ibrahim with support from Sharyn Rundle-Thiele. The study was analysed by Ali Ibrahim, Sharyn Rundle-Thiele and Kathy Knox. Ali led the writing, Sharyn Rundle-Thiele and Kathy Knox provided input on the analytical interpretation and critical contribution to the writing.

Conflict of Interest

None of the authors declare any competing interests.

Acknowledgements

The authors wish to thank the blind reviewers for their time and suggestions.

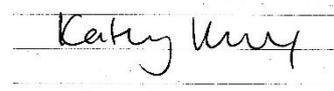
Authors Signature

Ali Ibrahim

Prof. Sharyn Rundle-Thiele

Dr. Kathy Knox

Ali Ibrahim



Chapter four

4.0 Working within resource constraints: A qualitative segmentation study

Abstract

Social marketers are often operating with scarce financial and human resources preventing costly quantitative segmentation methods from being applied. This paper explores the utility of applying qualitative research to identify groups that can be used for social marketing planning and program implementation. Drawing from a single water use case, six focus groups employing a semi-structured discussion guide involving 43 participants who were living and working within the site were conducted. Focus group interviews were audiotaped and manual coding was used to identify major segments within one water use market. Four distinctive segments emerged. The generated segments were denominated comfort users, careless users, price-sensitive users, and contradictory users respectively, with comfort users constituting the largest segment. This paper contributes to the literature by offering a method permitting social marketers operating within limited budgets to apply segmentation. Research limitations and future research directions are outlined.

KEYWORDS

Focus Group, Social Marketing, Qualitative Segmentation, United Arab Emirates.

4.1 Introduction

Fresh water is a scarce resource in many parts of the developing world (Mekonnen & Hoekstra, 2016). High temperatures and low precipitation in the Arabian Gulf make it one of the world's harshest environments. In the United Arab Emirates (UAE) for example, the average rainfall varies from 60 mm to 160 mm per year (Haque et al., 2007); only 7 mm of rain fell in 1999-2000 (Murad et al., 2007). The country's average per capita consumption of water, at 550 litres a day, is above average water use levels globally (Reporter, 2016a; Szabo, 2011a). Szabo (2011a) found that more than half (57%) of residential water consumption was attributable to luxury lifestyle habits and little awareness of water scarcity in the UAE. The country's growth in population is expected to lead to an even greater demand for water, estimated to increase by 50% over the period 2015-2020 (Ghaith & Abusitta, 2014). Strong economic development will, in addition, increase the demand for water by 40% over the next decade (Mohamed & Al-Mualla, 2010).

Two possible solutions to the problem of water scarcity are available to the UAE. These are: 1) increasing supply, i.e. developing new sources of water, such as by recycling wastewater, or continuing to build costly, energy-consuming and salinity-increasing seawater desalination facilities; and 2) reducing demand, i.e. conserving existing resources through changing water consumption behaviour. A major obstacle to implementing behavioural change solutions to excess water consumption is often imputed to public unwillingness to adopt new, or alternative water consumption behaviours (Longfield et al., 2016).

Recently, social marketing has been recognised as a credible behaviour change discipline and has been widely adopted to foster social change (Rundle-Thiele et al., 2015). Various social issues have been tackled by social marketing programs in a range of fields that include lifestyle-related health issues (Kamada et al., 2013), condom use (Purdy, 2011), childhood healthy eating (Keihner et al., 2011), alcohol and substance abuse (Glik et al.,

2008) and diet and physical activity (Huhman et al., 2008) as well as transport and environmental concerns (Lefebvre, 2011). Water consumption behaviour has similarly been previously targeted by social marketing interventions (Kubacki et al., 2015). For example, a social marketing program in Florida, U.S. directed at water consumption behaviour was able, through the use of positive messaging, to convince consumers of their role in the solution to the problem of overusing the resource Jespersion (2005). In South East Queensland, Australia, research by Lowe et al. (2014) demonstrated the success of a social marketing campaign that aimed to reduce water consumption to an enduring, sustainable level. While there are precedents of successfully targeting excess water consumption using social marketing in the United States and Australia, there is scant research concerning the UAE water use market.

To heighten the visibility of social marketing programs, program developers must deliver programs that more directly reflect the different needs and wants of identified groups within a target audience (Andreasen, 2012). Literature indicates that segmentation is rarely applied by social marketers (Kubacki & Rundle-Thiele, 2017), and this may be a direct result of a lack of capacity in the sector, given that complex multivariate procedures requiring large sample sizes dominate segmentation practice (Dietrich et al., 2017).

4.2 Market segmentation

Market segmentation is the process of clustering groups of individuals or objects with similar characteristics, needs, wants, and behaviours into a homogeneous cluster or group (Dibb, 2017). In social marketing, segmentation refers to developing a strong and meaningful understanding of groups within a population that share common characteristics and behaviours as the basis of developing a suitably tailored social marketing project that is segment-specific (Dolnicar et al., 2016; Donovan & Henley, 2003; French, 2017). As indicated by French and Gordon (2015b), social marketers can add real value to programs by applying segmentation. However, despite the reported benefits of market segmentation,

segmentation methods are underrepresented in social marketing programs. For example, of 93 interventions assessed in a recent review, a total of only 15 (16%) reported applying segmentation in social marketing programs (Dietrich et al., 2017).

Conducting consumer research is essentially for individual orientation (Andreasen, 2002). Social marketing research, therefore, requires a comprehensive understanding of a target audience's aspirations, needs, values, and their everyday lives and behaviours (Andreasen, 2012). Furthermore, market segmentation research offers unique insight into consumers' perceptions of benefits, costs and products, as well as illuminating other factors such as perceived threat, self-efficacy, and social influences that might motivate, or discourage, the target audience from adopting more desirable behaviours (Andreasen, 2012). Market segmentation also produces information about distinct population subgroups and the social and cultural environments in which consumers make decisions relative to certain behaviours. The information generated from market segmentation research is an important consideration in strategic marketing decision-making relevant to the selection of segments to be targeted, and the benefits and the costs of the program (French, 2017).

The types of data that can be utilised to construct a segmentation model vary in scope and insight. Segmentation data can be derived from a range of segmentation models and methodologies (French, 2017). There are, for example, a variety of quantitative approaches to segmentation. Data-driven segmentation methods for segmenting a target audience include two-step cluster analysis (Rundle-Thiele et al., 2015), K-means algorithm (Jain, 2010), and data mining (Berkhin, 2006). The social marketing segmentation process should be based on scientific research to identify the different segments of the target audience. However, this process need not be expensive or complex (Grier & Bryant, 2005).

While the benefits of employing quantitative techniques in segmentation are acknowledged, their processes may present some concerns for some social marketing

programs. First, quantitative segmentation processes cannot be applied in markets with small numbers; current best practice guidelines suggest 100 cases are needed for each variable measured (Dolnicar et al., 2016). Second, many social marketing projects lack sufficient funds for inclusion of sophisticated quantitative segmentation studies, which require time, expertise and, therefore, sufficient finance for the activity. Third, quantitative segmentation often faces a shortage of high-level expertise necessary to conduct an advanced successful segmentation study (Randle & Dolnicar, 2017). A qualitative segmentation approach is considered an alternative approach to segmenting the market when social marketers have limited access to the target audience (Lefebvre, 2013), and where populations of interest are small (Randle & Dolnicar, 2015).

4.3 Qualitative segmentation approach

According to Dolnicar et al. (2016), there is not a single best approach to social marketing segmentation. The most applicable market segmentation approach in any given situation depends on at least two factors: (1) the strategic marketing goals of the segmentation that will inform program design; and (2) the quality of the data required as the basis for the segmentation study.

Qualitative segmentation is a process of using qualitative methods, approaches, and techniques to group and cluster similarly targeted audience members according to their demographic, geographic, psychographic, and behavioural characteristics (de Visser et al., 2015). A qualitative market segmentation approach can generate unique and rich insights into marketing phenomena, and reduce the cost of conducting segmentation studies compared to data-driven segmentation approaches (Bond & Morris, 2003). Qualitative segmentation is important in identifying and managing the target market because of its efficient use of resources. Key strengths of a qualitative approach are its ability to generate situational insights, such as pinpointing the major competitor of the behaviour change and ascertaining

the extent of need in the segment, assess the segment of interest's responsiveness to change, and discover what social marketers offer in exchange (Atkinson & Hammersley, 1994; Carson et al., 2001; Lefebvre, 2013). In one example, using qualitative segmentation methods, namely observation and interviews, the San Diego-based social marketing behaviour change agency RESCUE segmented teenagers based on their risk behaviour (Dietrich et al., 2017). These qualitative approaches revealed distinct segments of the teenage audience (Dietrich et al., 2017).

In the commercial marketing domain, qualitative methods have been successfully used to generate segments, and to gain market insights. A study conducted by Charmaz (2006), for example, used structured in-depth interviews and semi-structured questions about participants' brand loyalty to identify distinct segments. Following that study, a semi-structured interview protocol was used to collect qualitative data from brand professionals by asking them a series of open-ended questions about their career, job profile, brand management experience, managerial level and role (Grougiou & Pettigrew, 2009). Recently, a segmentation study from Turkey segmented the container shipping service market. A total of 20 semi-structured interviews were conducted with managers to identify and understand the characteristics of four distinct segments (Balci & Cetin, 2017).

4.4 Method

The University of Sharjah (UoS) is one of the largest higher educational institutions in the UAE, with more than 30,000 students, staff, and faculty members. Its 280,000 square metres of building area includes student dorms, and faculty and staff housing units. Across the green landscape of the university's main campus, there are football fields, large parks, and huge fountains featuring constantly running. Water is freely available across all campus facilities.

In this study, knowledge/awareness, beliefs, habits, and facilitating factors that might influence participants' water consumption behaviours were explored in order to identify

whether different segments could be discerned. This study employed a single case study design (Yin, 2012) in which the case analysed was the UoS water use market. Six focus groups were formulated of the people living, studying, and working inside the campus, consisting of (1) female students, (2) male students, (3) graduate students, (4) faculty members, (5) staff members, and (6) a mixture of staff, faculty, and students.

4.4.1 Sampling Method

This research used a combination of purposive and convenience sampling techniques to locate key informants. The use of purposive sampling approach allows for identifying, detecting, and selection of information-rich cases related to the phenomenon of interest, which in turns helps in answering research questions (Creswell, 2012).

4.4.2 Sample Size

The sample size in qualitative research is a matter of the researcher's judgment and experience in evaluating the quality of the data collected, sampling strategy employed, the particular research method, and the research product intended (Sandelowski, 1995). According to Patton (2005), there are no rules restricting sample size in qualitative inquiry. For the purposes of this study, a minimum sample was constructed, and a minimum of one focus group session under each unit of analysis was conducted.

4.4.3 Validity and Reliability

During, and following each focus group session, the researcher took field notes, which were transcribed immediately to address any areas of uncertainty, and to ensure that any ambiguities could be clarified with the participant(s) before data analysis.

4.5 Focus group sessions

The purpose of the focus group discussions was to ask a series of open-ended questions, and encourage participants to explore the subjects of importance to them in their own vocabulary, generate their own questions, and pursue their own priorities (Esposito, 2001). Previous

social marketing studies aimed at examining water consumption have used the focus group method. Lowe et al. (2014) conducted four focus groups in South East Queensland, Australia, to understand residents' water consumption habits.

A focus group protocol was developed as a guide for the discussion, and participants were asked 11 open-ended questions (replicated in Appendix 2). In the first, introductory, stage participants were asked about their knowledge/awareness concerning the water situation and resources in the UAE. The second stage was the exploratory stage in which participants were asked about their actual water consumption behaviours inside and outside their housing. This stage contributed to identifying participants' water-use behaviours. In the third stage, participants were asked about the facilitators that might influence reductions in their water consumption.

The lead researcher acted as a facilitator, or moderator, of the discussion. Group sessions lasted from 45 to 60 minutes, with an average length of 50 minutes. The focus group sessions were recorded with the consent of participants and the recordings were later transcribed for analysis.

4.6 Data analysis

Qualitative data analysis was used to classify participants based on their knowledge, age, gender, place of living, paying for water usage, beliefs, and water consumption habits. Following procedures outlined by Bryman (2008) and Guba and Lincoln (1994), the researcher coded and/or indexed the data collected throughout the data analysis process, looking for common patterns to cluster the data accordingly so that common segments could be generated. It is important to note that while the process of analysis was taking place, the researcher contacted interviewees for additional data in two instances: (1) to gain a more detailed response; and (2) where doubt or inconsistencies were perceived.

The data were reviewed concurrently and coded consistently. To extract the major segments based on the content analysis of similarities, a careful and thorough examination of the characteristics of the population (i.e. gender, age, paying/not paying for water, living on- or off-campus, nationality, occupation, education level, and habits) that represented each segment was conducted.

4.7 Results

A total of 43 participants, whose demographic characteristics are summarised below in Table 6, voluntarily joined the focus groups from a diverse population of the UoS.

Table 6: Demographic distribution of participants

Focus group	Age	Gender	Living in/outside campus	Local	Expat	Who pays the water bill?
Female students						
P1	19	F	Inside		X	Uni
P2	22	F	Outside	X		Government
P3	21	F	Inside	X		Uni
P4	21	F	Inside		X	Uni
P5	20	F	Outside		X	Uni
P6	23	F	Outside	X		Government
P7	19	F	Inside		X	Uni
P8	21	F	Inside	X		Uni
Male students						
P1	22	M	Inside		X	Uni
P2	19	M	Inside		X	Uni
P3	21	M	Outside	X		Government
P4	19	M	Inside	X		Uni
P5	20	M	Inside		X	Uni
P6	20	M	Outside		X	Other
Faculty members						
P1	49	M	Inside		X	Uni
P2	55	M	Inside		X	Uni
P3	44	F	Inside		X	Uni
P4	53	M	Inside		X	Uni
P5	49	F	Inside		X	Uni
P6	51	M	Inside		X	Uni
P7	50	M	Inside		X	Uni
Staff members						
P1	44	M	Outside		X	Himself
P2	26	M	Outside		X	Father
P3	31	M	Outside	X		Government

P4	23	F	Outside	X		Government
P5	26	F	Outside		X	Herself
P6	28	F	Outside	X		Government
P7	39	F	Outside	X		Husband
Graduate students						
P1	26	M	Outside	X		Himself
P2	31	F	Outside		X	Government
P3	29	F	Inside	X		University
P4	36	F	Outside		X	Government
P5	24	F	Inside	X		University
P6	23	F	Outside	X		Father
P7	28	M	Inside	X		University
Students/staff, and faculty						
P1	48-faculty	M	Inside	X		University
P2	56-faculty	F	Inside	X		University
P3	19-student	F	Inside		X	University
P4	20-student	F	Outside	X		Father
P5	22-student	M	Outside	X		Parents
P6	29-staff	F	Outside		X	Government
P7	39-staff	M	Outside		X	Government
P8	31-Gstudent	M	Outside		X	Himself

The sample comprised of 19 males and 24 females; 25 participants were students, nine were faculty members, and nine were staff-members. A total of 19 participants were local Emirates citizens, and 24 were expatriates. A total of 23 were living inside university accommodation, and 20 lived off-campus. More than half of the participants (33) were not paying for their water usage, and 20 paid for water. The age range of participants was 18-56 years old.

4.8 Segmentation bases

Segmentation bases are the sets of variables used to create homogeneous groups or segments within the heterogeneous target audience (Wedel & Kamakura, 2012). The individuals who make up a segment necessarily have similar needs, behaviours, and factors that influence their behaviour (Dibb, 2017). This study used the four segmentation bases of demography (gender, age, nationality, role, and education); geography (living inside or outside the

campus), psychography (knowledge/awareness, paying for water, and beliefs); and the behavioural dimension of segmentation (water consumption behaviour). Social marketing scholars and practitioners have argued that by relying on only one segmentation base, true market segments are unlikely to be identified (Dibb & Carrigan, 2013).

This study was able to identify four major segments that best fitted the UoS sample of residents. These four segments were defined as: *comfort*, *careless*, *contradictory*, and *price-sensitive* users. Table 7 summarises the segmentation bases and variables used to compile segment profiles.

Table 7: Summary of segments characteristics

Segmentation Bases	Profiling variables			
	Comfort n =16	Careless n = 11	Contradictory n =6	Price sensitive n =10
Nationality	Emirati	Mixed	Mixed	Expatriate
Gender	Female	Male	Mixed	Male
Role Living	Grad students Off campus	Student On campus	faculty, and staff Off campus	Faculty & staff On campus
Age	Middle	Young	Middle	Older ages
Knowledge/ awareness	Low	Low	Aware	Aware
Beliefs	Water is available; used according to need	Water is plentiful	Role of religious instruction in conserving water	Price signal may reduce water consumption
Education level	First level education	Low	First level	Higher-level education
Pays for water	Third party	Third party	Mixed	Third party
Behaviour	Water used according to need.	Excessive	Above normal	Less than excessive.

4.9 Profiling the segments

In the profile analysis stage of segmentation the aim is to explore and construct the segments which, in turn, can form the basis of successful marketing strategies (French, 2017). Profiling was used to establish a clear understanding of the segments' similarities and differences, as recommended by Weinstein and Cahill (2014). Furthermore, the new generated segments were designated by a meaningful and interpretive name indicative of the salient information and insights pertinent to each segment (Lefebvre, 2013). During this stage of analysis the

researcher asked questions of participants to draw out their concerns, facilitating factors, interests, and beliefs in order to profile each segment (Dietrich et al., 2017). Once insights were gained, a systematic process of analysis was undertaken to consider segment similarities and differences (Longfield et al., 2016). Each identified segment is now described.

4.9.1 Comfort users

The researchers categorised 16 participants (37% of focus group participants) as comfort users; their average age was 28 years. This segment consists of local young Emirati, female students, who do not pay for the water they use. They typically live off-campus and are at their first level of higher education. Data from the focus groups showed that the comfort segment lacks the proper knowledge about the UAE's water situation, believing that the country is rich in natural water resources due to its geographic location (surrounded by the Arabian Gulf and Oman Sea) which, they had concluded, meant that water scarcity was not an issue.

“We are lucky in this country; we have two seas, water is always there for our use, government is ready to supply water for residents” (Female, local student, 19-years-old, living in a family whose water bill is paid by the government).

“Yes, UAE has enough water resources for the time being, and we should not be worried. I, my concern is to have water for my personal and family use” (Male, faculty-member, 46-year old expat, living inside the campus).

“The most important thing for me is to see my children and my house are clean, without overconsumption, and this is the university's responsibility to supply enough water” (Male, faculty-member, 53-year-old expat, living on campus).

The general consumption behaviour of this segment was to use available water as needed without attention to the quantities consumed. The major concern of this segment was to have running water for their daily requirements. Comfort users agreed that conserving water is necessary, believing that they can do more to save water voluntarily, without any external pressure to do so. Table 8 profiles the individuals in the comfort users' segment.

Table 8: Comfort segment participants

Comfort Segment	Age	Gender	Living in/out campus	Local	Expat	Who pays the water bill?
P1	19	F	Inside		X	Uni
P2	21	F	Outside	X		Government
P6	23	F	Outside	X		Government
P7	19	F	Inside		X	Uni
P2	19	M	Inside		X	Uni
P3	21	M	Outside	X		Government
P4	53	M	Inside		X	Uni
P7	46	M	Inside		X	Uni
P1	44	M	Outside		X	Himself
P3	31	M	Outside	X		Government
P6	28	F	Outside	X		Government
P2	31	F	Outside		X	Government
P3	29	F	Inside	X		University
P6	23	F	Outside	X		Father
P4	27- student	F	Outside	X		Husband
P5	22- student	M	Outside	X		Parents

4.9.2 Careless users

The researchers categorised 11 participants (25% of all participants) as careless users.

Participants in this segment had an average age of 28 years. Careless users were mostly young, male, local and expat students who lived on campus, and did not pay for their water usage. Again, people in this segment were unaware that the UAE is under water stress, has limited natural water resources, and that their water consumption was quite excessive.

Members of this segment habitually used water without heed to their consumption:

“I don’t think I can save water because I don’t know how” (Male local student, 22-years-old, living on campus).

“The UAE has a lot of water, and I can use it whenever I need it; why should I care?” (Male expat student, 22-year-old, living on campus).

“I take a shower for two hours; I feel the pleasure of warm water running over my body” (Female local student, 20-years-old, living on campus).

“I wash my car with a hose once a week” (Male expat faculty-member 49 years old, living with his family on campus).

“I wash my t-shirt by itself at the laundry every day” (Male local student, 21-years-old, expat, living on campus).

“I am lazy to turn the water off while I am shaving and brushing my teeth; I am not paying for water, why should I care?” (Male local student, 22-year-old, living on campus).

“I wash my cars using the hose, and I clean the driveway from sand almost every week; my cars and my house should look clean” (Male, 39-year-old, local staff, living off-campus, government pays for water usage).

Some highly educated faculty members exhibited careless water consumption behaviours, such as washing their cars in the driveways of their houses using a hose, and taking long showers. The careless users' segment was clearly distinguished by the excessive consumption habits of its members, together with an unwillingness to make any voluntary changes to their individual water consumption behaviour. They made clear their collective belief that it is the responsibility of a third party to make water continuously available. Table 9 sets out the demographic details of the careless segment.

Table 9: Careless segment participants

Careless Segment	Age	Gender	Living in/out campus	Local	Expat	Who pays the water bill?
P3	21	F	Inside	X		Uni
P4	22	M	Inside	X		Uni
P1	22	M	Inside	X		Uni
P1	49	M	Inside		X	Uni
P2	26	M	Outside	X		Father
P4	23	F	Outside	X		Government
P4	36	F	Outside		X	Government
P5	24	M	Inside	X		University
P3	19student	F	Inside		X	University
P6	29-staff	F	Outside		X	Government
P7	39-staff	M	Outside		X	Government

4.9.3 Contradictory users

This segment consisted of six people (14% of all participants) representing males and females with an average age 34.5 years old. The contradictory segment contained people from diverse backgrounds living on campus. Individuals in this segment did not pay for the water they used, and consistent with all other segments, they had high levels of usage. Members in the contradictory segment were educated, and similarly to the comfort and careless segments, people in this group also believed the UAE to have plentiful water. The key distinguishing feature of this segment was their belief in the importance of Islamic teachings as they relate to water consumption. People in this segment voiced support for the role of Islamic institutions as guides to reducing excessive water consumption. The misalignment between participants' actual over-consumption behaviour and their Islamic beliefs was evident:

“Islam is encouraging Muslims to use less water... but I use a lot of water” (Female expat student, 22 years old, living on campus).

“We all knew that our prophet Mohammed Hadith said, ‘Don’t use too much water even if you are living beside a running river’. However, we are not following that, not

even when we make ablution ‘Wudu’ for praying” (Male expat faculty-member, 55-year old, living on campus).

“I follow Islam instructions in saving water; however, my children, they don’t care” (49-year old expat male, living on campus).

The inconsistency between their professed belief in the tenets of their faith which advises Muslims to use water parsimoniously, and actual water consumption behaviour gave this segment the “contradictory users” label. This segment showed their faith in Islam is strong, which could be used by social marketers to target their water consumption behaviour by focusing on the Islamic injunction to conserve precious resources. Table 10 presents the characteristics of the contradictory users’ segment.

Table 10: Contradictory segment participants

Contradictory Segment	Age	Gender	Living in/out campus	Local	Expat	Who pays the water bill?
P8	22	F	Inside		X	Uni
P4	19	M	Inside	X		Uni
P3	44	M	Inside		X	Uni
P7	39	F	Outside	X		Husband
P7	28	M	Inside	X		University
P2	56- faculty	F	Inside		X	University

4.9.4 Price-sensitive users

Some participants indicated clearly that cost-free water is a major driver behind their excess water consumption. The price-sensitive users’ segment comprised of ten participants (23% of all participants), whose characteristics are shown in Table 11. Members of the price-sensitive segment did not pay for their water usage, yet were willing to change their behaviour and reduce their consumption if there was a price tag attached to their consumption:

“If we pay for water, I will watch my use, and push my children to do so” (Male faculty-member 48-year-old, living on campus).

“Price tag is necessary for residents to control their consumption” (Male faculty-member 55-year-old, living on campus.

Table 11: Price-sensitive segment participants

Price Sensitive	Age	Gender	Living in/out campus	Local	Expat	Who pays the water bill?
P5	22	F	Inside		X	Uni
P5	21	M	Inside		X	Uni
P6	20	M	Outside		X	Other
P2	55	M	Inside		X	Uni
P5	44	M	Inside		X	Uni
P6	51	M	Inside		X	Uni
P5	26	F	Outside		X	Herself
P1	26	M	Outside	X		Himself
P1	48- faculty	M	Inside	X		University
P8	31- Gstudent	M	Outside		X	Himself

The price-sensitive segment was unique in that they clearly expressed that they would not change their behaviour voluntarily, and would only likely respond to coercive measures, such as a price signal. Social marketers can target this segment by using structured approaches to reducing water consumption via pricing, for example, or other legalistic constraints on water use. which would support moving the social marketing upstream. The main focus of the upstream approach is on formulating new policies and regulations to make the environment more conducive to the desired behaviour. For many, upstream social marketing admits that individuals should not be wholly responsible for their own behaviour (Dibb et al., 2013). The upstream approach provides preventive measures that can be implemented by agencies and organisations that will bring about the desired individual behaviour or beyond individual behaviour to influence the behavioural environment at a policy level.

4.10 Discussion

This study sought to extend application of social marketing segmentation in a water use market beyond traditional quantitative methods by investigating whether, using a qualitative technique, focus groups, distinct segments could be identified. Results of the current study facilitated a deep understanding of the target audience. This informed understanding may be used to guide different initiatives to appeal to different types of water users.

The objectives of the current study were twofold. It first aimed to develop a context-specific focus group protocol to segment the water use market within one organisational context. The second objective was to understand whether segments could be distinguished using the qualitative research approach. The main finding of the study was that by using a qualitative segmentation approach, distinct segments could be obtained. While there is a growing number of statistical segmentation studies available (Ibrahim, Knox, Rundle-Thiele, & Arli, 2018; Rundle-Thiele et al., 2015), qualitative segmentation studies within the resource-constrained social marketing field are rare (Randle & Dolnicar, 2015).

The current study found that comfort segment members shared some characteristics, as was indicated by a U.S. study that segmented lawn irrigators (Warner et al., 2017). Furthermore, comfort users lacked factual knowledge about the UAE's water situation, instead believing that the country has adequate water resources. A social marketing campaign conducted in the U.S. over three years showed that positive messaging and informing people about the true water situation of their environment was able to persuade individuals of their responsibility towards solving, rather than persisting as part of the problem; this campaign reduced water consumption to a more sustainable level (Jespersion, 2005). Askew and McGuirk (2004), in a study conducted in New South Wales, Australia, found that 71% of the participants were using large quantities of water in their gardens, owing to their lack of knowledge of current water conservation measures. Based on these previous findings, and the

unique characteristics of the comfort users' segment within the water use market targeted in this study, disseminating knowledge that presents the true picture of water resources may significantly influence the water consumption behaviours of the majority segment of populations in other locales.

The second segment identified in the current study, classified as careless users, consisted mainly of young students living in university accommodation. Their shared common characteristics included excessive water consumption habits, negative attitudes, and inadequate knowledge about the UAE's water resources. Segments similar to the careless users have emerged in other studies examining an audience segmentation approach to water resources, such as the study of home landscape irrigation conducted in the U.S. (Warner et al., 2017).

A third segment emerging from this study, the price-sensitive users were, in the main, older and educated participants who lived in university housing, and enjoyed free water. Their preparedness to change their, and their families' consumption habits was found to depend on the cost of water to themselves. The literature affirms that the water consumption behaviour of a target audience can be influenced by structural change methods such as pricing and/or the imposition of water restrictions. For example, the study of 2179 participants conducted by Randolph and Troy (2008) in the Australian Capital Territory, which used a mixed method approach to researching water use behaviours through focus groups and telephone surveys, identified that tougher water restrictions and increased prices moderated demand.

The fourth, and most demographically diverse segment to emerge from the current study was called the contradictory users' segment. Although Islamic belief did not feature in the focus group protocol, in each of the focus group sessions, at least one participant introduced the importance of religious guidelines relevant to the use of water resources. The

ensuing discussion indicated that some participants perceived a misalignment between their faith and their water consumption habits, while others clearly did not. This finding was consistent with a study from the U.S. that, attempting to understand the relationship between self-interest, religion, and the collective good, encompassing issues like environmental protection, giving blood, donating to charity, and preferring public transport, revealed conflicts arising between self-interest and concern for the public good (Karp, 1996).

The findings of this study are insightful for social marketing researchers and practitioners whose aim is to reduce water consumption through targeted programs. This research identified that different audience segments exist and insights about facilitating factors for each segment were distinguished. Therefore, tailored social marketing solutions would assist in achieving higher rates of desired behavioural change pertinent to each segment.

4.11 Facilitating factors

A number of segment-specific approaches to reducing water consumption are indicated in this study. The excessive consumption habits of careless users could be curbed with technological solutions such as one or more water-efficient appliances (e.g. retrofitted shower heads, timers, and sensors). Comfort users of water could be motivated to change through educational programs, given their lack of accurate knowledge about water scarcity in the UAE. In contrast to the other segments, the contradictory segment could be motivated by appeal to the strength of their religious beliefs. Finally, the price-sensitive segment would only be induced to mitigate their excessive water consumption when a pricing scale applied. The insights gained from segment level analysis point to the range of alternatives that can be implemented to encourage more community members to alter their water use behaviour. The introduction of a price on water would provide a revenue stream to offset education program

activities and incentivising installation of fixtures and appliances to support water use reduction.

4.12 Limitations and future research

Because this study was limited to a university-based sample, it is not representative of the whole of UAE society. Participants in this study were relatively highly educated compared to the wider UAE population. Further research is recommended using a broader population base to determine whether the segments that were obtained from this sample and conclusions reached hold for wider UAE contexts.

Social desirability bias is a well-noted constraint in qualitative methods of data collection such as focus groups, which provided the data for this study. Social desirability bias refers to the tendency of research participants to choose responses they believe are more socially acceptable rather than responses that more accurately reflect their true thoughts or feelings (Grimm, 2010). The dilemma of social desirability bias is that it is most likely to occur in situations such as focus groups, where questions relate to what are widely accepted attitudes, or behavioural or social norms (Grimm, 2010). Alternate research approaches to overcome socially desirable responding are recommended to extend understanding further. Future research that employs different qualitative techniques, such as observation and interviews to consider their utility in segment formation within water use and other contexts is recommended.

4.13 Acknowledgment

The authors would like to acknowledge the participants in this study for their time and effort, and they thank the University of Sharjah for its support in the data collection process.

4.14 Declaration of Conflicting Interests

The author(s) declare no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

4.15 Funding

The author(s) received financial support from Griffith University to enable the research, authorship, and/or publication of this article.

Chapter five (study2): Segmenting a Water Use Market: Theory of Interpersonal Behaviour Insights

Funding

The lead author received financial support from Griffith University to enable the research, authorship, and/or publication of this article.

Contributors

The study was designed by Ali Ibrahim with support from Sharyn Rundle-Thiele. The study was analysed by Ali Ibrahim, Kathy Knox, Sharyn Rundle-Thiele, and Denni Arli. Ali led the writing, Kathy Knox, Sharyn Rundle-Thiele, and Denni provided input on the analytical interpretation and critical contribution to the writing.

Conflict of Interest

None of the authors declare any competing interests.

Acknowledgements

The authors wish to thank the blind reviewers for their time and suggestions.

Authors Signature

Ali Ibrahim

Dr. Kathy Knox

Prof. Sharyn Rundle-Thiele

Dr. Denni Arli

Ali Ibrahim

Kathy Knox

Sharyn Rundle-Thiele

Denni Arli

Chapter five

5.0 Segmenting a Water Use Market: Theory of Interpersonal Behaviour Insights

Abstract

Water scarcity due to climate change, low rainfall, and the damaging effects of human activity is a global concern. In the United Arab Emirates, water consumption rates are amongst the highest in the world. Recently, researchers have suggested social marketing might assist to change individual water consumption. Guided by the Theory of Interpersonal Behaviour this study sought to identify segments in one water use market, drawing on demographic, geographic, psychographic and behavioural segmentation bases. A cross-sectional theoretically-based online survey was designed based on the Theory of Interpersonal Behaviour constructs to collect data about one residential population's water knowledge/awareness attitudes, emotions, religiosity, habits, surrounding social norms, and facilitating factors. Email invitations to complete the survey were sent to the target population. Two-step cluster analysis was used to analyse the data ($N = 1350$), and three major water user segments were identified (Regular, Conscious, and Careless users) who could be characterised based on psychographic and water use (behavioural) determinants. Audience segmentation is often absent or done on the fly and this article proposes that effectiveness could be improved by applying a rigorous and theoretically based approach¹. Opportunities for social marketers to develop interventions targeting specific user groups are subsequently identified, along with a future research agenda.

Keywords

Social Marketing, Segmentation, Theory of Interpersonal Behaviour, Water Consumption, United Arab Emirates.

¹ We thank an anonymous for this feedback

Segmenting a Water Use Market: Theory of Interpersonal Behaviour Insights

5.1 Introduction

Water scarcity due to climate change, low rainfall and the damaging effects of human activity is a global concern (Mekonnen & Hoekstra, 2016). In the United Arab Emirates (Government), despite the country's hyper-arid climate, the rate of water consumption remains exceptionally high. The average consumption of water per capita is 550 litres per day, which is 82% above the global average (Reporter, 2016b). Szabo (2011b) found that 57% of UAE residential water consumption was attributed to luxury lifestyles, a lack of conservation measures, and low awareness of water resource scarcity. Given that the UAE is developing economically and its population is expected to continue to grow in size as well as in wealth, water security is a serious challenge for the government (Fishman, 2011). While the UAE government promotes the adoption of technologies to reduce water consumption and develop supply infrastructure, water misuse remains a highly significant factor contributing to the scale of demand. The enormous monetary and energy costs of desalinated water (Szabo, 2011b) that supplies the country's residential, agricultural and industrial consumption, are projected to increase by 300% (Sewilam & Nasr, 2017), which may not be sustainable in light of state budgetary constraints (owing to the global decline in oil price) on developing infrastructure to meet demand growth. Therefore, another strategic response to the UAE's water security challenge is water conservation, which would require individual behavioural change on a wide scale (McKenzie-Mohr, 2011).

The behaviour change literature affirms that water conservation can be achieved through encouraging residents to engage in more rational and considered consumption (Hurlimann & Dolnicar, 2010; Sáiz et al., 2010) and/or motivating appeals. Since changing individual behaviour can be cost-efficient compared to redesigning physical water infrastructure, the water consumption behaviour of UAE residents should arguably be a priority

target of any future efforts to reduce water consumption. Residents need to become aware of water situation inside the country, enhance their positive emotional, change their attitude, adopt new social norms, comply with religious instructions, and address audience-specific barriers, that might reduce their personal consumption which, has individual as well as wider community benefits (Andreasen, 2002). Recently, researchers have suggested the application of social marketing as a means of changing individual water use behaviours (Rosenbaum & Wong, 2015).

Social marketing is recognised as a credible behaviour change discipline and has been widely adopted to foster social change (Andreasen, 2012; French & Gordon, 2015a; McKenzie-Mohr, 2011; Rundle-Thiele et al., 2015), and has previously been used to tackle water consumption behaviour (Whitmarsh & O'Neill, 2010). Jespersen (2005) found that a four-year long social marketing campaign using positive messaging was able to reduce the water consumption of 700,000 people to a sustainable level in Florida, USA, through convincing this population that they were part of the solution to overconsumption, not the problem. In a mixed method study of 909 households in a large regional Australian city, Lowe et al. (2015) applied social marketing to reduce problematic water consumption from 250 litres per person to 150 litres per person per day. Their study found that in the absence of price as a constraint mechanism, social marketing programs significantly reduced household water consumption (Lowe et al., 2015). However, social marketing has been criticized for its tardiness in adopting benchmark strategies such as application of theory and market segmentation (Dibb, 2017; Dietrich et al., 2017).

Market segmentation is a core technique that seeks to identify and develop a reliable and clear understanding of different groups that share common characteristics within the audience targeted (French, 2017). Market segmentation is well understood in commercial marketing, where it is considered a key success factor (Weinstein, 1994). Furthermore,

although segmentation is held to be a key social marketing benchmark criterion (Andreasen, 2006; NSMC, 2010), social marketing does not apply market segmentation as frequently as commercial marketing (Dibb, 2017). When segmentation is applied in social marketing, it has typically been on the basis of objective or general measures that are readily available from secondary data (Raval & Subramanian, 2004). A recent umbrella review examined 93 social marketing interventions and identified that only 16% of those studies reported clear use of segmentation, and target market selection in their interventions (Dietrich et al., 2017). Closer examination of reviews of social marketing campaigns in different contexts such as healthy eating (Carins & Rundle-Thiele, 2014), alcohol consumption (Kubacki et al., 2015), and physical activity (Fujihira et al., 2015; Kamada et al., 2013) indicated that segmentation is rarely applied in social marketing.

Theory-based segmentation can assist social marketers to clearly understand different segments' characteristics (Andreasen, 2012), increase return on investment (Hastings et al., 2004), and add value to social marketing programs (French, 2017). For example a recent study conducted in the USA used a national online survey to collect primary data from the market to segment residents based on landscape irrigation behaviours (Warner et al., 2017). The study helped to identify distinct segments and comprehensively understand the characteristics of each segment.

In order to generate distinct segments for a successful social marketing program, social marketers need to employ specific measures (Raval & Subramanian, 2004). Furthermore, social marketers' efforts should be directed to their primary data collection, wherein insights into the audience can be generated and, concurrently, ensure that understanding is audience-orientated and that the targeted behaviour is included in the segmentation analysis (Rundle-Thiele et al., 2015).

Social marketing has in general lagged in applying behavioural theories; only 33 of 143 interventions (23%) identified in a recent review reported using theories or models (Truong, 2017). Given that behavioural theories can enhance the value of social marketing projects and market segmentation by helping to identify factors that will influence behaviour change for different segments (Lotenberg, Schechter, & Strand, 2011), omission of theory in social marketing research and practice is surprising. Schuster et al. (2015) claim that social marketing segmentation studies based on theory were able to identify the most promising segments, in order to increase efficacy and optimise resource allocation. For example, based on social exchange theory, in their segmentation of irrigation users in Florida, USA, Warner et al (2017) found that unique subgroups existed among targeted audiences related to specific behaviours. In summary, previous reviews of the literature identified one theoretically-based segmentation study in a water consumption context. There is a lack of research targeting the UAE water consumption behaviour, where unlimited water use is a feature of luxury lifestyles, and residents mistaken beliefs about the country's water resources are common. The current study aims to apply the Theory of Interpersonal Behaviour as the theoretical base for segmenting the water use market in one UAE market setting.

The TIB is a multidimensional theory combining both internal and external elements to understand the targeted behaviour (Spitzberg, 1989). TIB was first defined by Triandis (1977). TIB theory is recognized as a theoretical framework suitable for application to any pro-environmental behaviour (Turaga et al., 2010). TIB is a comprehensive model, since it includes all aspects of the Theory of Reasoned Action and the Theory of Planned Behaviour, as well as incorporating additional components that augment its predictive power, namely, habits, facilitating conditions, social norms, and emotions (Limayem et al., 2004). In his formulation, Triandis (1977) emphasized the significance of past behaviour, as “habits”, in explaining present behaviour, thus extending beyond psychographic variables in an attempt to

understand the roles of attitudes, social and affective factors in forming behavioural intentions. While individuals may have a favourable attitude to conserving water, this may not necessarily correspond to behaviour since attitude represents only a perceived value of an expected consequence (Triandis, 1977).

The theory of interpersonal behaviour tries to explain how patterns of behaviour result from a combination of internal (intended, habitual) responses, and the external conditions in an individual's environment. *Facilitating conditions* signify environmental or situational constraints or lack thereof as well as the presence / absence of opportunities to perform or prevent the desired behaviour (Gagnon et al., 2003). *Social norms* refer to the pressures and expectations surrounding an individual that influence ways of behaving, or cause an individual to perform a given behaviour (Cialdini, Reno, & Kallgren, 1990). Affective factors are emotional responses towards the environment. Emotion is considered a fundamental aspect of a motivational state directed to reducing individual water consumption (de Miranda Coelho, Gouveia, de Souza, Milfont, & Barros, 2015). The emotion attached to a behavioural decision may depend on a rational evaluation of consequences, and includes the relative strength of the positive or negative emotion. Thus, positive and negative emotions serve as predictors to conserve water resources (de Miranda Coelho et al., 2015). The wide and inclusive focus of TIB combines cultural, social, and moral constructs that are not accounted for in other theories, such that the possession of strong motivation and opportunity is a guide to the probability of an individual's enacting water saving behaviour (Triandis, 1977).

TIB has been applied in the field of information technology adoption. Thompson, Higgins, and Howell (1991) found that social norms and three components of expected consequences accounted for 40% of the variance in workers' behaviour in a study which examined the influences on personal computer use. A total of 81% of the variance in physicians' intentions to use telehealth was explained by TIB in a study of telemedicine

adoption (Gagnon et al., 2003). Furthermore, three constructs of the TIB have been augmented with the TPB and used in a health study conducted to predict and explain nurses' adherence to universal precautions when performing venipunctures (Godin, Naccache, Morel, & Ébacher, 2000). In a study conducted to examine physical activities behavior, past behavior was included as an additional variable to explain more variance in the behavior (Jackson et al., 2003).

Others, such as Luca and Suggs (2013) and Truong (2017) confirmed that TIB has not previously been used to predict or explain water consumption behaviour in social marketing. Using TIB as a framework for this study provides the advantage of going beyond individual psychographic focus present in theories commonly applied in social marketing, extending consideration to the external influences on water use behaviour. The TIB may assist social marketers to understand, analyse and evaluate segments, and support their decisions to target one or more segments in future interventions (Liu, Kiang, & Brusco, 2012).

The current study sought to extend extant literature by employing the theory of interpersonal behaviour within the market segmentation process. This research responds to a gap in knowledge and segments a resident population (a university campus offering residential services) according to their water use. Specifically, a data-driven segmentation method (Two Step cluster analysis) was used to understand whether different segments can be identified within a theoretical framework to gain insights into water consumption behaviours. The goal of this study was to disaggregate the UAE water use market into meaningful segments, each identified by demographic, geographic, physiographic, and behavioural characteristics.

5.2 Method

5.2.1 Participants

Sample participants were drawn from residents of the University of Sharjah (UoS) table (12), a national university located in University City, Sharjah, UAE, which includes students, faculty members, and general staff members living and/or working inside the main campus.

Table 12: Target population sample response rate

Target population	# participants	Complete responses	Response rate
Students	15669	965	6.1%
Staff-members	1177	175	14.8%
Faculty-members	713	210	29.4%
Total	17559	1350	7.7%

5.2.2 Materials

A survey instrument was used to collect data. The survey comprised geographic, demographic, psychographic and behavioural measures and was presented in English. Psychographic items were drawn from previously validated scales for the TIB constructs Table 13 (more details appendix 1). Pilot testing of the survey was undertaken by staff within the Marketing Department of the UoS, and their friends and families, prior to the study's implementation. As a result of pilot testing, the readability of the survey was improved before its distribution.

Table 13: The TIB constructs source and reliability

Constructs	items	Source in the literature	Answer options	Current study/ Cronbach's Alpha
Awareness	3	(Gregory & Leo, 2003; Williams & Syme, 1989) ; Staddon Consulting Services, 1992;.	1=strongly disagree to 7 strongly agree	0.94
Attitudes	3	Aitken, McMahon, Wearing, and Finlayson (1994)	1=strongly disagree to 7 strongly agree	0.85
Social norms	7	(Perugini & Conner, 2000)	1=strongly disagree to 7 strongly agree	0.84
Religiosity	5	(Allport & Ross, 1967)	1=strongly disagree to 7 strongly agree	0.90
Facilitating factors	4	(Dolnicar & Hurlimann, 2010)	1=strongly disagree to 7 strongly agree	0.81
Habits	7	(Aitken et al., 1994)	0=not applicable to 5=always	0.84
Emotions	7	(de Miranda Coelho et al., 2015)	0=does not describe me to 4=describe me completely	0.93

5.2.4 Procedure

The survey was administered both online and in pencil-paper format (replicated appendix 3). All surveys were administered during October and November 2016, following the granting of ethical approval (2016/368) for the study. The UoS administration provided a list of residents' email addresses, which was used to invite 17,559 residents to participate in the 15-20 minute online survey. The online survey was managed through Limesurvey Production Environment V1.9x. The online survey received a low response rate of 5%, despite the three reminders sent by authors, and one reminder was sent by the UoS administration. Therefore, there was a need to increase response rate by administering additional surveys in the pencil-paper format.

5.2.4 Data Analysis

The advantage of using Limesurvey software is the ability of the software to export collected data to SPSS file directly. Therefore, 875 responses were imported from Limesurvey to SPSS, and 475 pencil-paper version were manually entered. All data were combined and analysed together.

To assess the reliability and validity of the data, a total of nine congeneric models were examined using AMOS 24 for each construct item to identify loading factors for items; survey items with standardised regression coefficients under 0.60 were deleted one at a time (Byrne, 2016). Two-step cluster analysis in SPSS 24 was conducted to segment the participants.

5.3 Results

Participants comprised a purposive sample of 1,350 respondents from one residential university population. This represented a response rate of 7.7%, with a total of 875 respondents completing the online survey, and 475 respondents completing the paper survey. The sample mostly comprised of students (72%, $n = 965$), both graduate and undergraduate, while 13% of respondents were general/administrative staff members ($n = 175$), and 15% were faculty members ($n = 210$). A total of 69% of respondents were female ($n = 932$), three quarters of respondents were single, 90% were Muslim, 64% of respondents were aged under 22 years, and almost 75% of respondents reported they did not pay for their water use. (Table 14) below summarises the demographic distribution of the participants.

Table 14: Demographic distribution

Participants characteristics	Frequency	Percentage
Income (AED)*		
Less than 5000	643	47.7
5000-10000	206	15.3
10001-20000	204	15.1
20001-30000	196	14.5

30001-40000	55	4.1
Above 40000	44	3.3
Paying for water use		
No	988	73.2
Yes	361	26.8
Type of accommodation		
Students dorms	256	19
Apartment/flat inside the university	97	7.2
Semi-detached house inside the university	74	5.5
House inside the university	120	8.9
Flat outside the university	290	21.6
House outside the university	479	35.5
Other	27	2
Nationality		
Local emirate	351	26
GCC* countries	166	12.3
Arab nationality	470	35
Western nations	66	5
African	37	2.7
Indian	86	6.4
Pakistan	29	2.1
Middle-east	92	6.8
Other	53	3.9
Material status		
Single	1000	75
Married	263	19.5
Divorced	7	.05
Other	80	6
Employment		
Students-unemployed	853	63.2
Students employed	112	8.3
Unemployed	23	1.7
Staff	136	10
Faculty	198	15
Part-timer	9	.7
Visiting	3	.2
Other	16	1.2
Religion		
Muslim	1216	90
Christian	55	4.1
Hindi	47	3.5
Buddhist	11	.8
Other	7	.5
None	10	.7
Education		
High school	174	13
BA-students	709	52.5

Graduate students	52	3.4
Bachelor	118	8.7
Master	128	9.5
PhD	158	11.7
Other	10	.7
Age		
18-22	865	64
23-30	192	14.2
31-40	153	11.3
51-60	59	4.4
Above 60	10	.7
Gender		
Female	932	69
Male	417	31

*United Arab Emirates Dirham *Gulf Countries Council

5.4 Confirmatory Factor Analysis

This study used confirmatory factor analysis conducted in SPSS Amos 24. Random missing data was replaced with the mean for the same variable (Zikmund, Babin, Carr, & Griffin, 2013). The measurement model demonstrated a good fit to the data of $\chi^2 = 1275$, $DF = 248$, $p < .001$, GFI = 0.93, TLI = 0.93, CFI = 0.95, and RMSEA = 0.055. Further examination indicated that factor loadings were above .50 (Hair, Anderson, Babin, & Black, 2010).

The reliability and validity of the TIB construct scales were examined (see Table 16). First, the Composite Reliability (CR) of each construct exceeded 0.7, indicating strong reliability of all constructs except for attitude and indoor habits (Adedeji, Sidique, Rahman, & Law, 2016). Second, the Average Variance Extracted (AVE) for awareness/knowledge, emotions, religiosity, social norms, facilitating factors, and outdoor habits constructs were greater than 0.5. Therefore, each of these constructs was deemed to have convergent validity (Adedeji et al., 2016). The attitude construct (0.48) exhibited borderline convergent validity, while indoor habits (0.38) did not exhibit convergent validity. Maximum Shared Variance (MSV) and Averaged Shared Squared Variance (ASV) is less than AVE for personal hygiene habits, attitudes, awareness/knowledge, emotions, religiosity, social norms, facilitating factors, and outdoor habits constructs, which indicated discriminant validity for these

constructs (Adedeji et al., 2016). Indoor habits indicated partial discriminant validity evidenced by an ASV being less than AVE but an MSV that was greater than AVE. Below, (table 15) summarises the TIB constructs reliability and validity.

Table 15: Results of reliability and validity

Constructs	R	VE	SV	axR(H)	PR	TT	WR	MO	SELG	ONM	CFC	OD
HPR	.72	.56	.39	.72	.75							
ATT	.65	.48	.17	.82	.34	.69						
AWR	.86	.67	.24	.92	.05							
EMO	.90	.74	.19	.96	.17		.42					
RELG	.84	.64	.24	.96	.04	.22	.49	.44				
SONM	.84	.64	.18	.97	.19	.02	.35	.28	.36			
FCFC	.77	.64	.18	.97	.22	.04	.23	.15	.33	.42		
HOD	.83	.63	.24	.98	.36	.42	.14	.30	.06	.06	.08	
HIR	.55	.38	.39	.98	.63	.22	.14	.06	.18	.27	.24	.49

HPR: Personal hygiene habits. ATT: Attitude. AWR: Awareness. EMO: Emotions. RELG: Religiosity. SONM: Social norms. FCFC: Facilitating factors. HOD: Outdoor habits. HIR: Indoor habits

5.5 Cluster Analysis

The current study applied 19 segmentation variables drawn from all four segmentation bases: geographic, demographic, psychographic and behavioural. Geographic variables included living within or outside the main campus (Kotler et al., 2001). Demographic segmentation included income, paying for water use, nationality, marital status, employment, religion, education, age, and gender (Tkaczynski et al., 2009). Beyond demographic and geographic variables, psychographic segmentation sought to gain insights into individuals' attitudes, awareness/knowledge, emotion, religiosity, social norms, and facilitating factors (Tkaczynski et al., 2009). Behavioural segmentation included variable factors such as indoor water habits, outdoor water habits, and personal hygiene habits (Dickson, 1982; Tkaczynski et al., 2009).

Two-step cluster analysis was conducted to determine whether segments were observable. The analysis produced a sample with a silhouette measure of cohesion and separation of 0.3. A silhouette of more than 0.0 is needed for the within-cluster distance, and

for the validity of the between-cluster distance to be acknowledged (Norusis, 2011). A cross-validating method was carried out by dividing the total sample in half and repeating the identical analysis on each half of the sample (Punj & Stewart, 1983). A three-segment solution with 19 segmentation variables was accepted as the final solution. Individual variable predictor importance scores (ranging from 0 = least important to 1 = most important) were then assessed.

Emotion was the most distinguishing factor, with a predictor importance score of 1.0, followed by personal hygiene habits (0.83), awareness/knowledge (0.75), attitude (0.67), indoor habits (0.57), outdoor habits (0.43), and social norms (0.24). Least important were facilitating factors (0.13).

The first segment (*Regular users*) consisted in 25.2% of respondents, the second segment (*Conscious users*) represented 50.7%, and the third segment (*Careless users*) 24.1% of respondents. One-way ANOVA tests were performed on the continuous variables to examine group differences between these segments. (Table 16) below, summarises segment profiles.

Table 16: Segments profiles

Variables/constructs	Total		Regular segment 25.2% N=340		Conscious segment 50.7% N=684		Careless segment 24.1% N=326		Importance
	Mean	SD	Mean	SD	Mean	SD	Mean	SD	
Psychographic/ behavioural									
Emotion	.1	.1	.0	.1	.7	.5	.7	.9	.0
Habits/personal	.1	.2	.9	.9	.6	.8	.5	.1	.8
Awareness /knowledge	.9	.5	.4	.8	.6	.5	.8	.2	.8
Attitude	.5	.4	.1	.3	.7	.8	.6	.5	.7
Habits/indoors	.8	.3	.0	.9	.6	.2	.9	.9	.6
Habits/outdoors	.4	.3	.4	.0	.0	.0	.6	.5	.4
Social norms	.7	.3	.9	.4	.9	.2	.2	.0	.2
Facilitating factors	.7	.6	.9	.4	.8	.7	.1	.2	.2
Religiosity	.4	.4	.5	.5	.8	.2	.3	.1	.0

*Significant at the $p = 0.001$ level

Regular users were predominantly young (aged under 22), female, unemployed students reporting a low monthly income (US\$2,700.00). Approximately one-quarter (26%) paid for their water usage. Half of the individuals in this segment were single and lived with family, reported being Muslim, and considered themselves to be religious ($M = 3.9$, $SD = 1.4$). The results indicated that regular users ($M = 3.1$, $SD = 1.3$) have more positive attitudes than other segments. Awareness/knowledge ($M = 4.4$, $SD = 1.8$) and social norms ($M = 3.9$, $SD = 1.4$) measures were low for this segment.

Conscious users made up the largest segment (50.7%), which was characterized by individuals with predominantly higher education (faculty members), who were older, had a high monthly income of US\$6,000 and above, were married and lived on campus. Respondents in the conscious users' segment were from India, Pakistan, and/or were Arab nationals, and were divided more or less evenly by either paying for the water they used, or not. In this segment, people identified as being very religious ($M = 5.8$, $SD = 1.2$). The attitude of conscious users towards water conservation was unexpectedly less positive than the other two segments ($M = 1.7$, $SD = 0.8$). However, this segment showed an overall higher level of awareness/knowledge ($M = 6.6$, $SD = 0.5$), and emotion ($M = 3.7$, $SD = 0.5$). The conscious users segment expressed their susceptibility to influence by people around them, based on social norms ($M = 4.9$, $SD = 1.2$). Moreover, this segment was found to be influenced by facilitating conditions, such as price changes and water restrictions ($M = 4.8$, $SD = 1.7$). Finally, their water behaviours, e.g. outdoor habits ($M = 1$, $SD = 1$), indoor habits ($M = 2.6$, $SD = 1.2$), and personal hygiene habits ($M = 1.6$, $SD = 0.8$), were less marked than in the other two segments.

Careless users formed the smallest (24.1%) segment, which mainly comprised of unemployed students aged 18 – 22 years, who did not pay for water usage, were local

(Emirate and Arab nationality), were Muslim, and lived on campus. The attitude of the careless user segment was above the mean ($M = 3.6$, $SD = 1.5$), and its awareness/knowledge score was higher than the average of the sample population ($M = 5.8$, $SD = 1.2$). The careless user segment had higher social norms ($M = 5.2$, $SD = 1.0$), and facilitating factors ($M = 5.1$, $SD = 1.2$). This group's outdoor habits ($M = 2.6$, $SD = 1.5$), indoor habits ($M = 3.9$, $SD = 0.9$), and personal hygiene habits ($M = 3.5$, $SD = 1.1$) were stronger than those of other segments (see Table 16).

5.6 Discussion

The social marketing research tradition to date has been slow to adopt explanatory behavioural theories (Truong, 2017) and audience segmentation (Kubacki & Rundle-Thiele, 2017). By applying theories of behaviour, researchers can enlarge the value of social marketing projects and segmenting the market by helping to identify factors that influence behaviour for groups within that market displaying different characteristics (Lotenberg et al., 2011). Therefore, the aim of this study was to bridge the gap in the social marketing literature, by applying the TIB constructs in a water use market segmentation study using a data-driven segmentation method (Two-step Cluster analysis).

The current study contributes novel findings to the literature. Most importantly, this research applies TIB for the first time in social marketing demonstrating how this integrated framework can be used to explain the water use behaviour of individuals. Second, the study extends theory application in segmentation of the target market, providing a clear example of how TIB and four segmentation bases: demographic, geographic, psychographic, and behavioural, were used to identify segments in the context of water use.

The main result of this data-driven social marketing segmentation study, guided by TIB constructs (knowledge/awareness, attitude, emotion, religiosity, social norms, facilitating

factors, and habits), was the identification of three distinct segments, whose differentiating characteristics could be described in detail.

The findings of this study support previous research which suggested that market segmentation based on behavioural theory might lead to more clearly defined segments, and provide a wider view of generated segments (Schuster et al., 2015). Extending on earlier research, the current study highlights attitudinal and behavioural contrasts at a segment level. For example, the conscious water users' segment, who were more knowledgeable, felt positively about conserving water, and whose consumption habits reflected those emotions, had poorer attitudes than careless users, whose better attitudes but excessive consumption habits indicated an attitude-behaviour gap. In line with previous studies, positive attitudes and emotions were found to not necessarily correspond with behaviour (Parker, Aleti Watne, Brennan, Trong Duong, & Nguyen, 2014).

By identifying facilitating factors, social marketers in the UAE can design a more effective social marketing mix aimed to influence the water consumption behaviour of groups within the target audience. This study aligns with Lee and Kotler (2011) and Lefebvre (2011), in proposing that social marketing efforts would be most efficiently directed to the segment with excessive water consumption habits. This study provides evidence that segmenting the water use market in the UAE can offer a wider picture of consumption patterns within an audience composed of distinct segments based on individuals' water consumption habits, attitudes, emotions, social norms, and facilitating factors influencing their consumption.

This study showed that segmentation can and should be applied in formative research to gain insights from a particular market as the basis of program and intervention design, which ensures that unique messages respond to the parameters of each group's behaviours, attitudes, preferred media, and language. Application of segmentation is expected to increase the return on investment in behaviour change programs (Alcalay & Bell, 2000). It is also important that

segments be large, different, reachable, actionable, steady, parsimonious, familiar, relevant, and compatible (Hunt & Arnett, 2004; Inoue & Kent, 2014).

Third, this study applied the four segmentation bases, namely, demographic, geographic, psychographic, and behavioural (Dibb, 2017). Finally, this research contributes to the literature by offering a social marketing segmentation study of water consumption habits whose aim is to generate distinct segments from one heterogeneous university residential campus in a Middle Eastern country challenged by water scarcity. Therefore, there is a need to link the TIB constructs with target segment actual consumption behaviour.

5.7 Limitations

This study has certain limitations. First, the study used a convenience sample of English speakers from one large UAE university (students, staff members, and faculty members), a sample that can be considered educated beyond average and which has, moreover, greater access to the facility of free water compared to populations in other settings. Future studies could collect data from an expanded sample, for example, from residents of rural areas and low-income families, to derive a more comprehensive understanding of the UAE population for larger-scale community interventions. Furthermore, the current study is limited to self-report data. While self-reporting is the most widely used measurement method in social science research (Sallis & Saelens, 2000), its weaknesses due to social desirability bias and potential inaccuracies of data due to selective memory bias need to be acknowledged (Warnecke et al., 1997). In future research, measurement of actual water consumption behaviour, through mechanical observations (Bogomolova, 2017), could be made concurrently to verify the accuracy of self-reported measures. Ideally, observations would be linked to individual self-reports.

Quantitative surveys are robust but limited in scope (Punch, 2013). Therefore, this survey has allowed the researchers to comprehend the identified segments to the extent of the

measures utilised in the study. However, non-response bias should be acknowledged as a limitation of survey research. We suspect that the low completion rates for the survey (both online and pencil-paper modes) were related to Language. Therefore, our findings cannot be generalised beyond English speaking residents of the UoS, UAE. To avoid this limitation in the future, considerable attention must be given to the problem of non-response bias by posting the survey in all common languages in the country (Hill, Roberts, Ewings, & Gunnell, 1997).²

A lack of prior research studies on the application of TIB in social marketing (Truong, 2017) was noted. Some constructs did not show validity when tested in measurement models, suggesting that some scale development is necessary.

While application of the social marketing benchmark criterion of segmentation is recommended in all social marketing studies, empirical testing to ascertain whether application of segmentation enhances segmentation effectiveness remains absent. A large-scale field experiment is recommended to examine whether a program that caters differentially to unique segment needs and wants can outperform a campaign that is designed and implemented broadly across an entire market.

5.8 Acknowledgment

The authors would like to acknowledge the participants in this study for their time and effort and thank the University of Sharjah for their support in the data collection process.

5.9 Declaration of Conflicting Interests

The author(s) declared no potential conflicts of interest with respect to the research, authorship, and/or publication of this article.

² We thank an anonymous reviewer for this feedback

5.10 Funding

The author(s) received financial support from Griffith University to enable the research, authorship, and/or publication of this article.

Chapter six (study3): The relative merit of two segmentation approaches: Executives views and a cost-benefit analysis

Funding

The lead author received financial support from Griffith University to enable the research, authorship, and/or publication of this article.

Contributors

The study was designed by Ali Ibrahim with support from Sharyn Rundle-Thiele. The study was analysed by Ali Ibrahim, Sharyn Rundle-Thiele and Kathy Knox. Ali led the writing, Sharyn Rundle-Thiele and Kathy Knox provided input on the analytical interpretation and critical contribution to the writing.

Conflict of Interest

None of the authors declare any competing interests.

Acknowledgements

The authors wish to thank the blind reviewers for their time and suggestions.

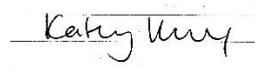
Authors Signature

Ali Ibrahim

Prof. Sharyn Rundle-Thiele

Dr. Kathy Knox

Ali Ibrahim



Chapter six

6.0 The relative merit of two segmentation approaches: Executives views and a cost-benefit analysis

Abstract

There is a strategic need for social marketers to explore and understand the target audience. This closer understanding of citizens' attitudes contributes value. Segmenting the target audience in social marketing can give a more nuanced understanding of a market, given that different segments may have different characteristics which impact their response to social marketing programs. Different segmentation approaches can be applied, and each approach may offer unique benefits and costs, yet studies have not, to date, considered the relative costs and benefits of different segmentation approaches. Responding to this gap, the current study examines costs and benefits for two different segmentation approaches, employing a minimax simple cost benefit analysis matrix and decision maker perspectives. While the financial cost of quantitative segmentation approaches was higher, decision makers trusted the quantitative approach more. This study bridges a gap in the literature by applying cost benefit analysis as a tool and combining this with decision maker perspectives to examine two alternate segmentation approaches. This study was not without limitations. Future research should consider a wider sample from different levels of management, and utilize different segmentation methods to extend our understanding of the relative merit of segmentation approaches.

Keywords: Costs Benefit Analysis, Qualitative Segmentation, Quantitative Segmentation, Social Marketing.

6.1 Introduction

Segmenting a target audience can lead to identification of segments, giving a more nuanced understanding of the differences between identified target audience segments (Sarstedt & Mooi, 2014). This understanding can help social marketers to more effectively apply limited social marketing resources (Dibb & Simkin, 2016). Furthermore, application of a segmentation strategy helps social marketers to make the most of limited resources (West, Ford, & Ibrahim, 2015). Social marketers promote desired behaviors to an audience, offering an exchange that aims to enhance benefits and reduce barriers (Xia et al., 2016). A recent systematic review of 173 social marketing interventions addressing physical activity reported that 92 interventions utilized three benchmarks or social marketing principles. Further, this review identified that interventions utilizing more benchmarks were more successful than their counterparts (Xia et al., 2016). Therefore, there is a need to adopt a greater number of social marketing benchmarks. Segmentation is one of social marketing's benchmarks, or key principles (Andreasen, 2002; French & Blair-Stevens, 2006).

A review of the literature indicates that social marketing is still behind in applying segmentation approaches to inform program planning, implementation and evaluation (Dietrich et al., 2017). Potential reasons for low use of segmentation may include (but are not limited to) difficulties in gathering sufficient quality data to conduct segmentation studies (French, 2017), and limited available financial resources and/or analytical capability (Lefebvre, 2013). A further reason for limited application of segmentation in social marketing programs may be a consequence of a lack of key decision maker (e.g. executives) knowledge of the benefits that can arise from applying segmentation in social marketing program planning and design. In a review of 93 social marketing interventions, only 15 studies (16%) reported the application of segmentation (Dietrich et al., 2017). Taken altogether, while evidence points to the benefits of applying segmentation in order to better utilize limited

resources available for social marketing programs, segmentation is rarely applied and/or reported in social marketing programs (Newton, Newton, Turk, & Ewing, 2013).

A review of the literature indicates that qualitative approaches may be applied to identify different segments (Bond & Morris, 2003) for organizations challenged by limited budgets, given lower research costs and expertise (Longfield et al., 2016), and/or organizations targeting small populations given that large sample sizes are needed for quantitative segmentation methodologies. On the other hand, quantitative segmentation approaches are more frequently used to identify distinct segments (Dibb & Simkin, 2016; Dolnicar et al., 2016). Quantitative approaches may, however, involve longer researcher time, advanced software application, expertise, and proportionately higher financial costs (Randle & Dolnicar, 2017).

While a range of alternate segmentation approaches are available to social marketers, limited consideration of different segmentation approaches has been put forth. Responding to this gap, the current study first aims to apply cost benefit analysis to examine the relative costs and benefits of a qualitative and quantitative segmentation approach in a water use reduction context. Second, this study has sought to capture executives' perspectives for the two segmentation approaches applied in the same context to gain insights into executive knowledge about and the perceived usefulness of segmentation, ensuring comparisons extended beyond financial cost.

6.2 Cost benefit analysis

Cost-benefit analysis is a tool frequently used by business and government officials to support trade-off analysis between competing alternatives (Kleindorfer & Saad, 2005). In the case of a quantitative cost benefit analysis, costs and benefits are expressed in monetary terms permitting a direct comparison to be made. In a quantitative cost benefit analysis the relative cost-benefit is articulated in terms of either a *benefit/cost ratio*, or the *net economic*

benefit, which is simply the sum of the value of benefits less the sum of costs (Ackerman & Heinzerling, 2002). In the case of a qualitative cost benefit analysis, such a direct comparison cannot be made (Funnell & Scougall, 2004). Rather than summarising the ratio of benefits to costs, a qualitative cost benefit analysis considers relationships and trade-offs between alternate approaches (Ackerman & Heinzerling, 2002; Bergh, 2004).

A cost benefit analysis is a systematic process which helps to calculate and analyse the relative cost and features of a project or task (Mishan & Quah, 2007) which, in turn, allows alternatives that may be vastly different to be compared and contrasted. The cost benefit analysis is a tool that can be used to guide a range of business and personal decisions and is a useful means of providing a solid rationale for funding (Lee, 2017). Cost benefit analysis is used by management to determine whether a proposed implementation is worthwhile for a company or not (Archer & Ghasemzadeh, 1999). Cost benefit analysis is a quick and simple technique that any individual person, business or company can use to make non-critical financial decisions to get positive progress (Mishan & Quah, 2007).

The costs of a social marketing project are the resources expended in both financial and non-financial terms, as well as negative outcomes resulting from any social marketing project (Agénor, 2003). Contrasting costs, benefits include positive outcomes achieved and negative outcomes avoided in the short term (during the life of the project) and longer term. It is usually easier to get evidence of positive outcomes that have been achieved than negative outcomes that have been avoided (Sabates-Wheeler, Mitchell, & Ellis, 2008). In some analyses, benefits also include additional resources leveraged if these are then effectively utilised (Agénor, 2003).

6.2.1 The challenges of cost benefit analysis

In social marketing, converting benefits into monetary value can present a challenge (De Groot et al., 2012). For example, in early childhood social marketing interventions it is

difficult, if not impossible, to attach a monetary value to outcomes such as a mother's greater satisfaction with her relationship with her child (De Groot et al., 2012). We cannot easily determine the monetary value to society of the greater academic readiness of children participating in an early childhood project (Agénor, 2003), given many subsequent years of schooling where value can be more easily attributed. Furthermore, separating out the outcomes of the social marketing project from those outcomes that would have occurred anyway (in the absence of the project) is rarely straightforward (Robson & McCartan, 2016).

While difficult to consider, identifying and describing related costs, both financial and non-financial, of social marketing remains critically important, given that monetary and other resources are expended and negative outcomes resulting from conducting projects may arise (Robson & McCartan, 2016), all of which bear a cost to the community. Similarly, should a project not proceed, potential positive outcomes and resources leveraged might be lost (Sweetman, Luthans, Avey, & Luthans, 2011). More attention, then, needs to be directed towards examining the relative value of social marketing activities.

A major challenge of any cost benefit analysis arises from the risk of over- or under-estimating costs or benefits (Funnell & Scougall, 2004). Therefore, any cost benefit analysis must err on the side of caution to ensure that any estimates of costs/benefits in monetary terms are conservative and not inflated in any way. Equal consideration must also be given to ensuring the accuracy of estimates.

6.2.2 Using cost benefit analysis

Cost benefit analysis (CBA) may look intimidating and complex. However, CBA is a useful technique for providing information about the accuracy of applications and additionally, guidance for future projects (Boardman, Greenberg, Vining, & Weimer, 2017). Using CBA has been a consideration of the literature since the early 19th century. This analytical technique has been used by US governmental agencies in environmental management

(Hanley, Spash, & Walker, 1995). Since the 1960s the application of CBA has expanded to “human beings” and “physical investment programs” (Sherman, Siebers, Aickelin, & Menachof, 2013). CBA allows comparison of a wider range of scenarios. For example, in the New South Wales Area Assistance Scheme – Australia (2002) a quantitative and a qualitative cost benefit analysis of funded projects was undertaken to evaluate the scheme (Funnell & Scougall, 2004). The CBA was conducted in areas such as funding not-for-profit organizations and local governments to run programs that deliver concrete change to vulnerable communities. The outcomes of the project were enhanced by CBA: more fully developed proposals and better-planned projects; more coordination between different project areas; distribution of funds to areas with relatively high benefits; and organizations involved were encouraged to explore alternative funding sources and increase available funding (Boardman et al., 2017).

The World Health Organization (WHO) used CBA to evaluate the results of eight interventions that aimed to reduce levels of indoor air pollution and improve health. The use of CBA played an important role in guiding public policy-making and investment in further interventions. CBA permitted alternatives judged to have a high ratio of benefits to costs to be funded and, in turn, these projects succeeded in influencing community and people’s health. Overall, interventions were of high value because the model developed by the project was expected to be transferable to other communities (Hutton, Rehfuess, & Tediosi, 2007).

CBA has been used to evaluate the effectiveness of water resource management projects in Europe and North America. For example, the results of one study led to high value outcomes, and additional funding was attracted from a variety of sources, producing outcomes that far outweighed the value of the initial funding committed to evaluating the projects using CBA (Brouwer & Pearce, 2005). Overall, applying CBA was deemed to have enhanced the performance of the project (Brouwer & Pearce, 2005). Furthermore, in a

Spanish study aiming to evaluate economic, environmental and resource availability of water-reuse projects, CBA indicated that only a proportion of projects were economically viable (Molinos-Senante, Hernández-Sancho, & Sala-Garrido, 2011).

A CBA of Chicago Child-Parent Centres was undertaken, using data from a cohort of 1,539 program and comparison-group children born in 1980 who participated in the Chicago Longitudinal Study. This analysis indicated that the measured and projected benefits of preschool participation, school-age participation, and extended program participation exceeded costs. In 1998 dollar values, the preschool program provided a return to society of \$7.14 per dollar invested, increasing economic well-being and tax revenues, and through reduced public expenditures for remedial education, criminal justice treatment, and crime victims (Reynolds, Temple, Robertson, & Mann, 2002).

In a cross-sectional sample of 1,272 persons to estimate the benefits in a cost-benefit analysis of a condom social marketing (CSM) program in Tanzania, the analysis supported the program's social value, showing a benefit-cost ratio in the range of 1.31 to 1.72 (Brent, 2009a). In another social marketing project drawing on panel data captured over an eight year period from 20 Tanzanian regions, the direct and indirect effects of female primary education on HIV/AIDS rates were estimated through identification of the benefits and costs of educating girls (Brent, 2009b).

The above studies showcase deploying CBA in social projects to examine program outcomes and compare and contrast the relative merits of alternate approaches. Quantitative cost-benefit analysis approaches were, however, observed to predominate, and this focus on economic approaches has been criticised (Bergh, 2004). It is argued that a qualitative stance complementing monetary approaches is needed to ensure that attention is also directed towards understanding extreme events, structural change and the complexity of the situation (Bergh, 2004). In the face of uncertainty, quantitative analysis can omit important, often

nuanced, information and information can be unreliable if its underlying assumptions deviate substantially from reality (Hanea et al., 2017).

There are several approaches to cost benefit analysis which can be deployed to evaluate program outcomes in the social field, such as the United Nations Industrial Development Organization (UNIDO) method (Kumar, 2002), the Little-Mirrlees approach (Little & Mirrlees, 1990), Shadow Prices (Zhou, Zhou, & Fan, 2014), Integrative Cost-Benefit Matrix, and Minimax Simple Cost Benefit Matrix (Ziller & Phibbs, 2003). This study applied the minimax in simple cost benefit matrix, in order to make a direct comparison between the two segmentation approaches, quantitative vs. qualitative. The minimax approach has been applied previously to evaluate natural disaster mitigation investments (Kramer, 1995) and in the UK in social defence protection programs (Schofield, 2018).

6.3 Method

This section summarises the methods used in this study. First, the sampling approach, units of analysis, and data analysis of decision maker semi-structured interviews (Study 1) are discussed, followed by the cost benefit analysis method (Study 2).

6.3.1 Study one – Decision maker interviews

6.3.1.1 Sampling approach

Study one employed a purposive sampling approach to focus enquiry on UoS executives because the selected informants can inform the understanding of the research questions (Creswell, 2012). The UoS executives were from applied scientific backgrounds, including engineering and mathematics.

6.3.1.2 Unit of analysis

A semi-structured interview protocol was used (replicated appendix 4) to collect data from executives of the UoS. Part of this study's rationale was to capture the views of executive-level UoS personnel on the alternative segmentation approaches, the focus of this study, as

applied in the research phase. In addition, the study sought to understand their viewpoint on the perceived costs and benefits of the respective segmentation approaches applied to their organization as the research setting. Beliefs about segmentation and the optimal approach, and the segments identified within the UoS audience were explored. The UoS executives are representative of the stakeholders whose trust social marketers need to gain to proceed with any future social marketing project.

First, an overview of results from the two segmentation studies (qualitative and quantitative studies) that were conducted by the researcher were shared with participants. Next, participants were asked their opinions on the different segmentation approaches applied. Finally, participants were asked to identify the costs and benefits associated with each approach.

Participants were informed that the qualitative segmentation study used six focus groups and consisted of 43 participants who were students, staff members, and faculty members. This approach generated four major segments (comfort, careless, contradictory, and price-sensitive users). The quantitative segmentation study used an online survey that collected data from 1,350 participants encompassing both staff and students living on and off the university site. The two-step cluster analysis method was used to analyse collected quantitative data, and this approach was theoretically informed. The quantitative segmentation approach generated three distinct segments (regular users (50%) conscious users (24%), and careless users (26%)) (Ibrahim, Knox, Rundle-Thiele, & Arli, 2017).

6.3.1.3 Executive interview data analysis

Following procedures outlined by Bryman (2008) and Guba and Lincoln (1994), the participant opinion data was organized accordingly. The first-level coding phase was completed through the process of manual coding of the transcripts. The manual coding of the raw data developed the memo-code, to which the following labels were assigned: expected

available segments, qualitative segment study, quantitative segment study, reliable segmentation approach, and preferred segmentation approach based on perceived cost-benefit analysis.

During the second-level coding process (pattern coding), the researcher recoded the data from the first-level coding by grouping the executives' perspectives and opinions into the following stages/phases:

1. Beliefs of executives about target audience segmentation;
2. Opinions of the executives about the segmentation approaches and the associated costs and benefits; and
3. Decisions of executives based on cost-benefit analysis (qualitative vs. quantitative segmentation approach).

It is important to note that while the process of analysis was taking place, the researcher contacted interviewees for additional data in two instances: (1) to gain a more detailed response, and (2) where doubt or inconsistencies were perceived. The data were organized in a sequential and coordinated manner, reviewed recurrently, and coded regularly. Because this research collected data from four different key executives, the researcher analysed each unit separately, and undertook a cross-unit analysis for comparative analysis after completing each individual. Each semi-structured interview averaged 45 minutes.

6.3.2 Study two – cost benefit analysis

6.3.2.1 Cost benefit analysis approaches

A cost-benefit analysis was undertaken drawing on staffing costs for the project. This cost benefit analysis study followed the minimax approach applying a simple cost–benefit matrix (Ziller & Phibbs, 2003) in order to identify the costs of the two segmentation approaches, namely qualitative and quantitative. The simple matrix gave the two applied segmentation approaches equal standing in unquantified data and other impact variables. The simple cost-

benefit matrix did not indicate where relative importance for each approach should lie. Furthermore, there is nothing to clearly identify that one cell in the matrix is more important than any other and no formula applied for comparison (Ziller & Phibbs, 2003). In addition to financial costs, the cost benefit analysis considered nonfinancial costs and benefits (Ziller & Phibbs, 2003).

6.4 Results

The results section presents the outcomes of the two studies, namely study one and study two.

6.4.1 Study one results

Interviews began with executives being asked if they could identify segments. Results suggested that understanding of possible segments varied substantially. Typically, executives selected one or two factors as a segment base (e.g. place lived), dividing the market into two segments:

P1 *“Aware (of the water shortage situation) and unaware residents. I think more people will fall into the unaware category”* (Male 55 year old, chair of sustainable committee).

P2 *“I think we have two clusters, males and females, mainly housewives and maids”* (Male 64 year old).

P3 *“Two major segments inside the university are locals and expatriates”* (Male 68 year old, living inside the campus).

P4 *“I guess that the residents inside the university can be categorized into older and younger people”* (Male 73 year old, living inside the campus).

After viewing segments obtained from the two different approaches, executives were asked to outline the costs and perceived benefits of the segmentation approaches they had been presented with. Executives believed the collected data for the quantitative study had come from a larger sample pool of residents, and this was viewed as being a more trustworthy approach.

P1: *“I trust the quantitative segmentation approach, because the generated segments were from a larger participant pool”* (Male 55 year old, chair of sustainable committee).

P3: *“Nice to have such results, from unknown field for us, to me both approaches gave remarkable results, but I think quantitative more trusted, because it’s less biased than the qualitative, regardless of higher costs”*.

P4: *“definitely, the quantitative study needs more time, people, and investments in the applications and computers, but outcomes benefits supposed to be higher and reliable”*.

Additional benefits of the quantitative segmentation approach that were identified by executives included accuracy and a more scientific approach.

P1: *“I know costs are going to be high, but results are going to be accurate”*. *“I am an engineer, so I am with the scientific approach quantitative approach”* (Male 64 year old).

P2: *“I have no doubt that the costs from time, expertise, and software will be higher, but you have to invest in your studies”*.

P4: *“I’m a strong supporter of quantitative approach because it is done based on opinion of the majority of residents”* (Male 73 year old, living inside the campus).

Analysis indicated a clear preference for the quantitative segmentation approach.

While the relative perceived advantages of deeper information from the qualitative approach were noted by executives the power of a quantitative segmentation to deliver the confidence that segments were derived on the basis of a larger sample of respondents was viewed favourably by executives.

P3: *“the large sample of the quantitative approach, made me feel confidence in the generated segments. However, the qualitative has the advantage of talking to the people and to get more insights”* (Male 68 year old, living inside the campus).

Analysis indicated a clear preference by executives for the quantitative segmentation approach. Executives clearly indicated that the perceived advantages of the quantitative approach outweighed the higher costs on the basis that a wider and potentially more representative sample could be gained.

P1 “Yes, the cost is higher in doing quantitative segmentation, but the benefits are also higher and the data is more trustworthy. If we have to do something like that, it should be worth it. I would chose the quantitative approach” (Male 55 year old, chair of sustainable committee).

P2 “You know the university has all kind of resources, funds, time, and expertise. Therefore, if we want to do a research it should be at a larger scale, in order to generate valid results. Thus, I will choose the quantitative approach to do a segmentation study, regardless of higher costs, I expect more solid outcomes and results. In the meantime, the qualitative approach is a good to do at a small scale for quick feedback” (Male 64 year old).

P3 “May be for small organizations or a quick study, the qualitative approach might be helpful, but for larger scale studies the quantitative approach is more convincing and appealing for decision makers. May be costs of this approach are higher but also the benefits should be more and can be used in different areas” (Male 68 year old, living inside the campus).

P4 “I will use the qualitative segmentation approach to gain more insights, then I will conduct a quantitative approach. So, I don’t want to miss any chance from the two approaches. Good results “benefits” important to me than “costs” at this level” (Male 68 year old, living inside the campus).

6.4.2 Study two results

The following, table (17), summarizes the CBA of the two segmentation approaches considered in this study, namely qualitative and quantitative segmentation.

Table 17: Summary of CBA for the two segmentation approaches

Qualitative Segmentation		Cost (AUS \$)		Quantitative Segmentation		Cost (AUS \$)	
		Min	Max			Min	Max
Tasks accomplished	Period in hours			Tasks accomplished	Period in hours		
Phase 1: Preparation stage	Searching for theory to guide the study	0	0	Searching for relevant theory to guide the study.	5-10	385	777
	Preparing the focus groups' protocol	4-6	308				
	Getting ethical clearance	4-6	308	Constructing a survey to constructs of the theory of planned behaviour (TIB).	15-20	1,155	1,540
				Prepare and revise the survey to	10-12	770	924

					make it culturally appropriate			
					Getting ethical clearance by relevant parties	8-10	616	770
					Loaded and launching the survey online (on Limesurvey tool), and pilot test, and made the suggested modifications.	20-24	1,540	1,848
					Total cost of phase 1		4,466	5,852
					Inviting participants and arranging focus group meetings	2-4	144	308
					Obtaining email list and getting the University of Sharjah's access approval.	1-3	77	231
					1-1 Focus group meetings 5 hours	6-6	462	462
					Online data collections, sending reminders, responding to participants inquires and follow up.	10-12	770	924
					Pencil and paper data collection to increase	10-12	770	924
					Data entry for 475 pencil and paper survey on SPSS.	15-20	1,155	1,540
					Total cost of phase 2		606	770
					Total cost of phase 2		2,772	3,619
					Transcription of the focus 6 groups sessions 5 hours	15-15	1,155	1,155
					Cleaning and preparation of data for two-step cluster analysis	10-15	770	1,155
					Data analysis, and coding	15-20	1,155	1,540
					Running the quantitative analysis	4-6	308	462
					Generating segments	1-3	77	231
					Reporting the results and to generate and label the segments	10-12	770	924
					Reporting the results	6-10	462	770
					Total cost of phase 3		2,849	3,696
					Total cost of phase 3		1,848	2,541

Total cost	4,071	5,390	9,086	12,012
Min Time 56 hours, Max 70			Min time 118 hours, Max 156	

Perceived benefits of qualitative

- The qualitative approach was delivered quickly
- A small sample was used (6 focus groups), which makes qualitative approaches suitable for small markets
- Situational insights were gained directly from participants
- Lower cost

Perceived benefits of quantitative

- Data was collected from 1350 participants, ensuring diverse perspectives were gained
- Generated segments were validated
- Detailed characteristics of each segment were gained

Costs of qualitative

- Difficult to distinguish segments when compared to quantitative analytical methods
- Social desirability bias

Costs of quantitative

- Costly (time, expertise, and money)
- Social desirability bias

CBA indicated that quantitative segmentation incurred a higher financial cost compared to a qualitative approach. Non-financial costs and benefits can also be identified by CBA. Table 18 summarises the costs and the benefits for the two segmentation approaches employed in this project (qualitative vs. quantitative) drawing on CBA and decision maker perspectives.

Table 18: Summary of CBA from executive perspectives

Weaknesses	Strengths
Qualitative approach	
Limited generalisability, few key informants	Provide detailed information of participants' views, and stories (n=43)
Lack of heterogeneity when compared to Quantitative approach.	Short time
Owing to the tendency of respondents to bias in their responses, in some cases it is difficult to cleanly categorise an individual into a segment.	Low financial cost
Quantitative segmentation	
Higher financial cost and time	Segments can be drawn from a large number of participants (e.g. n=1350) maximises heterogeneity
Requires data analysis software, and expertise	Data analysis could be validated
	Detailed understanding of characteristics of segments was obtained

Combining cost benefit analysis with executive viewpoints delivered an understanding of the relative costs and benefits of the two segmentation approaches. Executives agreed on the importance of conducting segmentation for the targeted audience and also identified that both approaches helped to uncover insights which may have not otherwise been produced. Importantly, executives trusted the segments generated from the quantitative approach, due to the large sample size and the ability to validate the results, notwithstanding the higher costs.

6.5 Discussion

The aims of this study were twofold. First, decision makers were interviewed to identify the costs and benefits of different segmentation approaches. Second, a cost benefit analysis was applied to examine the relative perceived benefits and costs of each segmentation approach, qualitative versus quantitative segmentation.

This study contributes to knowledge in the field of social marketing in different ways. This study revealed that UoS executives lack knowledge about market segmentation and how segmentation might be conducted, along with the importance of segmenting the market prior to designing and planning a social marketing intervention and other programs. The lack of detailed understanding of segmentation demonstrated by executives may provide one explanation for the low utilisation of segmentation in social marketing research and practice (Kubacki & Rundle-Thiele, 2017). Executives were interested in the results, presented by the lead researcher, of the two studies conducted inside the UoS that had been undertaken to derive segments for the water use market. Therefore, it is suggested that social marketers offer support to executive stakeholders to make strategic marketing decisions. Rather than limiting their attention to everyday business, executives should be directed to take a big-picture approach to the core services they administer (Randle & Dolnicar, 2017).

Researcher questioning of executives revealed that they were unable to identify clear segments. Their understanding of possible group differences as occurs in segmentation analysis was limited to one or two variables which, in turn, would describe two distinct groups (e.g. locals versus expatriates). Therefore, executives were unable to assess the validity of different market segments using assessment criteria such as size of the segment, and the extent to which identified segments are substantial, measurable, accessible, differentiable, and actionable (Dolnicar, Grün, & Leisch, 2018; Kotler & Lee, 2008). This study provides further evidence which suggests that executives have a poor understanding of market segmentation which, again, may describe limited use of this key social marketing benchmark (Kubacki & Rundle-Thiele, 2017). The results of this study suggest there may be a need for investment in segmentation (Dolnicar et al., 2016), given that application of segmentation can assist decision makers to direct resources to disadvantaged sectors, potentially strengthening communities most in need. This study indicated that decision makers from a non-business background (the four participants were from applied science backgrounds – engineering, mathematics, and physics) nominated quantitative segmentation over qualitative segmentation. This preference occurred, despite the higher costs, because of higher perceived benefits and their greater confidence due to the number of people included in quantitative segmentation analysis.

A quantitative approach was viewed by executives as more likely to be generalised to the targeted population and a key strength was the ability to validate segments derived analytically. The preferences expressed by decision makers were reflective of the dominant approaches applied within social marketing research and practice. Most social marketing segmentation studies use quantitative approaches (Ibrahim et al., 2017; Warner et al., 2017), consistent with executives' preferences identified in the current study. Another strength of the quantitative segmentation approach nominated by executives was that data analysis

procedures and results can be validated at all stages (Rundle-Thiele et al., 2015). Finally, executives highlighted that the quantitative approach gave a comprehensive description of the different segments, valuable for informing the design of a successful marketing mix (Randle & Dolnicar, 2017). Executives also perceived weaknesses in the quantitative approach such as the higher financial costs and time involved, and the requirement for expensive software and special expertise (Dolnicar et al., 2018).

Finally, application of CBA was demonstrated in the current study. CBA can facilitate the calculation of the relative costs and benefits of alternate approaches which may not be otherwise comparable. The current study provides a case study demonstrating how CBA provides a dollar amount estimate permitting alternate segmentation approaches to be compared and contrasted, assisting in value estimation (French, 2017). CBA analysis has previously been used to compare different programs (Schofield, 2018), with considerably less attention directed towards comparing different analytical approaches applied in social marketing, and behavioural change practice more broadly. CBA offers a technique applicable to demonstrating cost savings that can be derived from choosing one method over another. Moreover, CBA assists in understanding the benefits or potential opportunity costs both financially and non-financially.

Finally, this paper demonstrates the utility of using two different approaches to consider the relative costs and benefits of different analytical approaches. A purely financial CBA would have selected qualitative segmentation, costing considerably less than quantitative approaches. A mixed method approach yielded a different outcome with executives indicating a clear preference for quantitative segmentation, which was viewed as a more trustworthy data source than qualitative segmentation due to larger sample sizes and statistical validation of segments generated.

6.6 Limitations

Limitations of this study relate to the methodology applied, the sample selected and the lead researcher (Creswell, 2013). Semi-structured interviews require data collection in an environment constructed by both researcher and participants, in order to increase credibility and dependability; it is possible that different executives would yield different study outcomes (Bryman & Bell, 2015). Another factor is selection bias, which limited this study to four UoS executives. It is conceivable that middle-level management would have had the desire to participate because they make the recommendations to top management in decision making (Bryman & Bell, 2015). The researcher did not collect precise data on time taken to design, implement and analyse the two segmentation studies, which qualified the precision of the cost benefit analysis. Also, the fact that the sample includes participants from a relatively narrow range of disciplines should be noted as a limitation of the study.

6.7 Future research

This study provides a starting point to support future social marketing research demonstrating the potential for CBA to be applied to compare and contrast alternative approaches. It is important for future research to capture the opinions of all three levels of management – first line managers, middle management, and top management – and it is recommended that more than one data collection approach be utilised, extending insight beyond executive viewpoints. It is also necessary to include more stakeholders, such as participants and recipients, non-government agencies, service providers, multiple levels of government, and the broader society and economy in any future research.

It is necessary for future social marketing projects and studies to apply specific cost benefit analysis terms, to capture the complex nature of many of the costs and benefits of the programs, and understand the multiple stakeholders involved in the programs in order to

respond to inconsistencies in data across stakeholders. Therefore, it is recommend that social marketers use advanced reporting systems such as integrative cost benefit matrices (Ziller & Phibbs, 2003).

Chapter seven

7.0 Discussion and conclusion

7.1 Introduction

This chapter provides a summary and discussion of the combined research findings, synthesising the contributions, implications and significance of this PhD research program. This chapter describes the implications of the findings for theory and practice in the social marketing domain. Limitations of the work and recommendations for future research are described.

7.2 Research purpose, design, method, and results overview

The purpose of this project was to examine application of alternate segmentation approaches focusing within one market, namely water use in a developing country (the UAE). Study one examined the use of a qualitative segmentation approach to understand whether qualitative research approaches could be used to identify distinct segments within a water use market. Factors that might influence water consumption behaviour were explored in focus group discussions. The qualitative segmentation study was able to identify four segments, which yielded situational insights, and practical suggestions for social marketers. This study was unique in its offering an application of a qualitative segmentation approach in social marketing that can be used to cost-effectively gain insights into facilitating factors that might influence the water consumption behaviour of each segment in a single study, which is particularly important for a resource-constrained field such as social marketing.

Study two was designed to extend the application of strategic social marketing by using a quantitative approach guided by the theory of interpersonal behaviour, ensuring that key social marketing benchmarks of theory were used to generate segments, and thereby offering refined consumer insights for program planning. This segmentation approach

resulted in three segments being identified, with the distinguishing characteristics of each outlined in detail. The quantitative segmentation that was undertaken encompassed four bases of segmentation (demographic, geographic, psychographic, and behavioural). Guided by an augmented model of the TIB, a rigorous application of segmentation was performed. This approach was in contrast to other examples in the literature, an extensive review of which had made clear that sole reliance on demographic and behavioural factors continues to dominate segmentation practice.

Study three was designed to compare the two segmentation approaches, namely qualitative and quantitative. Cost benefit analysis was used to evaluate segmentation approaches, and executives' perspectives on the appropriate segmentation approaches were also gathered to for comparison with the results of the analysis. This study showed that the quantitative segmentation approach incurred greater financial and time costs, but was more trusted by executives because of the larger sample involved, and the advanced applications used. Notwithstanding that CBA had identified that the qualitative segmentation approach was cheaper and faster to perform, executives had less trust in the small sample size and the potential for participant bias. This result suggests that qualitative segmentation may be only usefully applied by small organisations operating on limited budgets, or in very small markets.

Considered altogether, the three studies that were undertaken in this project have examined the segmentation process both qualitatively and quantitatively, in the context of a water use market. Given the limited resources typically available for social marketing projects, the lessons learned throughout the project's research process demonstrate that there are alternatives available for social marketers to generate segments from any target audience, even those operating with constrained budgets.

This research employed a mixed method approach across the three studies. Study one, designed to bridge the gap in the literature investigating whether qualitative approaches could be used to identify segments, involved qualitative segmentation using the focus group technique. The further purpose of this study was to give elicited greater insight into current residents' behaviours, beliefs, attitudes, knowledge, habits, and emotions towards water consumption.

Study two employed "data-driven segmentation methods", as commonly occurs in social marketing, to segment the University of Sharjah water use market. Using two-step cluster analysis, a technique that has been used frequently in social marketing (Kitunen et al., 2018; Schuster et al., 2015), data collected via survey and face-to-face interviews were analysed, guided by theory. Investigation of the capacity of TIB to explain variance in water consumption behaviour. This investigation was made prior to the generation of segments differentiated on demographic, psychographic, geographic and behavioural bases.

Study three was a mixed method approach incorporating application of the minimax simple matrix CBA technique to compare qualitative vs. quantitative segmentation approaches. The cost benefit analysis was followed by semi-structured interviews with UoS executives to capture their opinions of the two segmentation approaches.

The following section outlines how each of the research questions has been answered by the research program of this thesis.

7.3 Addressing the research questions

7.3.1 Research question one

A considerable gap exists in the literature, namely that of applying segmentation and especially qualitative segmentation to identify distinct segments within the target market. The first research question asked:

RQ1: How can qualitative methodology be used to identify managerially useful segments in the context of sustainable water use market in the UAE?

Six focus group sessions, conducted with students, staff members, and faculty members, were held within the context of the UoS to address research question one. The qualitative data were analysed, and the results revealed that a qualitative segmentation approach identified four segments of the targeted audience. These segments of water users were:

- 1- Comfort segment: This group of participants were unaware of the water situation in the UAE, and cared only about having enough water for their needs without misusing available resources.
- 2- Careless segment: This group, of mainly younger participants, demonstrated lack of knowledge combined with careless consumption behaviours.
- 3- Contradictory segment: Members of this group were particularised by their religiosity. Although they acknowledged the Islamic instruction “to save water even when you are living beside a running river”, this counsel was nevertheless not reflected in their water consumption behaviour.
- 4- Price sensitive segment: This group of participants showed a willingness to reduce their water consumption and urge their family members to also stop wasting water, if they had to pay for the water that they used.

Qualitative segmentation can offer unique insights into consumers' perceptions of benefits, costs, aspirations, needs, and values, as well as their everyday lives and behaviours. Additional factors such as perceived threat, self-efficacy, and social influences that might motivate, or discourage the target audience from adopting more desirable behaviours (Andreasen, 2012) can also be gleaned from a qualitative approach.

Therefore, the findings of this study suggest that qualitative segmentation can be applied in social marketing studies, during the formative research stage to gain insights that can more precisely inform program planning. This qualitative segmentation study permitted generation of segments together with deeper insights into factors that might influence the water consumption behaviour, needs, and consumption habits of each. This study ensured that these segments and insights were audience-oriented, and that targeted behaviour was included in the segmentation analysis, as other scholars have (Rundle-Thiele et al., 2015).

7.3.2 Research question two

Luxury lifestyles in the UAE, combined with the absence of water conservation measures and the lack of knowledge about water scarcity is costly for the country (Szabo, 2011). For example, the UAE's per capita water consumption is 550 litres a day, or 82% above the global average for water use (Reporter, 2016a; Szabo, 2011a). This formative social marketing study tried to gain quantitative insights into the factors that might influence UAE residents' water consumption behaviour, and addressed research question two:

RQ2: What are the facilitators and barriers that might influence the water consumption behaviour of UAE residents?

The study found that price, technology, religious instruction, educational programs and reduced accessibility were the main influencing factors in residents' water consumption behaviour. According to participants, the following factors might facilitate changing their water consumption behaviour:

- 1- Price: Paying for the water the use might help might residents to reduce their consumption, a suggestion consistent with previous studies (Randolph & Troy, 2008; Romano, Salvati, & Guerrini, 2014) indicating a price signal can lead to reduced water consumption. The role of government should not be limited to educational programs to raise awareness; according to participants in the current study, the

government may also need to increase the price of water as a reduction measure, and set meters for each house in order to limit the quantity of water that can be used.

However, in Randolph & Troy's (Randolph & Troy, 2008) study of about attitudes to conservation and water consumption, 50% of respondents in Sydney, Australia, didn't agree that increasing prices would either reduce demand for water or conserve it.

Furthermore, consumer responses to price increases are often inelastic, partly because people are uninformed about the prices charged by utilities (Barrett, 2004).

- 2- Technology: Using technology in the form of devices that limit the quantity of water might lead to changed water consumption behaviour (Willis et al., 2013).
- 3- Educational programs: Participants felt that there was inadequate education at all levels that informed them about the UAE's true water situation.
- 4- Religion: With more emphasis on the religious teaching relating to water use, reduction may be achieved. Therefore, the following suggestions could influence residents to reduce their water consumption behaviour and conserve the environment by: Highlighting Islamic instructions regarding water consumption and environment in general; Emphasising efficient use of natural resources and mainly water in occasions; and finally, Strengthening religious beliefs especially among children and young generations.
- 5- Reduced accessibility of water and more stringent water restrictions are potential aids to water conservation (Romano et al., 2014).

This study extended understanding about the conditions that may influence and facilitate participants reducing the amounts of water they use by presenting situational insights into the target audience. These insights incorporated voluntary and non-voluntary behaviour change, which might provide evidence that the simultaneous application of all three social marketing streams could reinforce behavioural change (Peattie & Peattie, 2009).

Therefore, social marketers and policy makers should work together in the future to design a social marketing intervention targeting water consumption behaviour applied at downstream, midstream, and upstream levels concurrently.

This study also revealed that there are some barriers which prevent the UAE residents from reducing their consumption, such as the hot climate that requires the availability of greater quantities of water, inconvenience, and the higher costs of eco-friendly appliances, but also the association of using lots of water with living a luxurious life. Dolnicar et al. (2012) found that Australians have very positive attitudes towards water conservation and water saving appliances. However, they are not taking any serious behavioural actions that match these attitudes due to reasons of inconvenience, impracticality, and the cost of new water-saving appliances.

7.3.3 Research question three

Study one revealed qualitative differences in levels of knowledge about water scarcity in the UAE between segments, the water use behaviours of participants, and factors that might influence each segment. Study two complements and augments the picture using a quantitative approach, with the guidance of the theory of interpersonal behaviour to address

RQ3: Can TIB inform the segmentation process, and explain the characteristics of the different segments of the UAE residents?

Social marketing has generally lagged in consistently applying theory (Truong, 2014, 2017), especially within segmentation studies (Dietrich et al., 2017). A review of the literature suggested that the Theory of Interpersonal Behaviour (TIB) has not been previously applied in social marketing studies, and application of social marketing in environmental contexts are rare (Truong, 2017). In the TIB model attempts both cognitive and non-cognitive elements are included and the role of habit in any behaviour is assumed (Berger & Calabrese, 1975), thereby taking the behavioural environment into account. In this study, TIB constructs

were used to achieve two major purposes. The first was to guide the quantitative segmentation study to generate distinct segments and produce detailed segment characteristics. The second aim was to determine the extent that variance in residents' water consumption behaviours could be explained by the model.

This study used an augmented model of TIB which included new TIB constructs. This model was able to explain 10.2% of the variations in the water consumption behaviour of the sample. Therefore, the current findings suggest that the TIB had only limited explanatory power in the study context. These findings indicate the need for application of different behavioural theories in social marketing that offer wider perspectives to explain the variance in water consumption behaviour. One such example is found in (Pang, Rundle-Thiele, & Kubacki, 2017), who report more than 50% of the variance in walking-to-school behaviour could be explained by the influence of the built environment using an ecological and cognitive active commuting (ECAC) model.

Furthermore, additional development of TIB that may be warranted should focus on identifying social constructs and continuing to extend understanding of the facilitating conditions for the targeted audience. A modified model of TIB, for example, that enables social marketers to explain a greater part of the variance in residents' water consumption behaviour might be developed. The new model could most profitably focus on habits (indoor, outdoor, and personal hygiene habits), since habits explained much of the behavioural variance examined using the TIB model in the current study.

7.3.4 Research question four

To enhance the visibility of social marketing programs, there is a demand for program developers to deliver their programs to directly meet the needs and wants of the target audience (Andreasen, 2012). By developing targeted strategies that are closely aligned to cater to these different needs and wants, social marketers can increase return on investment

(ROI) (Hastings et al., 2004). Segmentation can help social marketers to emphasise and set specific goals for each segment, making the program or the intervention more effective by recognising and meeting the needs and wants of each targeted segment (Rimer & Glanz, 2005). The necessity of developing to develop a clear segmentation plan to increase the efficacy of social marketing interventions (Andreasen, 2002) suggested:

RQ4: What segments are evident in the UAE water use market as determined using two-step cluster analysis?

To answer research question four, an online survey was designed based on the TIB main constructs (awareness/knowledge, attitude, emotions, religiosity, facilitating factors, social norms, and habits). A water use market in the UAE was surveyed and data were quantitatively analysed. The results produced three segments. The first segment (normal users) accounted for 25.2% of respondents, who were mostly low-income, expats, female students in age range 23-30 years, living outside the main campus. The second segment (conscious users) comprised 50.7% of the water use market and were characteristically high income, married, faculty members, who did not pay for their water usage; 42% of this segment lived in university housing, and 40% were Arab. The third cluster, 24.1% of the total market, was identified as careless users, typically low-income single students, aged between 18-22 years, who did not pay for water usage, and were living with family or in dorms.

This quantitative segmentation study guided by an augmented TIB model was able to distinguish three distinct segments. The augmented TIB model also helped to identify the differences between segments in attitude, emotions, knowledge, religiosity, facilitating factors, habits, social norms and the demographic attributes of each. The process of quantitative segmentation helped to uncover insights which may not have otherwise emerged. Further, the three segments revealed differed in size, and each segment was large enough to warrant the design of a marketing mix to further increase desired behavioural change.

7.3.5 Research question five

Cost benefit analysis is often used as a tool to make decisions on return on investment in the business world (Hockley, 2014). Therefore, social marketers can use the same approach to provide a solid rationale to support decisions made. Despite the evident advantages of using CBA in social marketing, few programs have applied CBA to evaluate outcomes, and social marketing programs have not previously conducted CBA to evaluate alternate segmentation methods. Therefore, this thesis used the CBA approach to compare two segmentation approaches – qualitative vs. quantitative. Further, decision makers' perspectives on the appropriate segmentation approach were sought. The final research question, RQ5, asked:

A- Which of each segmentation approach qualitative vs quantitative is perceived appropriateness more by executives?

To answer this question, a minimax simple matrix CBA approach was undertaken to identify the relative key costs and benefits of the two segmentation approaches. The results showed that the quantitative approach was the more expensive approach. To then explore and achieve insight into which approach was more appropriate from the viewpoint of decision makers, the final research question asked:

B- What are the perceived costs and benefits respectively associated with methodological application of qualitative vs. quantitative segmentation approaches?

A semi-structured interview was used in Study 3, to capture the UoS executives' opinions on approaches to segmentation. The findings of this study highlighted that a managerial tool such as CBA can deliver for social marketers. For example, the findings of this formative study provided insights into executives' opinions on segmentation which, in combination with CBA, can ensure that any investment decisions are not made based on dollar cost alone.

7.4 Theoretical Contributions

Social marketing studies and interventions have adopted several behavioural theories (Truong, 2017). The cognitive or conscious-based models, for example, are the most commonly used behavioural models in social marketing studies, specifically the Theory of Reasoned Action (TRA), the Theory of Planned Behaviour (TPB), and the Health Belief Model (HBM) (Luca & Suggs, 2013; Truong, 2017). These models assume that decision-making is rational and considered.

There is a demand for social marketing to test and apply new behavioural theories and models in the real world (Lefebvre, 2013). This project used TIB, which had not been widely used in social marketing to date (Truong, 2017). By adding and omitting variables, this research was able to examine an augmented TIB model in a real-world application to generate distinct segments in a water use market and to test its power to explain the variance in residents' water consumption behaviour.

The application of the new augmented TIB model in social marketing helped to produce insights about the varying characteristics of each segment, and facilitated the understanding of target audience behaviours, water consumption habits, and the factors that might influence the respective behaviour of each segment. This understanding represents knowledge that can be used to assess the needs of each segment prior to deciding which segment to target (Ettl, Zadrozny, Chowdhary, & Abe, 2005).

The existing constructs in the new TIB model that were highlighted and affirmed by the current study included personal attitudes, awareness/knowledge, emotions, social norms, facilitating conditions, habits (indoor, outdoor, and personal hygiene), and religiosity. The results of this study have suggested that knowledge about the context is important in evaluating outcomes since, without accurate knowledge, people remain unaware of the results of their behaviour. Other facilitating factors included price, law, new technology, and reduced

accessibility. A further, significant, factor that emerged from this research was religiosity. All the above factors are likely to have been salient in differentiating segments' characteristics and gaining insights into the habits and influencers of each. This thesis supports the importance of extending the use of new theories and models to guide the social marketing process to achieve voluntary water saving behaviour change.

7.5 Practical and methodological contributions

A generalised program for the entire market may provide little or no benefit to the targeted audience (French & Gordon, 2015b). This research aimed to advance social marketing segmentation knowledge, applying both quantitative and qualitative methodologies to test the validity of the segmentation process in a water use market. In this thesis, by working towards the overall aim, the studies generated distinct segments, applying an augmented TIB model that can be utilised by UoS managers to guide program planning.

This social marketing project employed the formative research process to identify different segments in the UoS water use market, and to understand the UoS residents' water consumption behaviour as well as the factors that might influence their water consumption behaviour. This application is consistent with social marketing's dominant approach which has its focus on individuals and puts citizens and their behaviour at the centre of any future social marketing actions (French & Gordon, 2015b).

The qualitative segmentation study demonstrated that qualitative approaches can be used to identify segments. This examination of the evidence base is essential to understanding what works (and what does not) (Basil, 2017), for the optimal design of a marketing mix that can overcome barriers perceived by target audience (French & Gordon, 2015b). The qualitative study explored the facilitating factors that might help the targeted audience to change their water consumption behaviour. Providing one example of a facilitating influence on residents' behaviour, one participant said, "*I do not know if there are ways to save water*".

Therefore, education that increases people's awareness of the facts about water and how to save it is an immediate need. Furthermore, the insights gained in this study provided an understanding of how qualitative segmentation in social marketing can be used to identify which segments to target. Social marketers can therefore overcome the limitations of quantitative segmentation, such as time and funding restrictions, data, and availability of skilled personnel (Dibb & Carrigan, 2013).

This thesis extends knowledge relevant to the application of four segmentation bases by which residents can be differentiated, namely demographic, geographic, psychographic, and habitual behaviour. For each segment, social marketers must design a specific intervention, educational materials, social marketing program, and campaign that will inform individual residents about the realities of the water situation in the UAE, and the most efficient ways to use available water. In addition, it is important that the need to conserve water resources in all areas of life is emphasised.

Fourth, this thesis extends the use of strategic social marketing to water consumption behaviour, in a Middle Eastern context to develop solutions that suit the targeted segment(s). Social marketers need to understand that their audience is segmented based on different values, beliefs, needs, wants, behaviours, and influencing factors if a successful social marketing program is to be tailored to each segment.

Fifth, this thesis added another dimension to social marketing research and practice by applying cost benefit analysis to compare qualitative vs. quantitative segmentation approaches. This was followed by an evaluation of these approaches from executives' perspectives. Thus, the need to use further evaluative processes to elevate the visibility of social marketing projects, change practice beliefs, and enhance decision making (Florio & Sirtori, 2016). CBA is considered a powerful tool for comparing the costs and benefits of different practices, and allows users to incorporate a wide numbers of variables in the

analysis and assigning a dollar value to the comparison (Sherman, Siebers, Menachof, & Aickelin, 2012).

7.6 Practical implications

This social marketing project gained insights from all stages of the research. The qualitative segmentation study identified a contradictory segment wherein participants declared their belief in Islamic instructions that encourage Muslims to save water but whose consumption habits contradict this religious injunction. The social marketing strategy to influence behaviour change among this particular water use segment would require a collective effort involving university administrators, mosques and other religious places, student social clubs and accommodation dorms, faculty clubs, schools, and community houses, and public and private organisations operating inside the university.

Social marketing interventions are reported to be most effective when designed to influence behaviour through organisations. Educational programs in Denmark, for example, have had a positive impact (Nielsen & Wenzel, 2002), particularly on school children, who are taught about conserving water and energy, which led to reducing national per capita consumption in 2002 from 168 to 129 litres, towards a target of 110 litres by 2010 (Nielsen & Wenzel, 2002). In the case of the UoS water use market, university administration could focus its education effort on social clubs and mosques, in light of the finding that participants' water use behaviours do not necessarily correspond with their religious beliefs.

According to participants, reducing water consumption through appeals to their faith might offer a promising approach, such as by raising the importance of conserving water in during Friday prayer speeches, organising various events and workshops about Islam and the environment, focusing on the connection between religious belief and care for the environment, especially for younger people prone to over-consuming water, and emphasising the rights of future generations to clean fresh water and a liveable environment.

Both qualitative and quantitative segmentation studies clearly identified a price sensitive segment. This group must be targeted using upstream social marketing. The role of government, according to insights gained in this research should not be limited to awareness raising through educational programs. Participants in the current project felt the government could also increase the price of water as a reduction measure and/or set meters in all dwellings to limit the quantity of water that can be used. However, in Randolph and Troy's (Randolph & Troy, 2008) study of attitudes to water consumption and conservation in Sydney, Australia, 50% of respondents didn't agree that increasing its price would either reduce demand for or conserve water. Furthermore, it has been found that often consumer responses to price increases are inelastic, partly because people are uninformed about the prices charged by utilities (Barrett, 2004).

Social marketers can influence water consumption behaviour by working with water management authorities to schedule times when people can have access to water, encouraging them to store water for their personal use, which would oblige people to reduce their consumption by changing wasteful habits. In addition, the government can update building codes and practices to ensure real estate developers and citizens utilise new and developing technologies that save water and energy in commercial and domestic buildings, as well as incentivising the purchase of eco-friendly appliances. Willis et al. (2013) showed that installing advanced technologies like water-saving showerheads and washing machines reduced water consumption by 33%. Upstream actions that the UAE government might undertake include legal and regulatory changes to impose water- and energy-efficient standards on new appliances and fixtures and to facilitate importation of green appliances. Water conservation has an important role in the broader scheme of government action to raise citizens' awareness of the need to prevent human-created damage to the environment. This could be reinforced through the enacting of environmental protection laws and regulations

introducing penalties for residential, commercial and industrial behaviours resulting in harm to eco-systems, along with waste reduction initiatives across the board.

7.7 Limitations

Acknowledging the limitations of a research project is important, particularly as it contributes to improving the outcomes of future research. The limitations of each of the three studies in this thesis have been presented in respective detail in Chapters 4, 5, and 6 of the thesis. This section summarises their key limitations.

Studies were based on a convenience sample. The convenience sampling technique involved recruiting participants who were accessible and willing to participate. Participants were drawn from a higher education environment, and so represented the educated class of UAE society who lived and worked or studied on the University of Sharjah's main campus. Relying on a non-representative sample could therefore result in limited generalisability of the findings to the greater UoS and UAE populations.

Further, it is possible that the findings from investigating executives' viewpoints may have been different had interviews been conducted in a different setting and/or with different interviewers (Bryman & Bell, 2015). Another factor that may have inflected this result is selection bias. Since participants in that study were limited to four male university senior executives, their points of view may not reflect wider views held within UoS management.

Collecting self-reported data limited the scope of findings from all studies, due to the potential for inaccuracies of data arising from selective memory (Warnecke et al., 1997), and other biases such as social desirability (Grimm, 2010). The researcher endeavoured to minimise the limitations of self-reporting by using a range of techniques (e.g. ranking, multiple choice, and Likert-type scale questions (replicated in Appendix 2) were asked. Future research would benefit from the collection of more objective forms of data, such as metred water usage. A lack of prior research studies on the application of TIB in social

marketing (Truong, 2017) was noted. Some constructs did not show validity when tested in measurement models, suggesting that some scale development is necessary.

7.8 Future research

Social marketing is a promising approach to dealing with behavioural issues such as health, alcohol consumption, and over-use of resources (Lorek & Spangenberg, 2014). To date, social marketing has not been given the opportunity to achieve outcomes in the UAE that are desirable in terms of public benefit. It is suggested that further studies and research should take place in this field, especially in connection with personal behaviour issues where individuals need education, encouragement and incentives to change underlying habits such as over-consumption of water, and those that contribute to the rates of obesity and road accidents in the UAE.

For future research, a two-phase sequential transformative design would be suitable in this field, the first phase collecting data via a range of different methods, such as focus groups, interviews, observations, and document analysis, to identify audience segments. In the second phase, based on the qualitative findings, empirical data should be collected, using a theoretical model, from a larger sample to confirm both the results and the segments identified in the first phase to obtain results that have greater generalisability.

Further studies are required to explore connections between emotions, religion, attitudes, beliefs and current habits regarding water consumption behaviour within the TIB model. Alternate theories and models able to incorporate facilitating conditions should also be applied to identify the appropriate framework for explaining more variance in water consumption behaviour.

The current study has made an important contribution to future social marketing practice and application by using quantitative and qualitative approaches to generate, and characterise, audience segments. Furthermore, this study has helped to deliver insights into

the habits and behaviours of distinct segments, and the factors that might influence their consumption. By understanding individuals' behaviours, social marketers can develop comprehensive program plans in all three social marketing streams to mitigate people's over-consumption of water within the context of the theory of interpersonal behaviour. Activating people's interest in reducing water consumption is necessarily a collective effort.

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Religiosity (1=strongly disagree 7=strongly agree)	Is a realm of human life that has considered, in all cultures and times, the role of the emotions as constitutive. Despite growing secularisation, religion still shapes peoples life		(Allport & Ross, 1967)			3 items are modified to fit in the context
Facilitating factors policy price Accessibility technology (1=strongly disagree 7=strongly agree)	Any factors which stimulate, provide, or promote, a fertile environment for water consumption change. “WHO ”		(Dolnicar & Hurlimann, 2010) Developed from HDR paper			3 items are modified to fit the context. 1 item about accessibility is developed from HDR paper
Habit 1-out door 2-bathroom 3-hygiene 4-wahsing clothes 5-kitchen 6-cooking (0=not applicable 5=always)	Self-reported frequency of past behaviour.	6	(Aitken et al., 1994) Aitken C.K 1992 Factors affecting water consumption behaviour in Melbourne-Department of Civil Engineering/University of Melbourne.	.65	Habit scale Aitken 92-94	
Emotion	A strong feeling deriving from one's circumstances, mood, or relationships with others.	7	(de Miranda Coelho et al., 2015).			Scale of 1-5 1-does not describe me at all. 5-descibes me completely.
Ranking questions			Developed for this project			
Demographic		10				

Appendix 2: Focus group protocol:

Introduction by Moderator (5 minutes)

Good evening and welcome to our session. Thanks for taking the time to join us and for being willing to share your ideas about ways we can reduce water consumption among the UAE residents.

I would like to introduce myself, my name is Ali Ibrahim. I am a PhD student at Griffith University and my wife Dr. Wegdan is assisting me. We are meeting today because you are current residents of the UAE, and I would like to explore your opinion, views, and perceptions about water consumption inside the university and at home.

Your views will be very helpful and will provide me with feedback and deeper insights into ways that I may be able to change water usage.

Explain the process of focus group (5 min)

Let me talk briefly about focus groups. In a focus group we bring a group of people together to discuss a topic (in our case water consumption behaviour). There is no right or wrong answer. We want your point of view. Please feel free to share your opinions and ideas even if they differ from what others have said. Keep in mind that we're just as interested in negative as much as positive comments; sometimes the negative comments are the most helpful. You've probably noticed the microphone. We are tape-recording the session because we don't want to miss any of your comments. People often say very helpful things in these discussions and we can't write fast enough to get them all down. Our discussion today will last around 60 minutes.

Please, be assured that all of your comments are confidential and will be used for research purposes only. Once all the data is transcribed, we will delete the audio file. At this time any existing reference to your name on the written record will be deleted. We've placed name cards on the table in front of you to help us remember each other's names. Before we begin, there is a consent form I need you to complete.

Do you have any questions before we begin?

Engagement stage (5 min)

Objective: To put the participant at ease and to gather background information.

Let's find out some more about each other by going around the table. So in order to get to know each other a bit better, I want each of you to introduce yourself starting with your name, where you live, family background, how long have you been in the UAE.

- 1- Do you think that the UAE has sufficient water resources?
- 2- What is the main water resource in this country?

Exploration stage and questions:

- 1- Please describe the main ways that you use water in your home?
- 2- Who is paying your water bill?
- 3- What are some of the most important factors that help you and others in your opinion to conserve water?
- 4- Can you tell me when you think you waste water?
- 5- When do you use more water?
- 6- What do you think are the necessary tools that will help other people to stop wasting water?
- 7- Do you think there are ways that you could save water use?

8- What might help you and other reducing water consumption? For example while you are using bathroom, laundry, kitchen, fixing leak, and outdoor and car wash.

9- What are barriers for others to stop wasting water?

I would like to thank each of you for the time you devoted to this study, and please if you have any question or comments on the topic, don't hesitate to ask or to make any suggestions.

Appendix 3: Survey

IMPORTANT: Please fill in the table below:

Thinking about yesterday	Number of times (please write in numbers)
How many minutes did you shower? minutes
How many minutes did you brush your teeth? minutes
How many times did you use the toilet? times
How many times did you do (Wudu)? times
How many minutes did you shave? minutes
How many minutes did you bath? minutes
How many times do you wash your car with a hose every week? times
How many minutes you irrigate your garden? minutes
Please estimate how many liters of water did you use? liters

Strongly
Disagree

Strongly
Agree

Awareness

1- There is a need to conserve water in the Sharjah.	1	2	3	4	5	6	7
2- Current water supplies will not be adequate to meet the needs of the Sharjah residents for the next year.	1	2	3	4	5	6	7
3- Sharjah residents need to be encouraged to conserve water.	1	2	3	4	5	6	7
4- I consider water to be a scarce resource that must be carefully used.	1	2	3	4	5	6	7
5- I am concerned about the future of water in Sharjah.	1	2	3	4	5	6	7
6- I am concerned that Sharjah residents are using too much water.	1	2	3	4	5	6	7
7- It is not really important to be cautious about the use of water.	1	2	3	4	5	6	7
8- If each household does NOT reduce the quantity of water consumed, the Sharjah will face a serious water problem.	1	2	3	4	5	6	7
9- Water conservation is needed to preserve natural resources.	1	2	3	4	5	6	7
10- Water conservation will avoid the need for new desalination plants in the Sharjah.	1	2	3	4	5	6	7
11- The demand for water in the Sharjah is too great for the available supply.	1	2	3	4	5	6	7
12- Water shortages are potentially a big problem for the Sharjah.	1	2	3	4	5	6	7
13- If water usage patterns do NOT change there will not be enough water to meet the need of the Sharjah in the future.	1	2	3	4	5	6	7

Strongly
Disagree

Strongly
Agree

Attitudes

1- Saving water takes more effort than it is worth.	1	2	3	4	5	6	7
2- My lifestyle would change for the worse if I had to use less water.	1	2	3	4	5	6	7
3- I could save more water, but I don't see any reason to do so.	1	2	3	4	5	6	7
4- The water saved by fixing a dripping tap is not enough to justify the amount of work involved.	1	2	3	4	5	6	7
5- My own comfort is more important to me than saving a few liters of water.	1	2	3	4	5	6	7
6- I will save water if I pay for it.	1	2	3	4	5	6	7
7- I do not think about saving water.	1	2	3	4	5	6	7
8- Everyone should be able to use as much water as they like.	1	2	3	4	5	6	7
9- I don't want to change the way I live to save more water.	1	2	3	4	5	6	7
10- I would only try to save water when there is no water.	1	2	3	4	5	6	7
11- I would rather have my garden looking good than worry about how much water I used.	1	2	3	4	5	6	7
12- It is my duty as a responsible citizen to conserve water.	1	2	3	4	5	6	7
13- Fixing the leak of the water or you report it once you see it	1	2	3	4	5	6	7

Social Norms

1- Many of my friends are using a lot of water.	1	2	3	4	5	6	7
2- Many of my family members' are using a lot of water.	1	2	3	4	5	6	7
3- Many of the colleagues/classmates are using a lot of water.	1	2	3	4	5	6	7
4- Most of the UAE residents are using a lot of water.	1	2	3	4	5	6	7
5- People who are important to me think the water should be used carefully.	1	2	3	4	5	6	7
6- People who are important to me would disapprove of using a lot of water.	1	2	3	4	5	6	7
7- People who are important to me want me to save water.	1	2	3	4	5	6	7

Religiosity

1- I enjoy reading about my religion.	1	2	3	4	5	6	7
2- My whole approach to life is based on religion standards.	1	2	3	4	5	6	7
3- It is important to me to spend time listening to religious program about saving water.	1	2	3	4	5	6	7
4- I try hard to save water according to my religious beliefs.	1	2	3	4	5	6	7
5- Religious instructions and services helps reduce water consumption	1	2	3	4	5	6	7

Strongly
Disagree

Strongly
Agree

Facilitating Factors

1- Water efficient appliances should be mandatory inside the campus	1	2	3	4	5	6	7
2- I would consider purchasing a water efficient appliance	1	2	3	4	5	6	7
3- Paying for water use make me reduce water usage	1	2	3	4	5	6	7
4- Water restrictions would make you use less water	1	2	3	4	5	6	7

Habits	Not applicable	Never	Sometimes	Half of times	Most of the time	Always
Please rate each item						
1- Wait until there is a full load of clothes to be washed.	0	1	2	3	4	5
2- Adjust the water level in your washing machine to match the amount of clothes.	0	1	2	3	4	5
3- Put the washing machine through an extra cycle when it is not strictly necessary.	0	1	2	3	4	5
4- Leave the water running while you are soaping in the shower.	0	1	2	3	4	5
5- Leave the water running while you brush your teeth.	0	1	2	3	4	5
6- Leave the water running as you shave.	0	1	2	3	4	5
7- Run the hot water and cold water together before taking shower.	0	1	2	3	4	5
8- Soak the dishes before putting them in the dishwasher.	0	1	2	3	4	5
9- Use a bucket when washing vehicles rather than a hose.	0	1	2	3	4	5
10- Hose down your driveway rather than sweeping it clean.	0	1	2	3	4	5
11- Clean dirty cooking ware under a running tap	0	1	2	3	4	5
12- Using the hose to clean the outside of your house.	0	1	2	3	4	5
13- Wash vehicles using the hose.	0	1	2	3	4	5
14- Wash cups and dishes under a running tap.	0	1	2	3	4	5
15- Clean vegetables and fruits under a running tap.	0	1	2	3	4	5
16- Save dishes to wash in one large load.	0	1	2	3	4	5
17- Leave the tap running while you clean your kitchen surface.	0	1	2	3	4	5

Emotions	Does not describe me at all	Sometimes	Half of times	Most of the time	Describe me completely
Please rate each item					
1- I get upset when I see someone using water to wash the footpath/sidewalk or driveway.	1	2	3	4	5
2- It bothers me when someone stays in the shower for too long.	1	2	3	4	5
3- Sometimes, I stop what I am doing to turn off a dripping tap.	1	2	3	4	5
4- It troubles me to see someone wasting water by washing his/her car with a hose.	1	2	3	4	5
5- When I see someone wasting water, I feel like complaining.	1	2	3	4	5
6- I feel frustrated when I see a toilet running without anyone doing anything about it.	1	2	3	4	5
7- I feel indignant at the lack of awareness of some people regarding water conservation.	1	2	3	4	5
8- I get annoyed to see a tap running without anyone using the water.	1	2	3	4	5
9- I feel upset when I see water wasted from a running tap.	1	2	3	4	5
10- I feel good when I can save water.	1	2	3	4	5
11- I feel sad when I see rain water wasted, without being stored and used.	1	2	3	4	5
12- I feel bad when I see water being wasted from a water leak in the street.	1	2	3	4	5
13- It bothers me to see someone putting more drinking water than necessary in a glass, and then throwing away the rest.	1	2	3	4	5
14- It annoys me when I forget to turn off a tap.	1	2	3	4	5
15- I feel bad to see someone washing the footpath/sidewalk with a hose.	1	2	3	4	5
16- When I see a water leak in the street, I try to call the responsible organization to fix the problem.	1	2	3	4	5
17- It makes me happy to see someone who is trying to save water.	1	2	3	4	5
18- I feel disturbed by the waste of water in public places.	1	2	3	4	5

1- Please rank your main water use inside the house from the most to the least?	
a- Showering	
b- Shaving	
c- Tooth brushing	
d- Toilet use	
e- Bathing	
f- Cleaning the house	
g- Washing clothes	
h- Dishwashing	
i- Cooking (e.g. washing fruit and vegetables, boiling water)	
j- Drinking	
k- Other	

2- After having answered your main water use inside the house, we want you now to rank where you think you waste most water?	
a- Showering	
b- Shaving	
c- Tooth brushing	
d- Toilet use	
e- Bathing	
f- Cleaning the house	
g- Washing clothes	
h- Dishwashing	
i- Cooking (e.g. washing fruit and vegetables, boiling water)	
j- Drinking	
k- Other	

Tell us about yourself

1 – Gender	
a- Female	
b- Male	

2 - Age	
a- 18-22 years	
b- 23-30 years	
c- 31-40 years	
d- 41-50 years	
e- 51-60 years	
f- 61 and above	

3 - Education	
a- High School	
b- Bachelor student	
c- Graduate student	
d- Bachelor	
e- Masters	
f- PhD	

4 - Religion	
a- Muslim	
b- Christian	
c- Hindi	
d- Buddhist	
e- Other	
f- None	

5 - Employment	
a- Unemployed	
b- Student-employed	
c- Student	
d- Staff member	
e- Faculty member	
f- Part-Timer	

6 - Marital status	
a- Single living inside the dorm	
b- Single live with family	
c- Single live outside the dorm	
d- Married live with family	
e- Married live without family	
f- Divorced	
g- Other	

7 - Nationality	
a- Local-Emirati	
b- GSS countries	
c- Arab nationality	
d- Western nations	
e- African	
f- Indian	
g- Pakistani	
h- Iranian	
i- Other	

8 - What is the type of house you live in?	
a- Students dorms	
b- Apartment inside the university	
c- Semi-detached house inside the university	
d- House inside the university	
e- Apartment outside the university	
f- House outside the university	
g- Other	

9 - Do you pay for your water use?	
a- Yes	
b- No	
c- I don't know	

If "yes"

What was your last bill	
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10 - What is monthly income?	
a- Less than 5000 AED	
b- 5000-10000 AED	
c- 10000-20000 AED	
d- 20000-30000 AED	
e- More than 30000 AED	

Appendix 4: Semi-structure interview



Protocol

I will conduct 25-30 minutes semi-structured interview with **four** top officials/decision makers inside the UoS because they can inform changes on the UoS community.

The protocol will be as following

Stage	Questions	# Minutes
1	Introduce myself, give them an idea about this study, Griffith University, and social marketing.	2
2	What type of water customers “segments” do you think that UoS has?	5
3	<p>Display to participants the outcomes of the previous two studies “qualitative and quantitative studies” and the segments were generated from the two approaches.</p> <p>1- Which segmentation approach you think is giving a true reflection of the UoS residents? After each participant decided on segmentation approach “segments” representing most the UoS residents, then I will ask them to elaborate through asking them the following questions</p> <p>2- The approach you chose has costs and benefits? I explain the costs from expertise, financial, time for each segmentation approach? And highlight the benefits from using the qualitative and quantitative? Then ask them if they still want to keep the segmentation approach they already chose.</p>	18
	Ask any questions for further data if needed according to the discussion.	

	Ask to call them if we need more data or to clarify in some points.	
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