COMPARATIVE PLANNING IN PRACTICE: IDENTIFYING THE CULTURAL AND BEHAVIORAL BARRIERS TO LEARNING FROM INTERNATIONAL SUSTAINABILITY SOLUTIONS

BY

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DISSERTATION

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ABSTRACT

This dissertation is composed of three separate but related papers that address if and how practicing planners can identify the cultural and behavioral barriers to learning from international sustainability solutions.

Chapter 2 starts by acknowledging that analytical frameworks examining the international flow of concepts, practices, and techniques ("traveling ideas" or "international best practices") most often call for the slow and critical examination of these ideas prior to local adaptation. However, in fast-paced working environments where planners are challenged to urgently address environmental and social issues, this paper uncovers how these analytical frameworks are actually interpreted in practice. Building on existing comparative planning literature, semi-structured interviews with public sector planners from both the City of Chicago and the City of Stockholm were conducted in order to 1) explore the extent to which planners from each city utilize international best practices in relation to sustainability; and 2) when these best practices are used, understand the planners' evaluation process in determining if the practice could or should be adapted for their city's use. The insights and reflections garnered from this study were used to identify potential factors that influence successful translation of sustainability solutions across contexts.

Chapter 3 puts the findings from Chapter 2 in a specific context by aiming to uncover the key behavioral barriers to translating Singapore's high reclaimed water public acceptance rate and successful conservation strategies to different contexts. A national mail survey (n=218) utilizing the Theory of Planned Behavior framework (Ajzen, 1991) was conducted. The survey indicates that 74 percent of Singaporeans generally approve of NEWater. A positive attitude

toward NEWater was the most significant variable in predicting respondent's general approval. Furthermore, of the 7 specific water behaviors the Singaporean Public Utilities Board is trying to encourage, we found that fixing water leaks promptly (80.8%) and monitoring water bills (80.3%) are the most widely adopted, while washing dishes under a filled sink (11.7%) was the least adopted. Path analysis of the data showed that engagement in water conservation behaviors was most influenced by an individual's perceived social norms.

Building off of Chapter 3, where we discuss the behavioral barriers to Singapore's integrated water management plan, Chapter 4 explores the cultural barriers to translating Singapore's successful water conservation strategies. Fieldwork in the form of interviews and participant observation was conducted over a period of 9 months in Singapore. This qualitative data was analyzed using Hofstede's dimensions of national culture framework. We find that Singapore's national culture has played a significant role in the overall success of their water planning and management strategies. Differences in specific national cultural dimensions such as power distance and individualism could act as barriers to successfully translating Singapore's success to different countries. We propose simple, straightforward recommendations for identifying and addressing these cultural barriers.

Chapter 5 is a general discussion on the entire dissertation with a review of the work, methods and significant findings along with their policy and other implications. I conclude the piece with an exploration of future work.

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CHAPTER 1: INTRODUCTION

1.1 Overview

Imagine a city located on a tropical island with towering skyscrapers, one of the highest population densities in the world, expanding industry, a growing populace, no natural large aquifers or lakes, …and a goal of becoming water self-sufficient by 2061. This is not a fantasyland. The place I'm describing is Singapore; and much to the world's surprise they are well on their way to meeting their goal of independence from imported Malaysian water through adoption of numerous intensive sustainable water strategies (such as behavioral change campaigns and reclaimed water plants, charmingly dubbed NEWater).

Singapore's success has not gone unnoticed. Many planners, diplomats, and engineers from water scarce areas around the world have traveled there to learn from Singapore's water management and planning strategies firsthand. Visitors often find this experience to be inspiring, enlightening, and indicative social proof that Singapore's water solution works (Singapore Public Utilities Board, 2013). What may not be as apparent, however, are vast array of other cultural and behavioral factors related to the water planning and implementation process that contribute Singapore's water success story.

In fact, if you took the 9-hour flight from Singapore to Toowoomba, Australia you would find similar, pressing water scarcity issues. However, in 2006, during the most severe drought recorded in Australia's history, the City's attempt to implement a similar reclaimed water plant failed when 62% of the city's voters voted against it (Brisbane Times, 2013). The question relating to this particular situation (and thousands like it) this dissertation will focus on is, why

do these efforts fail? And more specifically, - *what are the barriers to replicating successful urban sustainability strategies?*

In this dissertation, I use of the concept of 'sustainability' to refer to, in the simplest sense, the 'human ability to endure' from an environmental standpoint. The concept points to the idea that "we must preserve and, where possible, restore the integrity of natural systems – soils, water, air, biological diversity – which sustain both economic prosperity and life itself" (Daly, 1997, p. 13). Daly's definition of sustainability is tightly associated with ecological science – a field that explores dynamic systems relating animals to their environments rather than simple classification and labeling. The concept in this sense, therefore, involves exploration of the balancing act between complex, dynamic systems, which is often best understood utilizing 'systems thinking' – a way of viewing problems as part of larger systems, rather than reducing them to separate parts (Checkland, 1999).

When viewed this way, the concept of sustainability has proven useful in addressing real-world problems. For example, sustainability goals influenced the Singapore's use of Integrated Urban Water Management (IUWM), which is a framework that helps manage the urban water system as a whole and generally advocates the need for:

- *"participatory management and collaborative decision making,*
- *increased integration of issues and sectors,*
- *management of problem sources not effects,*
- *decentralized and more flexible management approaches,*
- *more attention to human behavior by "soft" measures,*
- *include environment explicitly in management goals,*
- *open and shared information sources (including linking science and decision making),*
- *iterative learning cycles"* (Pahl-Wostl et al., 2008, p. 485)

The obvious inclusion of traditionally regarded 'soft' approaches in this list, such as attention to human behavior and iterative learning cycles, point to a management system that is

better adapted to unique institutional circumstances (Pahl-Wostl et al., 2008, p. 485). IUWM has now become a goal that many cities pursue (Brown & Farrelly, 2009; Makropoulos, Natsis, Liu, Mittas, & Butler, 2008). From this example, sustainability can be thought of as a core concept for development, and particularly urban planning, because it encourages more holistic thinking in lieu of linear based management concepts and models that have been known to produce unintended adverse consequences.

1.2 Problem Statement

Many in the academic community are acutely aware that the urban-rural landscape has rapidly changed since the industrial revolution, and continues to change into the 21st century. We know that more than ever before, people are leaving traditional rural farms and small towns for hope of economic prosperity in large urban cities. In fact, the United Nations is predicting that by 2050 more than 6.3 billion people will be living in urban areas – a 73 percent increase from 2011 (United Nations, 2012b). It probably is not that surprising, therefore, that this influx of urban populations (coupled with consumer driven economies) has increased the demand for natural resources. Water, energy, lumber, soil, and even other species are rapidly being depleted. Although these industrial processes have increased material wealth, they have caused significant environmental damage, while failing to significantly increase happiness (Diener, Oishi, & Lucas, 2003).

One such urban problem city planners all over the world are facing is potable water scarcity (McDonald et al., 2011). Approximately 1.2 billion people live in areas that are considered to be physically water scarce, while another 1.6 billion people lack adequate potable water infrastructure (United Nations, 2015). Although the global fresh water supply is more than

enough to support the current population of 7 billion people, many regions remain chronically short of clean drinking water due to both natural (i.e., climate change) and human factors (i.e., pollution, waste, unsustainable management) (United Nations, 2006). Solving these issues will become more complicated in the future, with an additional 3 billion urban dwellers forecasted by 2050, raising the demand for already strained potable water resources (McDonald et al., 2011). Addressing potable water scarcity requires municipalities to address both supply and demand pressures by looking for additional supplies of water (e.g., reclaimed water, desalination, imported water) and reducing potable water demand.

As such, urban planners all over the world have been tasked with addressing some of worlds' most urgent and evolving environmental and social problems such as climate change, water scarcity, and livability. Huge urban planning failures, such as Pruitt-Igoe in St Louis, MO, have made planners wary of urban solutions that have not been tried and tested in real world contexts. As the complexity and urgency of sustainability problems increase, however, planners are also beginning to broaden their search for potential solutions outside of their home country. As a result, international idea exchange and adaptation has become a significant component of a public planner's current arsenal of planning approaches and solutions (Healey & Upton, 2010). This presents a problem considering existing research indicates that culture plays a key role in successful strategy outcomes, yet its tacit nature makes it an elusive component for urban planning practitioners to understand (Bulkeley, 2006; Pahl-Wostl et al., 2008).

1.3 Importance of Study

This proposed study will combine insights from urban planning, psychological, and sociological theory help discern the role of cultural and behavioral context in innovative

sustainable planning strategies. Most existing research advocates for slow examination of sustainability strategies (Roy, 2011a), yet few understand how to proceed with its analysis. Moreover, use of global learning often paradoxically takes place in fast-paced organizational contexts, where practitioners might feel they only have time to superficially contextualize the models they reference, if at all (Bulkeley, 2006). Understanding how to 'pull out' the tacit structures (such as culture and behavior) that contribute to the success of sustainability strategies, therefore, will begin to fill this gap in aiding urban planning practitioners who wish to better contextualize the sustainable strategies they are learning from.

1.4 Overview of the Dissertation

This dissertation explores the issue of trying to learn from, and in some cases adopt sustainability solutions from international planning contexts. I do this in 3 substantive parts. Part 1 (Chapter 2), *Comparative Planning in Practice: The Pitfalls and Possibilities of Learning from International Sustainability Solutions*, looks at the extent to which planners from Chicago, Singapore, and Stockholm utilize international best practices in relation to sustainability. I explore the planners' evaluation process in determining if the practice could or should be adapted for their city's use. Part 2 (in Chapter 3), branches off of the results in the comparative analysis to explore behavior as a key factor of influence for successful translation of sustainability solutions across contexts using the case of Singapore and their much publicized water management program, In *Understanding the Behavioral Influences Behind Singapore's Water Management Strategies*, the key behavioral influences behind two of Singapore's most successful water management strategies: 1) their high public acceptance rate of reclaimed water (marketed as 'NEWater'); and 2) the Singaporean public adoption of targeted domestic water conservation behaviors, are examined through a nationally representative household survey. In

Part 3 (Chapter 4), *Discerning the Role of National Culture in Innovative Sustainable Planning Strategies: The Case of Singapore's NEWater and Water Conservation Programs*, I follow by explicitly link Singapore's water management and planning practices (and behavioral responses) to their national culture through ethnographic fieldwork that was conducted over a period of 9 months in Singapore. Using Hofstede's national culture analytical framework, I discuss how differences in specific national cultural dimensions could act as barriers to successfully translating Singapore's success to different countries.

More specifically, this dissertation is partitioned into 5 Chapters. This introduction is followed by Chapter 2, addressing the first part of my dissertation research. It explores the international idea exchange and adaptation that has become a significant component of a public planner's current arsenal of planning approaches and solutions (Healey & Upton, 2010). To do this, I address three core research questions: 1) What models (symbolic, verbal, and live) do planners observe and learn from? 2) By what process do planners move from simple observation to adaption or reproduction of the model?, and 3) What are the factors that influence (or obscure) observational learning? Using Albert Bandura's social learning theory (Bandura, 1969) as a framework, I gain a deeper understanding of planners' comparative learning processes through interviews with 12 practicing planners from Chicago, Stockholm, and Singapore. Understanding what role comparison played in these planners' progressive practices could be a key to helping other cities develop effective processes for comparison and for successful sustainable planning projects.

I then explore international learning in a specific context by using the example of Singapore's water planning and management program, an internationally acclaimed urban best practice in Chapter 3. This Chapter uncovers the key behavioral barriers to translating

Singapore's high public acceptance of reclaimed water and water conservation behavior changes by addressing three key research questions: 1) does the Singaporean public approve of NEWater? 2) How much water is Singapore conserving and what methods are they using?, and 3) What behavioral factors have most heavily influenced Singapore's' successful results. In order to address these questions, the Theory of Planned Behavior framework (Ajzen, 1991) was used to construct a survey that was mailed to a national sample of Singaporeans (n=218).

Finally, Chapter 4 examines the cultural factors that have contributed to Singapore's successful water management and planning results. This is examined using Hofstede's national culture framework, which aided in the analysis of qualitative data (in the form of interviews and participant observation) that was collected over a period of 9 months in Singapore. The two core questions I address include: 1) what role Singapore's national culture plays in their high public acceptance rate of reclaimed water and adoption of water conservation behaviors? In other words, are the cultural mores of Singapore so unique that any translation of programs hopeless in other contexts? Or are there cultural elements that would enable a successful translation if they were better understood, and 2) how might key differences between national cultures and behavior act as barriers to translating sustainable water strategies to other places?

Finally, Chapter 5 concludes the work. I start with a synthesis of the key themes discussed throughout the three previous chapters, followed by a discussion of key findings, implications for planning practice, and future areas of research.

CHAPTER 2: COMPARATIVE PLANNING IN PRACTICE: THE PITFALLS AND POSSIBILITIES OF LEARNING FROM INTERNATIONAL SUSTAINABILITY SOLUTIONS

2.1 Abstract

Analytical frameworks examining the international flow of concepts, practices, and techniques ("traveling ideas" or "international best practices") most often call for the slow and critical examination of these ideas prior to local adaptation. However, in fast-paced working environments where planners are challenged to urgently address environmental and social issues, how these analytical frameworks are actually interpreted in practice? Becomes an important question. Building on existing comparative planning literature, semi-structured interviews with public sector planners from Chicago, Singapore, and Stockholm were conducted in order to 1) explore the extent to which planners from each city utilize international best practices in relation to sustainability; and 2) when these best practices are used, understand the planners' evaluation process in determining if the practice could or should be adapted for their city's use. The insights and reflections garnered from this study were used to identify potential factors that influence successful translation of sustainability solutions across contexts.

Keywords: sustainable development, best practice, social learning theory, comparative learning

2.2 Introduction

Urban planners work in fast-paced environments and must respond to urgent and evolving environmental and social needs. Mistakes in urban planning practice can be costly in terms of time, money, and/or reputation. Spectacular urban planning failures abound (Pruitt-Igoe in St Louis, MO is one notable example). The fear of "getting it

wrong" often prompts planners to seek out solutions that have been tried and tested elsewhere. This usually means looking to communities of a similar size, structure, or geography for comparison and potential replication. As knowledge and information systems expand and the complexity and urgency of the problems increase, however, planners are beginning to cast a wider net in the search of potential approaches, including those found internationally. As a result, international idea exchange and adaptation has become a significant component of a public planner's current arsenal of planning approaches and solutions (Healey & Upton, 2010).

In this chapter, comparative planning is viewed from an international and sustainability oriented perspective[1]. A social learning lens is used to explore the extent to which urban planners from Chicago, Singapore, and Stockholm compare and exchange international sustainability planning ideas, and adapt these ideas for use in their own local practice. Each of these cities is a recognized regional, national and international center and each has been internationally recognized for their progressive sustainability practices. Understanding what role comparison played in their progressive practices could be a key to helping other cities develop effective processes for comparison and for successful sustainable planning projects. More specifically, this study attempts to answer the following questions:

a. What models (symbolic, verbal, and live) do planners observe and learn from?
b. By what process do planners move from simple observation to adaption or reproduction of the model?
c. What are the factors that influence (or obscure) observational learning?

[1] We define sustainable planning as strategic "development without growth beyond environmental limits" (Daly, 1997).

To answer these questions, we first outline key components of comparative analysis and Albert Bandura's social learning theory (Bandura, 1969), which provides a framework for understanding planners' comparative learning processes. We then describe interview data collected from urban planners in Chicago, Stockholm, Singapore, and the qualitative research methods that were used to evaluate them. The ways in which information is shared (for instance, through visits, verbal encounters, and websites) are identified, as well as specific adaptation methods used, and specific barriers to comparison that they have encountered over the course of their practice. We find that the hyper-connectivity of communication technology has made it easy for planners to form networks, exchange ideas, and adapt best practices. We also find there are limitations to the successful translation and implementation of these practices. Using our survey results as a backbone, we discuss our understanding of the urban planner's thought process in the adoption of international sustainability ideas and we identify potential factors to the successful adaptation of internationally derived, municipal sustainability solutions.

2.3 Comparative Analysis

The literature on comparative approaches to planning and the transfer of urban planning ideas (e.g., city-building models, techniques, and concepts) is long and fairly comprehensive, beginning with the work of anthropologists and sociologists in the 1960s (Pahl, 1968) and moving into more contemporary urban studies that compare cities (Abu-Lughod, 2000; Amelang, 2007), processes (Roy, 2011), or typologies (Brenner, 2003; Ward, 2010). Using these as a frame, recent sustainability-oriented insights in comparative urban analysis will be summarized here.

Using comparative approaches can facilitate a deeper understanding of underlying planning issues than if these analyses are conducted within a single context (Davis, 2005). In her theory of comparative urbanism, Abu-Lughod (2000) argues for "a strategy which moves in disciplined fashion from the very specific to the somewhat more general … via the semi-controlled experiment … to illuminate similarities and differences." Lange (2012) expands on the idea by describing the methodological processes of comparative analysis, outlining the intersection of direct comparative methods with other approaches, including case study methods, social-science analytical methods, and methods using various scales of analysis. He suggests that comparative analysis has provided great insight into "diverse social phenomena" and in the process has made significant contributions to "our understanding of the social world." Comparative methods have been found useful for gaining insight into the causal determinants of particular urban phenomena and identifying similarities and divergences in individual trajectories (Amelang, 2007). According to Lange (2012) the simultaneous use of comparative and within-case methods can help balance ideographic and nomothetic explanations of empirical phenomena.

In terms of urban sustainability, the main advantage of comparative analysis is thought to be the ability to assess similarities and differences across geographies while simultaneously accounting for environment, context, and causal relationships (Berke & Conroy, 2002). The approach has been used to compare entire nations (Beatley, 1999) or cities within a single nation (Berke & Conroy, 2002; Portney, 2003). Solecki et al. (2005) use cross urban comparisons to structure a conceptual framework for urban climate change mitigation and adaptation, and Marsal-Llacuna & Fabregat-Gesa (2015)

propose the use of real-time data in order to construct a set of smart-city indices for comparative purposes. In terms of urban design, Frey (2003) uses a comparative framework to make arguments for a more sustainable urban form.

A common shortcoming of comparative methods, however, is a tendency to offer parallel descriptions of different places without a clear research question, hypothesis, or coherent system of comparison (for example, many approaches simply reduce complex systems down to a series of indicators that are then used for comparative purposes (United Nations, 1996)). Wolman (2008) and others critique sustainability indicators as a diverse, incoherent, and often unsystematic classification schemata. The indicators typically produced do not provide deep insights, tend to be context specific, culturally biased, and mostly marginalized by regional decision makers because they are seen as not applicable or not understandable (Wolman, 2008; Mcfarlane, 2010).

Adopting a comparative sub-national sample of cities within the same country has the advantage of being able to hold national factors constant and assume sustainability is a factor of local or regional criteria. Such an approach may be useful, but may not provide a distinct enough contrast to highlight the multi-scale structural factors that influence important changes (Mcfarlane, 2010). As such, it might prove useful to compare places with varying structural factors at all administrative scales. This approach argues for a wider, international scaled approach to comparative analysis.

The translation of comparative ideas into planning practice can be a much more difficult process (Friedman, 2001). Comparing the efforts of sustainability-minded cities in different national contexts, for example, can highlight innovative solutions. It can also call into contrast the structural elements that may be preventing global urban centers from

making the necessary changes to meet sustainability goals. For example, Queensland, Australia's initial attempts to replicate Singapore's highly successful potable water reclamation project, NEWater, has been a noted disappointment (Ching, 2010). Why? Are there specific barriers to NEWater's replication in other places? An incomplete understanding of key social and behavioral factors contributing to the success of best practices can often lead to failed translations in other contexts contributing to planners' trepidation and potentially, "getting it wrong."

2.4 Social Learning Theory

Many "traveling ideas" or "best practices" are developed initially as a solution to a specific problem in a specific context, but are then transferred through networks of planners or economic/social relationships (Healey & Upton, 2010; Nasr & Volait, 2003). In this way, planning problems are addressed through a process of dialogue, learning, and action between stakeholders who hold different perspectives (Nilsson & Swartling, 2009, p. 1). Social learning, or a change in understanding and skills that becomes situated in groups of actors/communities of practice through social interactions, is a strategy to facilitate this learning and dialogue (Albert, Zimmermann, Knieling, & von Haaren, 2012a, p. 348; Nilsson & Swartling, 2009). The concept of social learning was first developed by psychologist Albert Bandura in 1961, and it has since been applied to an array of sectors including environmental resource management (Albert, Zimmermann, Knieling, & von Haaren, 2012b) and urban planning (Healey, 2009). Below, we describe the key aspects of social learning as they relate to urban planning and comparative analysis. We use this framework as a lens to analyze and understand how planners in the City of Chicago and the City of Stockholm learn from international comparisons.

2.4.1 Observational Learning

Although there are many different aspects of social learning, we focus on observational learning; learning that occurs through observing other peoples' behaviors, attitudes, and/or emotions.

When planners make community scaled decisions, many would argue that they are significantly influenced by personal desires and aspirations (Stern, 2000). Bandura argues, however, that these decisions are also heavily influenced by observations. In other words, people learn important behavioral lessons vicariously, through others' experiences and reactions (Bandura, 1971; Bandura & Jeffrey, 1973). He points out that "learning would be exceedingly laborious, not to mention hazardous, if people had to rely (only) on the effects of their own actions to inform them what to do" (1971, p. 5). For example, we learn to talk by listening and learning from other's approaches to speech. Likewise, we learn to avoid dangerous but edible plants through the experiences of others. In the same way, planners observe and learn from other planners' experiences in order to avoid potentially negative planning consequences.

Bandura acknowledges that personal cognition plays an important role in how observational learning occurs. He notes that observational learning occurs through a) live models (the action is demonstrated), b) verbal instructional models (the action is described), or c) symbolic models (the action is represented and viewed via online resources, television, film, books, magazines, etc.) (Bandura, 1971). He describes it as a four-step learning process:

- Step 1. Attention: Observational learning begins when a person concentrates on specific elements of the observed model. Anything that detracts a person's attention

will likely have a negative effect on their ability to learn. People are more likely to direct their attention on novel aspects of the model.

- Step 2. Retention: Next, a person must store the observed information in the form of words or visual images and "pull it up" for later use.
- Step 3. Reproduction: Finally, observational learning is complete when the person reproduces the observed behavior, often adapting it to a new circumstance.
- Step 4. Motivation: Throughout this process, the observer's mental state (e.g., intrinsic vs. extrinsic motivators) has a profound impact on how the observed behavior is modeled.

2.4.2 Social Learning and Urban Planning

Bandura's 4-step framework explains how observations can lead to behavior replication in different situations. The more complex forms of observing and modeling that urban planners engage in require them to identify similarities between their own environment and the observed environment and formulate a rule for producing a similar result (Bandura, 1971, p. 10). Unfortunately, few urban planning practice studies have explored the process of social or observational learning.

Practice-based case studies have largely focused on social learning among citizens who participate in formal planning processes. For example, studies in Boston, Austin, and Kansas City have confirmed high levels of social learning throughout the participatory planning process (Goodspeed, 2013). Similarly, case studies of waterfront development projects in Melbourne and Vancouver showed that public participants engaged in both facilitated and un-facilitated social learning (Holden, Esfahani, & Scerri, 2014). These studies focus on the social learning that occurs among stakeholders belonging to a

particular community. They do not explore the kind of social learning that occurs when planners or citizens observe people or behaviors outside of the community, in an international context, for example. In addition, these studies focus on citizen social learning and do not address how public sector planners themselves engage in the social learning process.

This study seeks to fill this knowledge gap by asking practicing planners a) what models (symbolic, verbal, and live) do they observe and learn from? b) what process they use to move from simple observation to adaption or reproduction of the model?, and c) what factors influence (or obscure) their observational learning?

2.5 Data and Methods

Between February 2013 and March 2015, twelve interviews were conducted with public sector planners from the City of Stockholm in Sweden, the City of Chicago, Illinois in the United States, and the nation-state of Singapore. Planners from these three cities were chosen partly due to pre-existing relationships with each city's planning department (as part of a broader international planning project), and partly because both cities have various sustainable features that countries around the world have attempted to emulate (e.g., green roofs in Chicago, sustainable master planning in Stockholm, and municipal reclaimed water in Singapore). Interviewees were identified using a combination of methods including snowball sampling (via email).

Of the twelve total interviews, four were conducted by phone (3 with city planners from Stockholm and 1 with city planners from Chicago), and eight were conducted in-person (with Chicago and Singaporean planners). Each respondent was made aware that

individually recognizable information would not be published or presented. Consequently, respondent descriptors are limited to “Chicago Planner,” “Stockholm Planner,” “and Singapore Planner” in order to avoid personal descriptive characteristics and maintain privacy. All of the urban planners interviewed are highly educated, with the vast majority holding masters degrees.

A semi-structured interview approach was used to ensure specific points were covered, while still providing an open-ended flexibility for the respondents to relate their past experiences and current projects in a relaxed and free-flowing way. Questions generally related to background, experience, sustainability idea travel, and comparative sustainability idea adaptation. Additional questions were asked to Singaporean Planners regarding their NEWater integrated water management program. The interviews were conducted in English and ranged from 45 minutes to 2 hours; most lasted for approximately one hour. Nine of the twelve interviewees were audio recorded (with permission) in order to transcribe and tabulate. Three interviewees declined to be recorded. When audio recording was not possible, detailed notes were taken throughout the interview and then typed and expanded upon directly after the interview. Each interview was imported into qualitative analysis software (Nvivo) for a line-by-line coding to group substantive ideas and phrases into structured nodes. This approach is patterned on a Summary Oral Reflective Analysis (SORA) method (Thompson & Barrett, 1997, p. 60) and is used to help organize the data into identifiable patterns, themes, and conceptual connections.

The study was intended to be exploratory in nature. It was developed to capture an in-depth view of the contextual environment in which planners operate and the processes

of international idea transfer and adaptation through a limited number of case driven examples from the field. Because of this, the results will not be broad or representative, but rather will add to a body of literature that seeks to understand the process of, and factors that influence, international idea adaptation.

2.6 Results

In order to more usefully understand the data collected, we utilized concepts from Bandura's observational modeling theory (symbolic, verbal, and live) to describe and compare the types of models that the planners referenced and to help explain their adaptation thought processes (Bandura, 1971). The results are organized as follows. First we look at international sustainability models and solutions in terms of symbolic, verbal, and live models. Then we examine the process of sustainability solution adaptation as described and characterized by the interview responses. We conclude the section with a discussion of factors that influence the successful adaptation of sustainability driven plans and ideas that are derived from the interviews.

2.6.1 International Sustainability Models and Solutions

2.6.1.1 Symbolic Models

Not surprisingly, planners from all three cities acknowledged that they learn about international best practices through symbolic models (email, newsletters, etc.). However, planners from Chicago seemed to place greater emphasis on the use of technology for learning. One Chicago planner stated, "Probably 70 percent of the time (is) just searching websites, but we also do talk with other cities directly. But probably 30/70 … a lot of it is just kind of looking around to see what's happening." Some Chicago planners could rattle off a number of different blogs, websites, and other online resources they use to

"keep up to date" (e.g., the American Planning Association website, City of Portland, and Grist), while other searchers were more general, "It is more of a Google search."

Not all of this symbolic information they described was found or accessed via simple online search engines, however. Stockholm planners are heavily involved in global and European partnerships and projects that exchange information. A Stockholm planner stated, "We join projects and by joining a project we get a lot more cooperation with other cities…especially in Europe with European projects cofounded by the European commission. Then we are inspired by others. We get information and they get information from us." Singaporean planners were also not shy about referencing good ideas from overseas, admitting that they often "look around to see what other people are doing."

A Chicago planner also mentioned that consultants, who developed the online products for other cities, directed planners in his department to some of the electronic resources they now use frequently. These consultants, as well as other electronic mediums, often provided visual representations, such as drawings and photographs, which were found to be "motivating."

2.6.1.2 Verbal Models

Bandura's concept of observational learning through verbal models (i.e., explanations and descriptions of behavior) was also very prevalent in my interviews with planners from all three cities. Stockholm planners particularly emphasized listening in their verbal exchanges, with one planner being "inspired by listening and in the process of listening coming up with ideas that could be implemented at home." Similarly, a different Stockholm planner said, "By listening [to] how others have thought and [what]

others have done you can come up with ideas of your own, which sometimes work out." Chicago planners also described verbal interaction with a range of actors, but their vocabulary and way of explaining these interactions varied. Chicago planners seemed to place less emphasis on the listening aspect of communication. More common phrasing in the Chicago interviews included "talking with other cities," "talked to us," "picked our brains," and "I do a lot of public speaking."

Conferences, invited talks, and presentations made up a significant portion of opportunities for planners to exchange ideas. Chicago planners in particular emphasized that conferences are where they find "all the latest and greatest in policy, development, research, design, etc." Depending on the branch of planning, individual planners from Chicago are invited to several ("four or five or six") conferences each year, mostly within the United States. Similarly, Stockholm planners attended a range of international conferences in both Europe and the U.S. Stockholm planners also described visits by international architectural firms to give lectures or discuss projects as occurring approximately every other week. The Singaporean government provides funding for large, global sustainable planning events such as Singapore International Water Week and offers consulting services to those interested in implementing similar technology abroad. These conferences are one means of fulfilling their desire to be seen as a global planning leader in sustainability and water.

Planners from Singapore, Stockholm, and Chicago stated that they have been invited to "give talks" to cities and organizations located in other countries. These talks were generally described as being based on their experience or expertise in solving a specific problem that was of interest to the visited entity. For example, Stockholm

planners were invited to Rome multiple times to speak about their attempt to "get the Olympic games [through the application of] green building [concepts]." They also noted trips to Bangkok to speak about clean vehicle issues, to China to discuss wastewater treatment plants, and to New York to present waste collection solutions that have been effective in Stockholm. One Swedish planner was also invited by the U.S. Swedish Ambassador (who was "very keen on increasing the cooperation between Sweden and the U.S. on renewable energy") to meet with a Washington delegation and exchange ideas on renewable energy strategies.

In Chicago, the green roof initiative was noted to have garnered many invitations for the planners to come and "give a talk" on the experience to a wide variety of international cities. The planner most heavily involved in the implementation of the green roof program was thought to have been invited to the Netherlands, Copenhagen, Paris, Hamburg and Singapore within the past couple of years. These speaking opportunities are seen as an important way to foster the mutual exchange of information with the host city. They typically include visitor tours and informal opportunities (e.g., lunches, receptions) to exchange ideas with other planners and politicians.

2.6.1.3 Live Models

Of the three basic models of observational learning, access to international live models varied the most between the planners in each city. This might be explained by a number of factors, including contextual differences in geography (Stockholm and Singapore are closer to a greater number of countries and major cities), institutions (Sweden is part of a wider supranational institution – the European Union), and city budget constraints.

Live model observation is an important part of the Stockholm planning culture. Stockholm planners often go on regular "study trips" to experience new places first hand. These are typically funded by the Stockholm planning department. In many cases specific project teams will travel to various European countries together in order to view potential solutions, gain inspiration, and develop social bonds within the team. On one such trip Swedish planners went to the City of Bremen, Germany, which is known for a successful car-sharing program.[2] After experiencing this live model, a similar program was developed for Stockholm. A planner explained, "We took that idea direct and tried to implement it in Stockholm and incentivize it to get some car sharing systems working." The planner explained that the Swedish version has not quite lived up to their expectations, at least when compared to its German inspiration. It is, however, still considered a good program in Stockholm because it has helped reduce total vehicle miles traveled in some residential areas by approximately 10 percent.

Similarly, one Singaporean water planners said "we have actually made some references to overseas…we do look around to see what other people are doing, and we visit Australia quit often also. Yeah. Because they're also facing droughts and things like that. So we learn from each other." More often, however, visitors from a wide range of nationalities – mayors, planners, even presidents - have visited Singapore in hopes of learning from their integrated water management program.

Instead of looking outward, Chicago planners seemed focused on the diversity of cultures that were coming into their city for inspiration. For example, they were very aware of the large number of groups from overseas (e.g., Thailand, Japan, and Sweden)

[2] Car sharing entails user subscription to a program that provides vehicle usage on a 'pay per kilometer' basis, which is seen as an alternative to the need for an individual to own their own vehicle.

that have traveled to Chicago to learn from their own "living city model." They noted that many foreign delegations (e.g., Ministries of Transportation) will be sent to Chicago through the delegate's government on study missions, often when something in Chicago has gotten significant publicity and they "want to learn more about … how we pull this off and how it will be applicable to whatever situation they're dealing with in their own country."

Opportunities for Chicago planners to go on Swedish and Singaporean style "study trips" are far less frequent. One Chicago planner stated, "it's not as common as it should be … I mean any given year somebody will go somewhere overseas for something, but, you know, I'd say the opportunity should probably be more widespread than it is." The same planner felt that every planner in his department should get the opportunity to travel overseas "at least a couple times" because "it would be a good opportunity to see how things happen in other countries … [It would be] kind of a reawakening, at least I find it that way. You re-think how your own city works." In contrast, a Chicago planner opined that they did not think that planning ideas from countries that they had recently visited (Italy and Mexico) had any influence on their Chicago planning projects. Additionally, multiple planners from Chicago felt that some of the issues (transportation was one example given) that they were facing in their city were too unique to gain much insight from international models. One stated that one specific and current project was "addressing challenges that are unique to the way Chicago works." It was additionally noted, however, that this project could be used as a model for the successful coordination of a complex network of stakeholders in other cities to follow.

Despite the less extensive program for study trips in Chicago, certain Chicago government officials have had the opportunity to experience live international models relating to specific issues. In one case, bike sharing, a commissioner and deputy commissioner for the city traveled to Copenhagen on a "bike [sharing] best-practices learning trip" where they were able to "look at what works and what doesn't work" in terms of bike share programs. Some planners had similar experiences on their own time and at their own expense. One Chicago planner said, "I've never been to a conference in Europe, but I've been all over Europe to just kind of learn. And I … took pictures of the bike share system [while there]."

2.6.2 Sustainability Solution Adaptation

Bandura describes the observational learning process as moving from "attention" to "retention" to "reproduction." He suggests that the process is influenced by the motivation of the observer/potential adopter and emphasizes how an individual adapts the observed behavior to their individual circumstance.

In this section, we explore how the responding planners describe their learning and adaption process of internationally observed sustainably oriented projects. This particular topic was not touched on during the interviews with Singaporean planners. As suggested in the live model discussion above, the Stockholm and Chicago planners generally perceived international travel as novel and interesting. Their attention was reported as generally heightened and they appear to be receptive to learning. Terms used included "reawakening" and "re-thinking," among others, suggesting a heightened attention to planning details when visiting other places. The overall retention of the observed ideas was excellent in some ways. For example, most reported to have documented their

experiences through pictures and note taking. There was also, however, a reported overload of new and very different geographies, languages, and cultural/social norms that may have impacted the planners' ability to adequately capture and retain certain aspects of the observed phenomena.

The planners provided an array of answers when asked to describe their thought process regarding the general adaptation of an internationally observed idea for their own local use. The Swedes tended to focus on the inspirational qualities of the observations and their potential to generate new ideas and new ways of doing things. One Swedish planner described the need to take his time to truly understand the idea, reflect upon it, and "see what imagery is [relevant to his] own system where we have our constraints and our preconditions." Another Swedish planner had similar thoughts, saying that one has to understand the city, their goals, how their ideas are presented, and what process they worked through to produce those ideas, but says it's "seldom you take exactly what they've done." He went on to say that the process of listening was important. He listens to the ideas of others in order to imagine new ideas for his community that could potentially be implemented, and how it might work within local economic and legal frameworks.

The group from Chicago seemed more focused on the observations in terms of their potential for problem solving. A Chicago planner described a thought process that included bringing in their own perspectives and training and trying to infuse them with best practices from other places: "but at the end of the day … it's a luxury to think outside the box, so to speak; it's more of 'find a solution that works' [here and now]." A different Chicago planner echoed this sentiment, saying that the first step is having an

understanding of what the problems in Chicago are, and then being exposed to different types of solutions to "problems that have some relationship or some similarities to the problems we have here." Still another Chicago planner said that adapting international ideas was just plain "common sense," while another said that his thought process started with two main questions – "do we have the resources and the political will to implement this?"

When asked about a specific sustainable planning idea, the adaptation process for the bike share program they saw in Copenhagen, a Chicago planner said, "We are doing something pretty similar to what they did ... I don't think we had to do a lot of tweaking. The biggest challenge we have here in Chicago is just the sheer size of the city … and [bike resources] are just not as wildly taken up as we'd like." The planner went on to describe the stigmas that have become attached with bicycling in certain racial/ethnic groups, and how they are trying to combat these stigmas with bicycle education programs in elementary through high schools. The planner did not mention approaches that Copenhagen had taken when dealing with similar problems.

2.6.3 Factors that Influence to Successful Transfer or Adaptation

The above discussion reveals a few of the factors that the planners considered when assessing the potential adaptation of an observed idea. Resource constraints, politics, economic frameworks, legal frameworks, institutional/governmental differences, and time constraints were all concepts that came up throughout the interviews. Some of these factors might also impact the planner's own ability to critically examine each model.

Budgetary constraints seemed to weigh heavily in the Chicago planners' thought process. In terms of idea adaptation, financing and budget issues emerged as one of their key factors for assessing potential success. One Chicago planner plainly stated,

> *"Other countries tend not to have as many constraints on resources as we do here, I mean it's like our level of infrastructure spending is so low compared to most other developed countries and even some developing countries, you know, spend a lot more, certainly relative to their GDP than we do, so it's more, one of the frustrating aspects … there's ways you can solve transportation problems by investing in infrastructure with capital investments. We don't have the capital, the resources to do that, so things just don't get done or we do it on maybe not the most effective basis."*

Chicago planners also felt that budgetary constraints limited the number of learning opportunities that were available to them for professional development, implying this might affect idea adaptation. One planner discussing opportunities for travel learning opportunities, said that "there may be a foundation organization that [would] sponsor it, I mean the city itself wouldn't do that, it pretty much can't do that." Another Chicago planner thought that opportunities for funding travel opportunities were being cut extensively throughout the United States. He explained,

> *"The National Academy of Engineering who oversees the transportation research board had a quite an extensive program of oversea study tours, but I think a lot of that's been cut in the last couple of years because, you know, our head in the sand congress doesn't want anybody to see how anybody else does it, or else somebody might learn something. Heaven forbid they learn anything!?"*

In contrast, Swedish planners acknowledged that budgetary issues were rarely a problem for them, especially in terms of study trips, noting with pride, "of course the City of Stockholm is very rich and we have money … and a stable economy."

The Singaporean planners think adaption of their innovative water planning strategies will increase in many cities as the technology advances and gets more reliable and cheaper, and when the cities have more issues with water scarcity (coming closer to the situation faced in Singapore). One planner said, "I think we are world leaders in water husbandry. But then Singapore is atypical. It's a mid-size city and also a country. We can do things which many people cannot do." He likened the implementation of their municipal reclaimed water to Singapore's Electric Road Pricing (ERP) system used for traffic congestion charging. He said, "That was just like ERP and all of that. When we introduced ERP in Singapore, other countries will never be able to introduce ERP because you are monitoring people's movement. But Singapore, we just did it and yeah, most people accept you. You hardly hear a dissenting voice, so we could do a lot of things that many other countries cannot."

Although they acknowledge these factors would affect the results of a project, a Singaporean Planner did concede that they "have projects in China, because Singapore helps China develop cities. The one we're doing now is the Tianjin Eco-city. So a lot of what we do in Singapore we try to transplant to Tianjin." In addition to China, many of the water sector professionals mentioned the water consulting Singapore has engaged in with India and the Middle East. They are less involved in developing countries because "it's not about the NEWater. It's about infrastructure and building water plants to process.

They don't even have-- first, you've got to have a functioning sewage system in order to make NEWater."

A different Singaporean water planner was quick to point out that his staff were wary of the many factors that influence a 'good' per capita consumption rate. He explained, "world class performance is actually 110 [liters per capita water consumption]. In Europe, in the Nordic countries - they are doing that. So of course they tell me it's different because if you live in a temperate place, you use less water. You don't have to take two showers a day. And of course our food. You need more water to make curry, to cook. If you eat sandwiches all day, you don't need much water. And then you have to wash your clothes more frequently, because you perspire. You have a fresh set. We change our clothes every day. In northern Europe, no."

Singapore's Public Utilities Board has also participated in water benchmarking through the European Benchmarking Co-operation (EBC). The EBC publishes a report that anonymously allows countries, or different utilities to share water consumption per capita data. Several water sector leaders I spoke to in Singapore found this data interesting and informative; though they readily acknowledged that Singapore has far less trouble that European countries setting and enforcing regulatory measures relating to water due to their political structure.

Working Environments. The working environments for the urban planners in all three cities were for the most part, similarly perceived. The groups reported that they generally enjoyed the diversity and wide-scale impact their job offered, while many disliked the rigidity of the administrative bureaucratic frameworks they had to follow. Many of the planners reported a hectic work schedule. One Stockholm planner offered, "We

sometimes have too many things on our desks and we don't really manage to fulfill our tasks at a good quality level." A Chicago planner echoed this sentiment, saying, "Well, you know, I think that the public sector generally these days is pretty under resourced … [The department is] as small as it's ever been, but our needs are as great as they've ever been … there're a lot of needs that just go unaddressed because there aren't resources to deal with them both in terms of the manpower within the city as well as just the overall capital resources." Stockholm planners spoke about the collegial nature of their working environment more frequently and more positively, "The best thing is that we have a quite good team here and my colleagues are very competent. This is of course found day-to-day. We have very good climate, local climate; a very good exchange. We can submit ideas [with] the confidence that is necessary to have good discussions."

2.7 Discussion

In the 12 semi-structured interviews conducted with urban planners from the Cities of Chicago, Stockholm, and Singapore it was apparent that each planner does, in fact, attempt to learn from international symbolic, verbal and live models of sustainability techniques, initiatives and measures, although to varying degrees. In Stockholm and Singapore, there seemed to be a more robust idea exchange, with the freedom to observe live models more frequently. Although many planners in Chicago acknowledged that observation of live models would be helpful, budgetary restrictions often keep them closer to their home office. This limitation often required comparative learning to occur in the form of symbolic and verbal models. All cities noted conferences as particularly important opportunities to share sustainability ideas and learn.

The cognitive process used to evaluate the local adaptability of internationally based ideas (i.e., the process of comparison) varied widely from planner to planner, although many planners considered similar factors (e.g., social acceptability, budgetary constraints). In terms of Bandura's 4-steps (see Figure 2.1), the majority of planners acknowledged that their attention and retention was heightened when traveling to new cities, which they perceived as novel and exciting. The majority of planners also acknowledged that they did reflect on their observations in order to determine if the phenomena would be useful to reproduce or adapt locally. This reflection process varied vastly between planners. It ranged from specific, set questions they asked themselves to simply relying on their common sense. It rarely included quantified analysis.

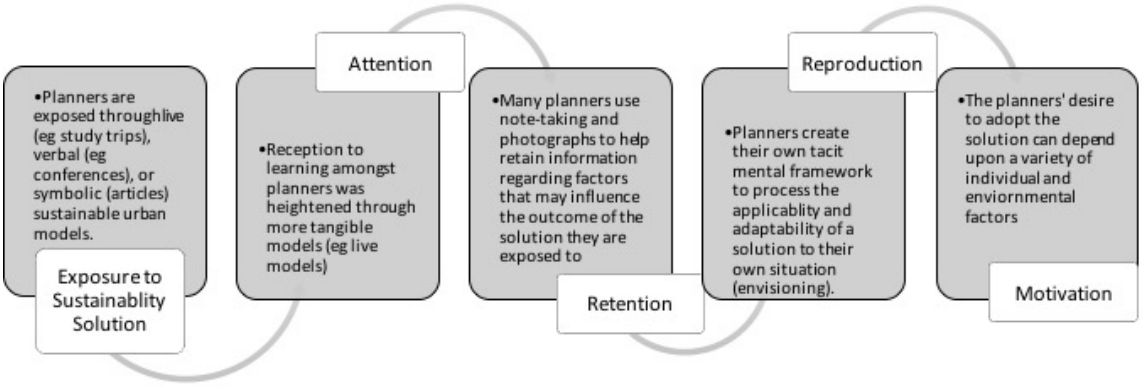

Figure 2.1: Planners' Cognitive Processing of International Sustainability Solutions

When organizing responses, we notice that the act of reflection in the comparative process was an important factor. In our study we find that it serves 2 fundamental roles: 1) triggering new ideas, and 2) identifying factors that influence replication or adapting the idea. A majority of the planners readily acknowledged that budget is a key barrier to

adaptation or replication of a sustainable solution. Chicago planners also added that, although hard to quantify, politics can play a significant role in successful implementation. Other acknowledged factors included exposure, ideology, education, internal factors, and climate (see Table 2.1).

Table 2.1: Factors that represent barriers to successful international idea adaptation as found in our study categorized by planning scale.

Level	Factors
Planner	• Prior education (level and field) • Exposure to opportunities for continuing education • Convenience of information retrieval • Places visited for personal travel (domestic/abroad; rural/urban) • Places visited for professional travel • Time spent living abroad/studying abroad • Previous relationships with planners from other countries
Planning Division	• Time requirements for continuing education • Project budgets • Group dynamics • Internal policy/procedures
City	• Sister city agreements • Budget • Shared partnerships or projects
Region/ County (if applicable)	• Social class • Budget • Shared partnerships or projects
Country	• Political system • Institutional partnerships

We argue that the implementation success rate of sustainable urban planning solutions would improve if a more thorough understanding of potential barriers were readily acknowledged and understood during the reflection process. For example, none of the planners mentioned culture as a barrier they reflect upon – which is historically one of the key reasons for unsuccessful adaptations (Nasr & Volait, 2003; Roy, 2011; Sanyal, 2005).

Our interview findings suggest that a structured reflection process should take place after planners' experience live, verbal, or symbolic models. This reflection process should more fully explore the potential factors that influence international idea adaptation. For the planners we interviewed, only a few potential barrier factors came easily to mind. We argue that factors that do not easily come to mind should also be reflected upon and analyzed. These typically are the factors that have the most potential impact on implementation and that are most likely to cause problems down the road – or to provide the best rationale for implementation. For example, planning agencies and consultants seeking to implement Shanghai's urban model in Mumbai neglected to consider culture and socio-economic factors, which led to the "violent … brutal marginalization of the city's poor" (Roy, 2011).

In Table 2.2, we have compiled a number of factors that could impact successful international idea adaptation (barriers) at various levels that were not acknowledged in the data, but have been discussed in the existing literature (Healey & Upton, 2010; Hofstede, 2001; Jorgensen, 1979; Kaufman, 1985; Keiner & Kim, 2007; Rodriguez & Brown, n.d.). Acknowledging and understanding these factors through a more structured reflection process (of both the observed and home country) will help planners more successfully adapt ideas and avoid pitfalls.

Table 2.2: Potential factors that could impact successful international idea adaptation at various levels

Level	Factors
Planner	• Ideology • Mental state (intrinsic vs. extrinsic motivations) • Comfort with technology • Years of professional planning experience
Planning Division	• Developed continuing education program • Prominent ideology

Table 2.2 (continued)

City	• Historical background • Culture
Region/ County (if applicable)	• Climate • Historical background • Culture
Country	• Legal system • Economic system • Historical background • Culture

This study speaks to the value of learning from other cities through symbolic, verbal, and live observations and underscores the importance of reflection in idea adaptation. We acknowledge, that this study is not representative of planners worldwide (our 3 cities are considered from the global north, for example), or even necessarily of planners from the Cities of Chicago, Singapore, and Stockholm. The methodology is imperfect in that all planners from the City of Stockholm were not interviewed in their native language by someone who was familiar with their planning processes; therefore, some components of what they said may have been lost in translation for example.

2.8 Conclusion

Urban centers urgently need sustainable solutions to pressing issues such as climate change, water scarcity, and urban sprawl. Over half of the world's population lives in cities, and this number is increasing. This is producing strain on vital natural resources worldwide (United Nations, 2012). We contend that learning from other city's successes and mistakes is key to helping urban planners implement much needed solutions to these critical urban issues.

Luckily, this learning is now easier than ever due to an ever-increasing interpersonal connectivity through websites, social media, and communication technologies. This increased connectivity however, has also led to rapid changes in personal values and in professional practices (for example, according to Jennifer Good (2007) television has had a powerful influence on public opinion and attitudes about the natural environment). Because of this rapid pace of change, planners need to constantly search for new knowledge. What they learned 10-20 years ago can now be irrelevant, if not obsolete. We think that the process of comparison can provide a useful means to acquire this necessary new knowledge.

We found that planners from Stockholm, Singapore and Chicago learn comparatively from symbolic, verbal, and live international models of sustainability techniques to varying degrees. Sometimes, this comparative approach acted as an affirmation of existing ideas, while in other cases it was a catalyst for new ideas or inspired close to exact replication in a different context. The observation of live urban models is an important part of Stockholm and Singapore's planning culture, inspiring their most innovative sustainability plans and processes. Planners from Chicago, however, were more constrained by budget from observing live city models. They acknowledged, however, that the best way to "get things to change is [to have] politicians look at good examples in another country or city."

Our qualitative study is exploratory in nature. It captures an in-depth, but limited view of the contextual environment in which planners operate and the processes of international idea transfer and adaptation. The results therefore, are not broad or

representative, but do add to a body of literature that seeks to understand the process of, and barriers to, international idea adaptation.

In this work, we identify a variety of factors that influence the success of international idea adaptation (see Tables 2.1 and 2.2). Future research should more closely examine these factors and develop a more robust analytical framework for international sustainability idea adaptation. This framework can then be utilized by planning practitioners to help guide their thinking when attempting to adapt an international idea for their own local use. It will assist them in taking advantage of the countless possibilities of international idea exchange, while helping them avoid the many potential pitfalls.

2.9 References

Abu-Lughod, J. L. (2000). New York, Chicago, Los Angeles: America's global cities. Minneapolis: University of Minnesota Press.

Albert, C., Zimmermann, T., Knieling, J., & von Haaren, C. (2012a). Social learning can benefit decision-making in landscape planning: Gartow case study on climate change adaptation, Elbe valley biosphere reserve. Landscape and Urban Planning, 105(4), 347–360. http://doi.org/10.1016/j.landurbplan.2011.12.024

Albert, C., Zimmermann, T., Knieling, J., & von Haaren, C. (2012b). Social learning can benefit decision-making in landscape planning: Gartow case study on climate change adaptation, Elbe valley biosphere reserve. Landscape and Urban Planning, 105(4), 347–360. http://doi.org/10.1016/j.landurbplan.2011.12.024

Amelang, J. (2007). Comparing cities: a Barcelona Model? Urban History, 34(02), 173–189. http://doi.org/10.1017/S0963926807004592

Bandura, A. (1971). Social Learning Theory. General Learning Corporation.

Bandura, A., & Jeffrey, R. W. (1973). Role of symbolic coding and rehearsal processes in observational learning. Journal of Personality and Social Psychology, 26(1), 122–130. http://doi.org/10.1037/h0034205

Beatley, T. (1999). Green Urbanism: Learning From European Cities (1 edition). Washington, DC: Island Press.

Berke, P. R., & Conroy, M. M. (2002). Are We Planning for Sustainable Development? Journal of the American Planning Association, 66(1), 21–33. http://doi.org/10.1080/01944360008976081

Brenner, N. (2003). Stereotypes, Archetypes, and Prototypes: Three Uses of Superlatives in Contemporary Urban Studies. City & Community, 2(3), 205–216. http://doi.org/10.1111/1540-6040.00051

Ching, L. (2010). Eliminating "Yuck": A Simple Exposition of Media and Social Change in Water Reuse Policies. International Journal of Water Resources Development, 26(1), 111–124. http://doi.org/10.1080/07900620903392174

Daly, H. E. (1997). Beyond Growth: The Economics of Sustainable Development. Beacon Press.

Davis, D. E. (2005). Cities in Global Context: A Brief Intellectual History. International Journal of Urban and Regional Research, 29(1), 92–109. http://doi.org/10.1111/j.1468-2427.2005.00572.x

Frey, H. (2003). Designing the City: Towards a More Sustainable Urban Form. Taylor & Francis.

Friedman, V. (2001). Action Science: Creating Communiteis of Inquiry in Communities of Practice. In P. Reason & H. Bradbury (Eds.), Handbook of Action Research. SAGE.

Good, J. (2007). Shop'til we drop? Television, materialism and attitudes about the natural environment. Mass Communication & Society, 10(3), 365-383.

Goodspeed, R. (Robert C. (2013). Planning support systems for spatial planning through social learning (Thesis). Massachusetts Institute of Technology. Retrieved from http://dspace.mit.edu/handle/1721.1/81739

Healey, P. (2009). The Pragmatic Tradition in Planning Thought. Journal of Planning Education and Research, 28(3), 277–292. http://doi.org/10.1177/0739456X08325175

Healey, P., & Upton, R. (2010). Crossing borders : international exchange and planning practices. London; New York: Routledge.

Hofstede. (2001). Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations. SAGE.

Holden, M., Esfahani, A. H., & Scerri, A. (2014). Facilitated and emergent social learning in sustainable urban redevelopment: exposing a mismatch and moving towards convergence. Urban Research & Practice, 7(1), 1–19. http://doi.org/10.1080/17535069.2014.885735

Jorgensen, J. G. (1979). Cross-Cultural Comparisons. Annual Review of Anthropology, 8, 309–331.

Kaufman, J. L. (1985). American and Israeli Planners: A Cross-Cultural Comparison. Journal of the American Planning Association, 51(3), 352–363. http://doi.org/10.1080/01944368508976422

Keiner, M., & Kim, A. (2007). Transnational City Networks for Sustainability. European Planning Studies, 15(10), 1369–1395. http://doi.org/10.1080/09654310701550843

Lange, M. (2012). Comparative-Historical Methods (1 edition). London: SAGE Publications Ltd.

Marsal-Llacuna, M.-L., & Fabregat-Gesa, R. (2015). Modeling citizens' urban time-use using adaptive hypermedia surveys to obtain an urban planning, citizen-centric, methodological reinvention. Time & Society, 0961463X15577259. http://doi.org/10.1177/0961463X15577259

Mcfarlane, C. (2010). The Comparative City: Knowledge, Learning, Urbanism. International Journal of Urban and Regional Research, 34(4), 725–742. http://doi.org/10.1111/j.1468-2427.2010.00917.x

Nasr, J., & Volait, M. (2003). Urbanism : imported or exported? Chichester, England; Hoboken, NJ: Wiley-Academy.

Nilsson, A., & Swartling, Å. (2009). Social Learning about Climate Adaptation: Global and Local Perspectives. Stockholm Environment Institute.

Pahl, R. E. (1968). Readings in Urban Sociology: Readings in Sociology. Elsevier.

Portney, K. E. (2003). Taking Sustainable Cities Seriously: Economic Development, the Environment, and Quality of Life in American Cities (second edition edition). Cambridge, Mass: The MIT Press.

Rodriguez, A., & Brown, A. (n.d.). Cultural Differences: A Cross-cultural Study of Urban Planners from Japan, Mexico, the U.S., Serbia-Montenegro, Russia, and South Korea. Public Organization Review, 1–16. http://doi.org/10.1007/s11115-012-0204-9

Roy, A. (2011). Commentary: Placing Planning in the World--Transnationalism as Practice and Critique. Journal of Planning Education and Research, 31(4), 406– 415. http://doi.org/10.1177/0739456X11405060

Sanyal, B. (2005). Comparative planning cultures. New York: Routledge.

Solecki, W. D., Rosenzweig, C., Parshall, L., Pope, G., Clark, M., Cox, J., & Wiencke, M. (2005). Mitigation of the heat island effect in urban New Jersey. Environmental Hazards, 6(1), 39–49. http://doi.org/10.1016/j.hazards.2004.12.002

Stern, P. C. (2000). New Environmental Theories: Toward a Coherent Theory of Environmentally Significant Behavior. Journal of Social Issues, 56(3), 407–424. http://doi.org/10.1111/0022-4537.00175

Thompson, S. M., & Barrett, P. A. (1997). Summary oral reflective analysis: a method for interview data analysis in feminist qualitative research. ANS. Advances in Nursing Science, 20(2), 55–65.

United Nations. Dept. for Policy Coordination, & Sustainable Development. (1996). Indicators of sustainable development: Framework and methodologies. United Nations.

United Nations. (2012). World Urbanization Prospects. Department of Economic and Social Affairs.

Ward, K. (2010). Towards a relational comparative approach to the study of cities. Progress in Human Geography, 34(4), 471–487. http://doi.org/10.1177/0309132509350239

Wolman, H. (2008). Comparing local government systems across countries: conceptual and methodological challenges to building a field of comparative local government

studies. Environment and Planning C: Government and Policy, 26(1), 87 – 103. http://doi.org/10.1068/cav5

CHAPTER 3: UNDERSTANDING THE BEHAVIORAL INFLUENCES BEHIND SINGAPORE'S WATER MANAGEMENT STRATEGIES

3.1 Abstract

This paper aims to uncover the key behavioral influences behind two of Singapore's most successful water management strategies: 1) their high public acceptance rate of reclaimed water (marketed as 'NEWater'), and 2) the Singaporean public adoption of targeted domestic water conservation behaviors. We used the Theory of Planned Behavior framework (Ajzen, 1991) to construct a household survey that was mailed to a national sample (n=218) obtained from the Singapore Department of Statistics. Our descriptive and path analysis results indicate that 74 percent of Singaporeans generally approve of NEWater, and that a positive attitude toward this municipal water technology was the most significant variable in predicting respondent's level of approval. In terms of water conservation, we asked participants which of the 7 specific water behaviors targeted by the Singaporean Public Utilities Board they engage in regularly. We found that the most widely adopted behaviors were fixing water leaks promptly (80.8%) and monitoring water bills (80.3%), while washing dishes under a filled sink (11.7%) was the least adopted. Path analysis of the data showed that a belief that other people they respect and believe to be 'like them' (social norm) was the most significant variable in predicting adoption of the water conservation behaviors. We discuss how knowledge of these key behavioral influencers can make behavior change campaigns more effective both in Singapore and other countries.

3.2 Introduction

There are cities on every continent facing potable water scarcity issues (McDonald et al., 2011). Approximately 1.2 billion people live in areas that are considered to be physically water scarce, while another 1.6 billion people lack adequate potable water infrastructure (United Nations, 2015). Although the global fresh water supply is considered (theoretically) more than enough to support the current global population of 7 billion people, many regions remain chronically short of clean drinking water due to both natural and human factors (i.e., pollution, waste, unsustainable management) (United Nations, 2006). Coming to grip with these issues is becoming more complicated and urgent as our cities continue to grow. An additional 3 billion urban dwellers are forecasted by 2050, raising the demand for already strained potable water resources (McDonald et al., 2011). In fact, by 2030, it is predicted that approximately half of the global population will face water scarcity issues due to a mismatch of availability, demand, cultural mores and geography (United Nations, 2015)

Water planning methods that have helped cities deal with these mismatches in the past are no longer able to adequately address the new challenges (see southern California for an example). And although radical technical solutions abound (recycling, desalination, CO_2 filtration, water turbines, atmospheric generators, and water stills for example), most water management plans and models still lack a thorough understanding of the socio-cultural-behavioral factors critical for the societal acceptance and ultimate success of these technical interventions. A good example is the implementation of recycled water infrastructure (Wester et al., 2015) the main subject of this chapter.

Examples of a successful integration of technology and behavioral acceptance in terms of potable water infrastructure does exist in the literature. Singapore for example, implemented a national-scale reclaimed water system in 2003. Along with the large scale technological infusion of 100% water recycling (blue, green, gray, and black water), it was supported by aggressive household water conservation campaigns aimed at reducing per capita consumption by 10 % (Singapore Public Utilities Board, 2013). The success of their technological infusion has encouraged planners, diplomats, and engineers from other water scarce areas to travel to Singapore to learn from their water practices firsthand. These visitors often find the experience to be inspiring, and enlightening. They also reportedly find indicative proof that Singapore's water strategies *work* (Singapore Public Utilities Board, 2013). What is less apparent and more difficult to discern however, is *actual* proof that the strategies *are* in fact working for *all* Singaporeans. Are Singaporean's accepting NEWater and changing their conservation behaviors? If so , what are the behavioral influences that support the strategies and more simply, can the program can be classified as a success?

This Chapter we consider the role of *behavior* in the integration of a sustainably driven potable urban water management and planning solution from both a supply and demand perspective. We look closely at Singapore's NEWater program by posing the following four research questions. First, does the Singaporean public *really* approve of NEWater? The Singaporean government has suggested that there is almost universal acceptance of the program. This fact however, has never been verified by an independent entity. Next, if Singaporeans do accept the program, what behavioral influences might have played a role in gaining this acceptance? Similarly, looking at the demand side of

Singapore's water management strategy, how much water is Singapore conserving, what methods are they using to accomplish it and what behavioral factors have influenced water conservation?

We address these questions by looking at water management planning in terms of supply and demand strategies in the Singaporean context. Using the Theory of Planned Behavior framework (Ajzen, 1991) we construct a survey that was mailed to a national sample of Singaporeans (n=218) to understand what proportion of the population currently accepts NEWater, how many have actually adopted the PUB targeted water conservation behaviors, and in both cases – why? A 74% public acceptance rate of NEWater was significantly affected by individual attitude, while the most widely adopted behaviors were found to be fixing water leaks promptly (80.8%) and monitoring water bills (80.3%). The most significant variable in predicting adoption of the water conservation behaviors was a belief that other people the participants respected and believed to be 'like them' (social norm) were engaging in the behavior.

3.3 Water Management

Water management plans help entities set long- and short-term water supply and conservation goals. In the Singapore case this means careful conservation and the reclamation of all water for reuse.

3.3.1 Reclaimed Water Supplies

The term 'reclaimed water' (also referred to as recycled water, renewed water) refers to potable water that is used, collected, filtered, cleaned and repurposed for other, additional uses. It typically denotes wastewater (sewage) that has been treated for re-use

in industrial/commercial applications, landscape irrigation, and/or (at times) consumption. It is used in lieu of both securing (and treating) new fresh water supplies and discharging treated wastewater into surface water systems and has therefore been considered an important strategy for sustainable water management and for effectively increasing potable water availability in water scarce areas. Among other technical approaches, reclaimed water is considered to be a much more sustainable option in terms of energy consumption, greenhouse gas emissions, and cost (Cooley, Gleick, & Wolff, 2006).

3.3.2 The 'Yuck Factor' and Public Acceptance

Public acceptance of reclaimed water, especially for potable use, has proven to be one of the key issues the effective implementation of the technology and water conservation strategy. Reclaimed water has been found to trigger the 'Yuck Factor' – an emotional reaction of disgust that can affect human behavioral decision-making (Ching, 2010; Wester et al., 2015). In other words, people generally find the idea of drinking water previously used for sanitary sewage purposes as repulsive. Past research has shown that people are likely to oppose the use of reclaimed water for human consumption due to this emotional reaction (Dolnicar, Hurlimann, & Grün, 2011).

The 'Yuck Factor' or the 'wisdom of repugnance', is the common conception that an intuitively negative response to something is evidence that it is harmful (or evil) (Kass, 1997). From a basic, bio-evolutionary perspective this intuition has been useful for human survival. From a more advanced socio-cultural perspective however, a more complex and nuanced picture emerges. Jonathan Haidt (2011) for example, proposes that these instinctive gut feelings, rather than logic and reasoning, can cloud our judgments of

right and wrong. His *social intuitionist* approach to morality. suggested that "moral judgment is caused by quick moral intuitions" while moral reasoning simply serves as a post-hoc rationalization of already formed judgments. He argues that these intuitive, gut feelings are related to six key moral foundations: care; fairness; liberty; loyalty; authority; and *sanctity* (Haidt, 2013). This sixth foundation, sanctity, commonly refers to an abhorrence for disgusting things, foods, or actions. It is this intuitive feeling of disgust that often arises at the thought of drinking reclaimed water. Haidt (and others) however, also argue that, "a cultural learning process shape(s) each individual's response" (Haidt, 2001). In other words, cultural differences in sensitivity to the sanctity foundation could ultimately impact the likelihood of public acceptance of reclaimed water.

According to the National Center for Biotechnology Information (Curtis, 2011), the feeling of disgust is an adaptive, evolutionary human reaction to things that have the potential to cause harm or disease that is developed at around the age of four years. These feelings, however, can be triggered by objects or situations that are not dangerous. For example, a laboratory/questionnaire study conducted at University of Pennsylvania found that participants refused to drink a beverage that came into contact with a "fully sterilized" cockroach even though each participant rationally understood the drink was safe for consumption (Rozin, Millman, & Nemeroff, 1986). Reclaimed water operates within the same psychological dilemma.

3.4 Water Conservation Behavior Change

As part of a 'conserve and load' strategy of reducing consumption rates and loading with renewable sources, municipal governments in water scarce areas often employ education campaigns to promote water-saving behaviors. These campaigns typically

encourage residents to reduce their shower time, install water saving fixtures or appliances, or limit outdoor watering. The messages used to encourage these behaviors (e.g., normative, educational) – and the delivery channels (e.g., social media, television, transit signage) used to carry them, vary widely. Often, however, it is difficult to predict the measurable impact of these specific interventions – especially when others who have implemented them are in vastly different contexts.

3.4.1 Pricing and Rationing

Neoclassical economists have long argued for the use of water pricing as a means to manage water demand, while supporters of Integrated Water Resource Management (IWRM) principles argue that water should not be viewed as a normal economic good. It supports the idea that water is unique to other goods because it is a human necessity and natural resource that has no alternative and whose quality and quantity varies with time and space (Savenije & Zaag, 2002). In economic terms, the price elasticity of water demand (i.e., the effect price change has on water demand) has been shown to be minimal (-0.5g/day) (Brookshire, Burness, Chermak, & Krause, 2001). This means that raising the price of water by 10% would decrease consumption by only 5%. Additionally, because of its necessity and lack of alternative, in the case of extreme price increases, political and social upheaval (i.e. rioting etc.) are the assumed economic response.

Due to the ecological and equity implications, the literature generally acknowledges that price manipulation is not the preferred method for managing water demand (Renwick & Green, 2000; Ruijs et al., 2008). The consensus is that pricing should however, provide full cost recovery that enables the water utility to be financially sustainable. This is often accomplished through block tariffs (IBR), where water utilities

utilize price as a demand variable by increasing pricing tiers as consumption increases (S. Olmstead, Hanemann, & Stavins, 2007).

Implementation of water rationing, in conjunction with or in lieu of water pricing changes has become a the preferred option (Kenney, Goemans, Klein, Lowrey, & Reidy, 2008; S. Olmstead et al., 2007), although rationing is considered most effective in short-term drought conditions (Vaux, 2011). Mandatory rationing has resulted in the most significant savings, while voluntary programs are typically much less successful (Kenney et al., 2008). One study in Colorado for example, found that savings during mandatory rationing periods ranged from 18 to 56%, while voluntary periods saved only 4 to 12% (Kenney, Klein, & Clark, 2004).

3.4.2 Education and Technology

Public education and marketing is a frequently used intervention aimed at reducing water consumption. Although many educational campaigns have been shown reduce consumption over the short-term (Syme, Nancarrow, & Seligman, 2000), it has been difficult to separate it from other, concurrent intervention measures thereby discounting its effectiveness over the long term (Michelsen, McGuckin, & Stumpf, 1999). A recent study of 374 households in Los Angeles, California, however, found that specific *types* of educational and informational messages to the public can be more effective than others at reducing water consumption. Messages relating to social norms (how water usage compared to the neighborhood average), social identity (how water conservation behaviors are an important a part of "who we are" and "what we stand for" as a city), or personal identity (how water conservation behaviors are an important a part of "who you are" and "what you stand for") resulted in household water conservation.

Messages utilizing only the water deficit approach (simply suggesting water saving behaviors) resulted in greater not less water consumption per household (Seyranian et al., 2015).

These results are not unique to California. A study conducted in 20 cities in Spain (n=637) for instance, found that psychological elements of "persuasion, motivation and generation of stable attitudes" were necessary for an effective water conservation campaign (Sarabia-Sánchez, Rodríguez-Sánchez, & Hyder, 2014), although some water saving behavior changes were found to be easier to adopt than others. For example, toilets account for approximately 27 percent of indoor residential water use, making reduced flushing (or waterless fixtures) a key opportunity for water conservation. But barriers such as disgust sensitivity and cleanliness norms, have been shown to limit the adaption of this particular conservation opportunity (Lute, Attari, & Sherman, 2015).

Technological interventions, such as residential retrofits to dishwashers, washing machines, toilets, and showerheads, have also been a center-point of water conservation strategies (S. M. Olmstead & Stavins, 2009). Savings over time, however, have proven to be less consistent than one would expect due to behavioral factors like the 'rebound effect', when users change their behavior in ways that offset efficiency gains. For example, users of low-flow showerheads often take longer showers (Shan, Yang, Perren, & Zhang, 2015). These types of behavioral effects, quasi-experimental and qualitative methods investigating residential water demand, and studies on the barriers to water saving behaviors to this point however, have been limited (Syme et al., 2000).

3.5 The Singapore Water Management Plan

Singapore is a small island nation of 277 square miles with a population of 5.5 million people. Its 19,855 people per square mile, make it the 3rd densest nation in the world. Singapore's growing population and its resultant water demand are further complicated by their significant geographic constraints. The nation has no natural aquifers or lakes and very limited area for water catchment. As of 2005, Singapore was declared a 'water stressed' country by the World Resources Institute (World Resources Institute, 2005). Despite these limitations, their national water agency, the Public Utilities Board (PUB), has a goal of being water self-sufficient by 2060. Singapore's water situation may act as a glimpse into the future for many nations, given global urbanization rates (density) and expected climate change impacts (scarcity).

Singapore's water management plan is a *conserve and load* approach that includes a combination of careful water conservation to reduce demand while modifying supply chains toward more recycled and reclaimed sources. Its ultimate goal is water independence. Although many might find Singapore's goal of water self-sufficiency laughable given their severe constraints, they have surprised everyone by meeting their progressive supply and demand targets. In fact, between 1995 and 2015 Singapore has steadily reduced its per capita domestic water consumption by 12.6 percent - from 172 to 150.4 liters per person each day. Their goal is to reach 147 liters per person by 2020 and 140 liters per person by 2030 (Tortajada & Joshi, 2013). Two of the key strategies that have made Singapore's overall water management plan successful are 1) the implementation (and corresponding public acceptance) of recycled drinking water, and 2)

a successful behavior change campaign that has addressed water conservation (Luan, 2010).

Singapore's efforts have not gone unnoticed around the world. They won the 2014 UN Water Best Practice Award for their NEWater program and the 2007 Stockholm Industry Water Award for their holistic approach to water management. Their method is arguably the best living model of Integrated Water Resource Management (IWRM) – a management framework that was established in 1992 during the International Conference on Water and Environment and has been the goal for many water scarce urban areas who seek safe, dependable drinking water now and in the future. IWRM is a more holistic approach to providing water that addresses social equity, economic efficiency, and ecological sustainability.

3.5.1 Singapore's Water Supply

Historically most of Singapore's fresh water has been imported from more readily available supplies in Malaysia. Singapore and Malaysia however, have a long-standing conflict over these water resources (Lee, 2005). To address this, Singapore's Public Utilities Board (PUB) opened its first reclaimed water plant in 2003. Since then, three additional plants have been constructed, providing about 30% of Singapore's total potable water needs. Future construction of additional plants and capacity increases are planned in support of their ultimate goal of 55% reclaimed water use by 2061. With a goal of complete water independence, the remaining 45% will be provided by water catchments and desalination processes (Singapore Public Utilities Board, 2013). Many cities in countries far from Southeast Asia have since followed suit in setting water

recycling goals. For example, the Australian state of Perth has set the goal of recycling 30 percent of all its water by 2030 (Water Corporation, 2015).

In Singapore, the PUB initiated several strategies to assuage the publics' gut feelings of disgust (and yuck) including educational campaigns, media tours, a documentary, and the establishment of a NEWater visitor center (Singapore Public Utilities Board, 2013). During the National Day parade in 2002, bottled NEWater was freely distributed to parade goers and public officials were photographed and publicized drinking it. These methods, and a plethora of positive media are thought to have influenced public acceptance (Ching, 2010). Although the Singaporean government has widely advertised an incredibly high (98%) acceptance rate (Singapore Public Utilities Board, 2016), some Singaporean suppliers of imported bottled water noted a sales spike following the implementation of NEWater ("FOCUS: Singapore pumps reclaimed water into reservoirs.," 2014).

3.5.2 Singapore's Water Demand Conservation Efforts

As of 2015, Singapore's water demand is 400 million gallons per day for both domestic and non-domestic usage. The national population is expected to increase to 6,680,000 by 2050, and total water demand is expected to double by to 800 million gallons per day by 2061 (Singapore Public Utilities Board, 2013). A number of Singapore's water conservation methods and campaigns have been discussed at length in previous publications (Tortajada & Joshi, 2013). Therefore, we find it unnecessary to describe the progressive steps taken in detail. We do think it is important, however, to highlight the key elements of their residential water conservation program as they were in 2014-2015.

3.5.3 Singaporean Water Pricing and Rationing

Water in Singapore is now "priced to recover the full costs of production and to reflect the scarcity of the resource and the high cost of developing additional water sources" (Tortajada & Joshi, 2013). In 1997 water prices were raised significantly in conjunction with an onslaught of water-saving behavior change campaigns and a Water Conservation Center (Tortajada & Joshi, 2013).

These prices have not been raised since 2000. At this time water bills for the median employed residential household were 0.69 percent of their income (based on a 20 cubic meter monthly average). In 2014, this percentage has decreased by almost half to 0.36 percent. Targeted subsidies (U-SAVE vouchers) that cut water cost by more than half are provided to protect people who fall within the lowest socio-economic groups (Singapore Public Utilities Board, 2016b).

Rationing has not been used heavily in Singapore, though mandatory rationing did take place between 1963-1964, which led to a 13.4 percent drop in water consumption. A water rationing exercise also was implemented for 6 days in 1995. The aim was to remind the public of the importance of water by interrupting water supply for 14 hours each day to over 30,000 households (Tortajada & Joshi, 2013).

3.5.4 Singaporean Water Education and Outreach

In 2006 the Public Utilities Board introduced the residential 10-litre challenge, which acts an umbrella program for many of their other initiatives and efforts. This program aims to have every individual save 10 liters of water through targeted behavior changes or technology adoptions. Seven distinct behaviors are encouraged, which include:

1. Monitor your water bill – check your water bill to monitor your family's water consumption. If your consumption is more than average, re-examine at your family's usage habits
2. Take shorter showers – keep showers to under 5 minutes and turn off the tap while soaping
3. Wash in a filled sink – wash vegetables and dishes in a filled sink instead of under a running tap
4. Wash on a full load – fill your washing machine on a full load
5. Reuse – Collect rinse water from the washing machine for flushing the toilet and mopping the floor
6. Repair leaks promptly – repair leaks and dripping taps immediately to prevent water wastage
7. Half flush – use a half flush for liquid waste

These behavior changes are based off of the Public Utilities Board's understanding of how water is used in households. On average, they have found that most potable water is used for showering (29 percent), in the kitchen (22 percent), laundry (19 percent), flushing toilets (16 percent), the sink basin (10 percent), and other (4 percent). They are encouraged through several mediums including the Straits Times, MRT advertisements, television commercials, and on their various social media outlets (to name a few).

Under the 10-Litre Challenge umbrella program the Public Utilities Board also has been encouraging the use of water efficient technology in households. Free thimbles that reduce water flow in sink faucets and showerheads are distributed to the public, and can actually be installed by PUB as part of the Water Efficient Homes program by request

(Singapore Public Utilities Board, 2016a). Water efficiency labels on faucets, toilets, and urinals has also been mandatory since 2009 in order to help consumers understand how efficient water consuming products are before purchasing (Tortajada & Joshi, 2013).

Although the Public Utilities Board has widely communicated the array of conversation programs they implemented, very little research has been published that addresses how effective these programs have been. Similarly, while many of Singapore's water conservation programs have been held up globally as best practices, little has been said regarding if, or how, the Singaporean national culture might support the program's success and therefore act as barriers to international planners who attempt to adopt their practice expecting similar results.

3.6 National Singaporean Survey

Pro-environmental behavior, or "behavior that consciously seeks to minimize the negative impact of one's actions on the natural and built world (e.g., minimize resource and energy consumption…)" (Kollmuss & Agyeman, 2002, p. 240) can be affected by a range of variables. This is most often measured at the scale of the individual, which can then be aggregated to the level of the collective (i.e., culture). Many theoretical models have been developed that contribute to our conceptual understanding of the underlying human causes (i.e., motivators) of direct and indirect pro-environmental behaviors. The theory that has arguably generated the most empirical support, however, is the Theory of Planned Behavior (Ajzen, 1991), which states that an individual's intention to behave a certain way is the best predictor of pro-environmental behavior. Behavioral intentions are thought to be a function of three interconnected elements – attitude, subjective norms, and perceived control (Ajzen, 1991). This theory, therefore, supports research that has

shown attitude alone is not a strong predictor of behavior, which is a common misconception seen in environmental education and policy (Kaiser & Schultz, 2009; Kollmuss & Agyeman, 2002).

The Theory of Planned Behavior has been shown to exhibit high explanatory power. For example, in one study, the intentions predicted by the theory accounted for 95 percent of conservation behaviors (Kaiser, Hübner, & Bogner, 2005). The factors that have been shown to influence pro-environmental behavior are by no means comprehensive, but do arguably have the most significant or foundational influence over many human behaviors (Kollmuss & Agyeman, 2002) and are used to describe the behavioral components and efficacy of the Singapore water management plan.

3.6.1 Study Design and National Survey Instrument

In April 2015, a nationally representative mail survey was sent to a random sample of Singaporean households to help us more deeply understand the behavioral influences behind Singapore's NEWater public acceptance and the effectiveness of their water conservation campaigns. The four-page hardcopy survey instrument was constructed in accordance with Ajzen's recommended Theory of Planned Behavior question formation guidelines (2013). In total, the survey included 8 demographic items, 10 items relating to water conservation, and 10 items related to the public acceptance of NEWater.

The NEWater portion of the survey included six items that directly measured the four characteristics of planned behavior (attitude, social norm, perceived control, and intention) as outlined by (Ajzen, 1991), two items that addressed general approval and familiarity of NEWater, and a 'check all that apply' question regarding how the respondent learned about NEWater.

The water conservation behavior portion of the survey used eight items to measure the four factors of volitional behavior outlined by (Ajzen, 1991), while one asked which water behaviors the participant engaged in regularly, and one asked what exactly has influenced their water conservation behaviors. The items measuring water behavior participation and influences utilized the 'check all that apply' format, while the items measuring volitional water behavior factors utilized a seven-point bipolar adjective scale. For example:

Bad: 1 2 3 4 5 6 7 : Good.

The eight demographic questions included covered topics such as age, ethnicity, income, sex, citizenship, housing type, number of years residing in Singapore, and whether or not the respondent pays for his/her own water bill.

3.6.2 Survey Distribution and Analysis

A random sample (N=2,000) of residential addresses was obtained from the Singapore Department of Statistics (SDS). The SDS-maintained Singaporean household sampling frame includes addresses of Singaporean citizens, permanent residents, and visa holders. An explanatory cover letter, statement of informed consent, and the survey instrument were distributed to each of the 2,000 addresses April 2015 via mail. The survey was completely voluntary and individuals from vulnerable populations (e.g., persons under the age of 18 years) were not recruited. A reminder postcard was mailed to each address 1.5 weeks after the initial survey was sent.

Data from completed paper surveys were entered into a proxy online survey template in SurveyGizmo software. This process allowed for quick viewing of descriptive data and

easy conversion of the data into SPSS and Excel files. Descriptive and inferential analysis using the exported files was then conducted using SPSS and AMOS quantitative software.

3.7 Results

The purpose of this survey was to determine 1) what the current status of Singapore's NEWater public acceptance rate and adoption of domestic water conservation behaviors was; and 2) understanding the key behavioral factors that influence these strategies using the Theory of Planned Behavior framework. A total of 218 people responded to the mail survey yielding a response rate of 10.9%. This is significantly higher than the 4.8% national response rate found for Singapore in a 22-country study of mail survey response rates (Harzing, 1997). The results of this national survey are accurate at the 95% confidence level with a 6.64% margin of error.

The survey respondents ranged in age from 19-89 years old, with a median age of 47. They included Singaporean citizens (82%), Singaporean Permanent Residents (11.5%), and Singaporean Work Pass Holders (5.5%). Ethnically, the respondents reflected the national population with 72.8% being Chinese; 10.8% Indian; 3.5% Malay; and 7.5% Other. Of these, 69.1% live in an HDB (i.e., Singaporean public housing); 24% live in a condo; and 6.5% live in a landed property. The vast majority (95.4%) reported that they pay for their water bill directly.

3.7.1 NEWater Public Acceptance

Table 3.1 shows the means and standard deviations for all responses to the survey questions. As the results indicate, familiarity with NEWater amongst the respondents was

high. Responses to a 'check all that apply' question asking how the respondent learned about NEWater indicates that the majority of people were exposed to NEWater through television (74.8%), newspapers and magazines (68.5%), and posters/public advertisements (40.8%). Only about a quarter of the respondents (25.7%) indicated that they learned about NEWater through their award winning NEWater visitor center. The vast majority of respondents strongly agreed that it was important that they do their part in helping achieve Singapore's goal of water security and approximately 74 percent of respondents reported that in general, they approved of NEWater.

Table 3.1: NEWater Acceptance

	Scale	***M***	***SD***
It is important that I do my part to help achieve Singapore's national goal of water security	false (1) to true (7)	6.44	0.88
How familiar are you with Singapore's reclaimed water named NEWater?	never heard of it before (1) to I am familiar (7)	5.87	1.49
Attitude			
NEWater is…	bad (1) to good (7)	5.31	1.44
NEWater is…	unpleasant (1) to pleasant (7)	4.48	1.75
Subjective Norm			
Most people who are important to me approve of drinking NEWater	disagree (1) to agree (7)	4.43	1.76
Most people like me approve of drinking NEWater	unlikely (1) to likely (7)	4.83	1.61
Perceived Behavioral Control			
Drinking NEWater is up to me	disagree (1) to agree (7)	5.50	1.96
Intention			
I intend to drink NEWater in the next three months	unlikely (1) to likely (7)	4.10	2.13
Reported Behavior			
Over the past three months, I have drank NEWater	false (1) to true (7)	3.46	2.33
In general, I approve of NEWater	false (1) to true (7)	5.49	1.68

3.7.1.1 Path Analysis

Path analysis using the Theory of Planned Behavior framework was conducted for those participants who approve of NEWater, those who do not approve of NEWater, and all participants collectively in order to understand the influence of the measured independent variables (attitude, social norm, and perceived control) on the dependent variable (approval of NEWater).

First, however, a reliability analysis was conducted for the two variables that were measured with multiple survey items. The Cronbach alpha coefficients ranged from .634 to .67, which are considered to be in the 'acceptable' internal consistency range (see Table 3.2). A Spearman-Brown reliability coefficient was also calculated with nearly identical results.

Table 3.2: Cronbach Alpha Reliability Coefficient: Reclaimed Water Acceptance

	Attitude	Social Norm	Perceived Control
Cronbachα	.67	.634	NA
No. of Items	2	2	1

Data from all 218 respondents were first integrated into the initial path analysis. The regression weightings found indicate that attitude has the largest influence over NEWater approval (.42), followed by respondents' views of NEWater approval being the social norm (.33). The perceived control independent variable was the smallest contributor to NEWater approval. Double-headed arrows in Figure 3.1 below indicate the corresponding correlations between the independent variables.

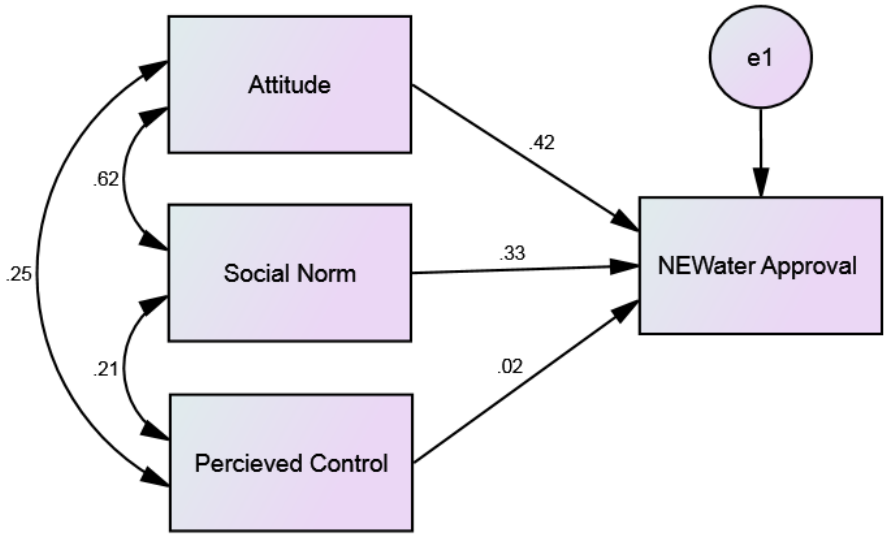

Figure 3.1: All Respondents with regression weights. Attitude best predicts NEWater Approval.

Of the 218 total respondents, 161 (74% of total respondents) indicated that they generally approve of NEWater. Seven of these surveys were not analyzed due to missing data. We conducted a separate path analysis of this group (as shown in Figure 3.2) and found that the trends in regression weightings in terms of influence roughly mimicked those in the collective grouping.

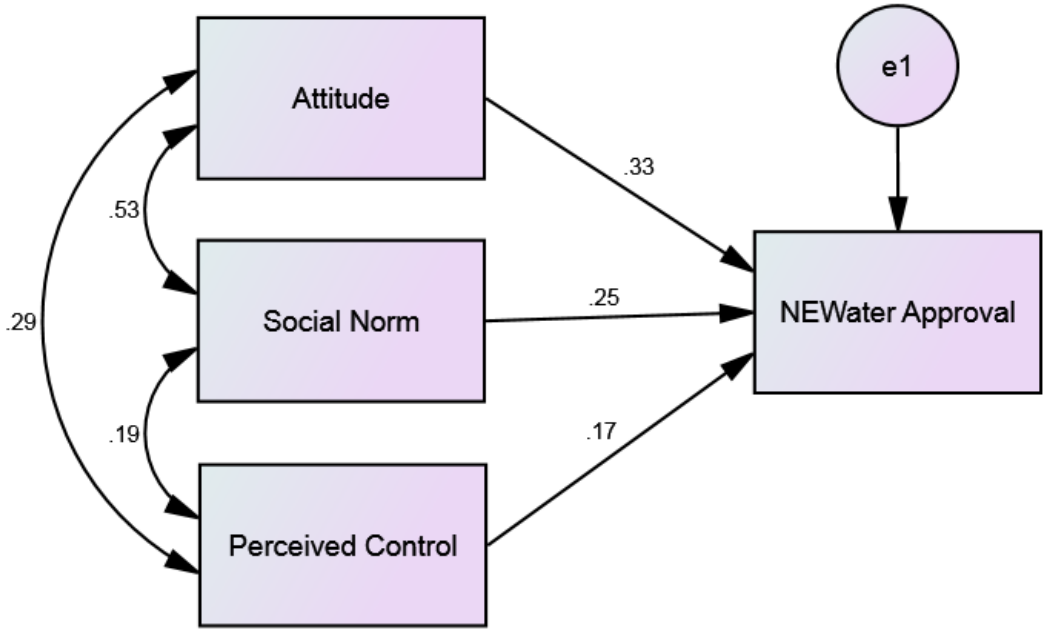

Figure 3.2: A diagram describing participants who approve of NEWater. Attitude best predicts NEWater Approval

Finally, we conducted a separate path analysis for the 22 respondents (10 percent) who indicated that they do not approve of NEWater (the remaining 35 respondents were neutral). Interestingly, the perceived control independent variable had the largest regression weighting (.21), followed by attitude (.13), and then social norm (-.26) (see Figure 3.3).

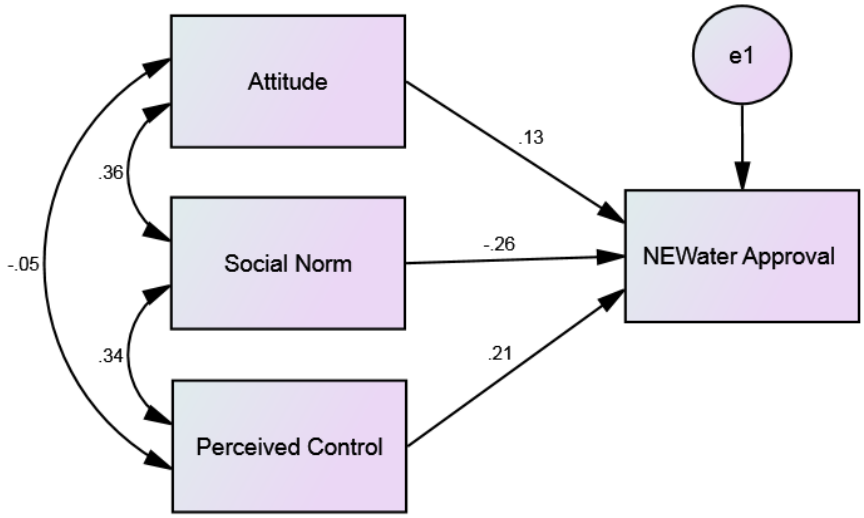

Figure 3.3: Participants who do not approve of NEWater. Perceived Control best predicts NEWater Approval

3.7.2 Water Conservation

One 'check all that apply' question addressed which of the 7 water conservation habits promoted by the Public Utilities Board (as part of the 10-litre challenge discussed in section 3.3.2) have actually adopted by Singaporean residents. We found that the most widely adopted conservation behaviors were fixing water leaks promptly (80.8%) and monitoring their water bill (80.3%). The least adopted water conservation habit was washing dishes under a filled sink (11.7%). See Figure 3.4. Approximately 53 percent of respondents engaged in 3-4 of the targeted behaviors. Only 7.8 percent of respondents reported engaging in 6 or more of the targeted behaviors.

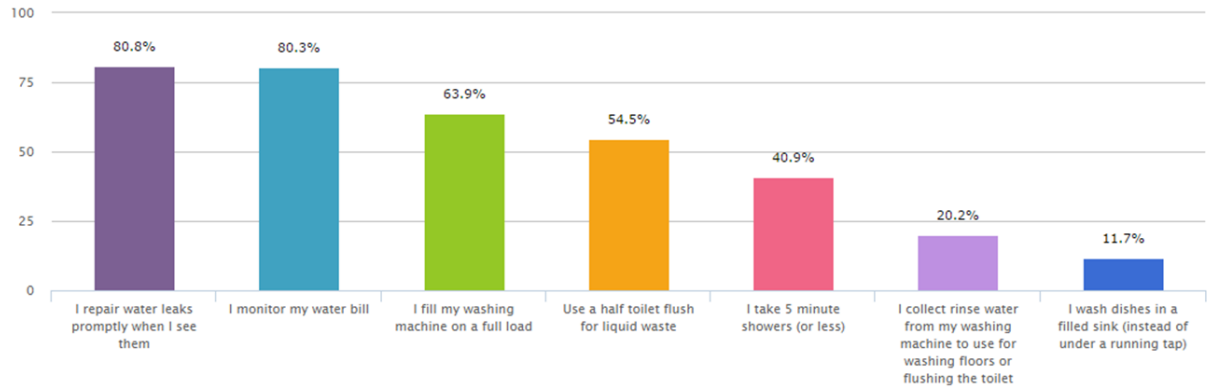

Figure 3.4: Which of these 7 habits do you regularly engage in at home? Check all that apply. The results indicate repairing water leaks was the most adopted behavior.

The second 'check all that apply' question we asked addressed the mediums that might influence resident's water conservation behaviors. Residents reported finding television to be the most influential medium (63.6%), following by newspapers/magazines (48.1%) and posters/public advertisements (41.3%). Websites were reported as the least influential at reducing water use (12.1%). See Figure 3.5.

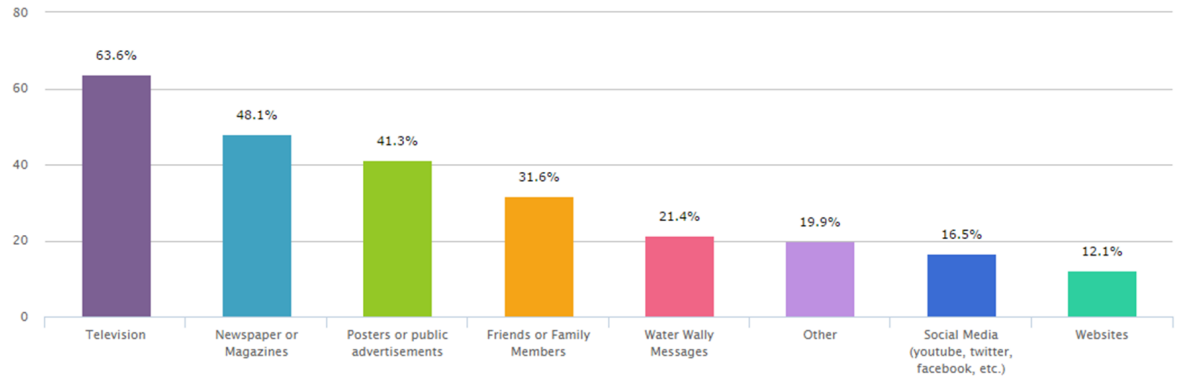

Figure 3.5: Have any of the following influenced you to reduce your water use? Check all that apply. These results show differences in the influence of different communication mediums on reported water conservation behavior.

The mean and standard deviations for the remainder water conservation-related survey questions that were measured using a seven-point bipolar adjective scale are included within Table 3.3. These results have been further analyzed using path analysis.

Table 3.3: Water Conservation

	Scale	***M***	***SD***
It is important that I do my part to help achieve Singapore's national goal of water security	false (1) to true (7)	6.44	0.88
Attitude			
Reducing the amount of water I use by 10-litres per day would be:	bad (1) to good (7)	5.96	1.29
Reducing the amount of water I use by 10-litres per day would be:	unpleasant (1) to pleasant (7)	5.09	1.72
Subjective Norm			
Most people who are important to me would approve of me reducing the amount of water I use by 10-litres per day (on average)	disagree (1) to agree (7)	5.29	1.79
Most people like me are trying to reduce the amount of water they use by around 10-litres per day (on average)	unlikely (1) to likely (7)	4.26	1.75
Perceived Behavioral Control			
I am confident that I could reduce the amount of water I use by 10-litres per day (on average)	false (1) to true (7)	4.57	1.75
Reducing the amount of water I use by 10-litres per day (on average) is up to me	disagree (1) to agree (7)	5.68	1.58
Intention			
I intend to reduce the amount of water I use by 10-litres per day (on average)	unlikely (1) to likely (7)	4.68	1.75
Reported Behavior			
Over the past three months, I have tried to reduce the amount of water I use at home	False (1) to true (7)	4.68	1.93

3.7.2.1 Path Analysis

SPSS Amos was used to conduct path analysis for 1) all survey participants, 2) those participants who indicated they regularly engage in 6-7 of the targeted conservation behaviors, and 3) those participants who indicated they engage in 0-1 targeted

conservation behaviors. The Theory of Planned Behavior framework was utilized to understand the influence of the measured independent variables (attitude, social norm, and perceived control) on the dependent variable (reducing water conservation by 10 liters).

A reliability analysis was first conducted to determine the internal consistency range for the three variables that were measured with multiple survey items. The Cronbach alpha coefficients ranged from .43 to .63 indicated a relatively low internal consistency (see Table 3.4). Spearman-Brown coefficients were also calculated with similar results (see Table 3.5).

Table 3.4: Cronbach Alpha Reliability Coefficient: Water Conservation

	Attitude	Social Norm	Perceived Control
Cronbachα	.634	.438	.430
No. of Items	2	2	2

Table 3.5: Spearman-Brown Reliability Coefficient: Water Conservation

	Attitude	Social Norm	Perceived Control
Cronbachα	.65	.438	.432
No. of Items	2	2	2

First, all surveys that completed the water conservation portion of the survey were analyzed (195 total). The regression weightings indicated that social norms had the largest influence over individual's attempts to conserve water (.26) followed by perceived control (-.10). Attitude did not show any influence over survey participant's attempt to conserve water. Corresponding correlations between the independent variables are shown in Figure 3.6 with double-headed arrows.

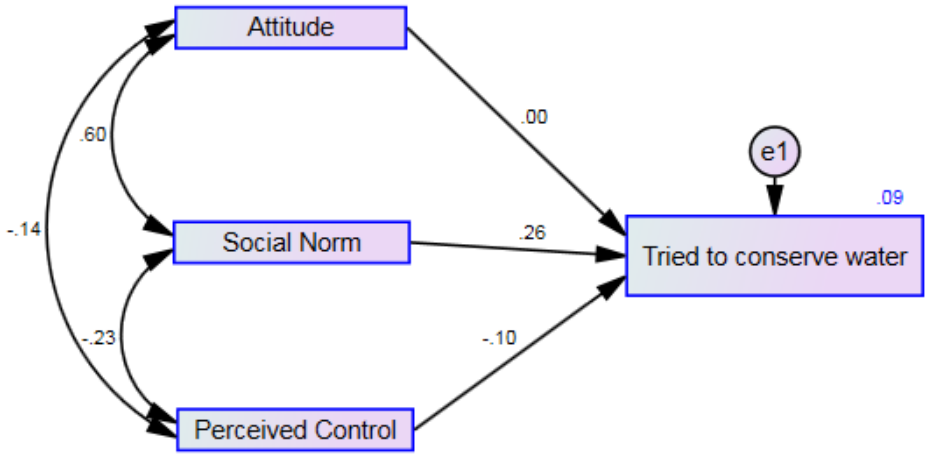

Figure 3.6: All Respondents with regression weights shows that social norms best predict water conservation behavior

Of the 218 survey respondents, only 15 participants indicated that they engage in 6 to 7 of the targeted conservation habits *and* answered all behavioral questions in relation to water conservation. We conducted a path analysis of this unique group (see Figure 3.7) and found that similar to the collective group, social norms were the most influential in reported conservation behavior.

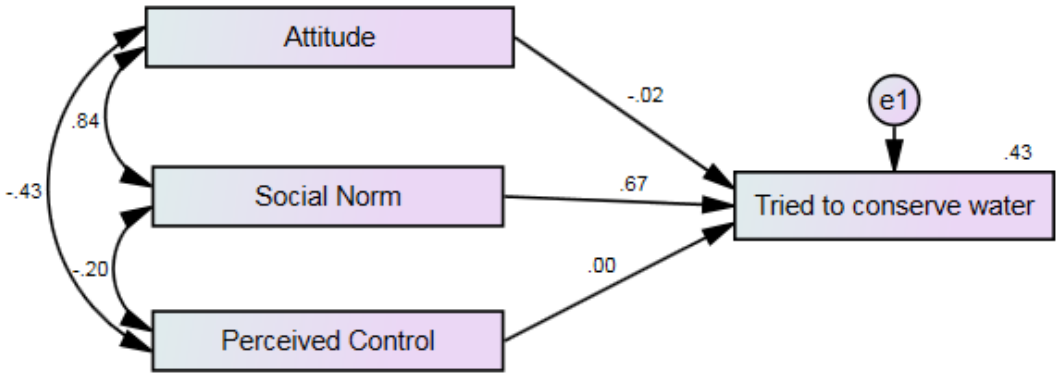

Figure 3.7: Participants who engage in 6 to 7 conservation behaviors. This suggests that for this group, social norms best predict water conservation behavior.

Lastly, we conducted a path analysis for the 20 respondents who indicated that they engage in only 0-1 of the targeted conservation behaviors. Once again, we found that the social norm independent variable had the largest regression weighting (.20), followed by perceived control (.11) and attitude (-.08) (see Figure 3.8).

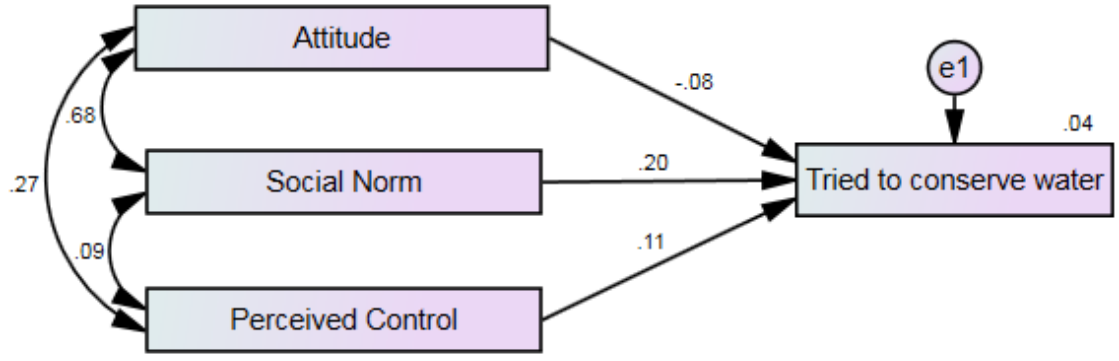

Figure 3.8: Participants who engage in 0 to 1 conservation behaviors – social norms once again have the largest regression weighting.

3.8 Discussion

The purpose of this research was to 1) discern whether Singaporeans actually accepted the use of reclaimed water for drinking, and which domestic water conservation behaviors they were adopting, and 2) uncover the key behavioral factors that have influenced these behaviors. The reported public acceptance rate of NEWater in 2002 was 98%, and between 1995 and 2015 Singapore has reduced its per capita domestic water consumption by 12.6 percent - from 172 to 150.4 liters per person each day (Singapore Public Utilities Board, 2016b). They have used a variety of different methods to both encourage public acceptance of NEWater (e.g., publicity campaigns, construction of a plant visitor center) and water conservation (e.g., pricing, technological standards, and water conservation education). The Singaporean Public Utilities Board specifically encourages residents to adopt 7 water conservation habits including: 1) monitor water bills, 2) keep showers to under 5 minutes, 3) wash in a filled sink, 4) fill washing machines on a full load, 5) collect rinse water from the washing machine for flushing the toilet and mopping the floor, 6) Repair leaks promptly, and 7) use a half toilet flush for liquid waste.

Using the Theory of Planned Behavior framework (Ajzen, 1991) we constructed a survey that was mailed to a national sample of Singaporeans (n=218) to understand what proportion of the population currently accepts NEWater, how many have actually adopted the PUB targeted water conservation behaviors, and in both cases – why? The results of this national survey are accurate at the 95% confidence level with a 6.64% margin of error.

We first asked the key question, what percentage of the Singaporean public approve of NEWater? Using the results of our national mail survey (n=218) we found that 74 percent of Singaporeans generally approve of NEWater, 16 percent are neutral, and 10 percent generally disapprove. This acceptance rate is significantly lower than the previously reported 98 percent. We also included items that would help us understand what behavioral factors have influenced public acceptance of NEWater in Singapore. Path analysis of this survey data points to "attitude toward drinking NEWater" as having the most influence over overall approval, followed by the perception that drinking NEWater is an accepted social norm. When a separate path analysis of respondents who do not approve of NEWater was conducted, perceived control was the variable with the highest regression weighting. This perhaps indicates that respondents who were the least approving are the most wary of the lack of control they had over the implementation of NEWater.

In terms of water conservation behaviors, we found that fixing water leaks promptly (80.8%) and monitoring water bills (80.3%) were the most widely adopted habits, while washing dishes under a filled sink (11.7%) was the least adopted. Residents reported finding television to be the most influential water conservation communication medium (63.6%), following by newspapers/magazines (48.1%) and posters/public advertisements (41.3%). Websites were reported as the least influential at reducing water use (12.1%). Path analysis showed that perceived social norms were the most influential element in trying to conserve water. Thus, in Singapore, it would make most sense to implement normative-based water conservation interventions (e.g. letting a resident know if their water consumption is higher than their neighbors').

Typical analysis regarding water planning and management report only current public opinion and reported behavior. This study took this a step further by using the Theory of Planned behavior to tell us *why* this public support and behavior exists. Knowing that attitude most significantly affects whether a person accepts NEWater, and perceived social norms most significantly affect whether a person adopts water conservation behaviors is useful in helping us estimate which interventions were successful when so many have been implemented simultaneously. For example, we can estimate that Singapore's inclusion of normative information on their water bills helps reduce overall consumption because we now know that perceived social norms most significantly affect adoption of water conservation behavior. This knowledge can help Singapore water management plan for the long term, and other countries pinpoint the 'how and why' of this internationally renowned best practice.

3.9 Conclusion

We used a national household mail survey (n=218) to understand the key behavioral influences behind two of Singapore's most successful water management strategies. The 74% public acceptance rate of NEWater we found was most significantly affected by individuals' attitude. Conversely, public adoption of the specific water behaviors targeted by the Singaporean Public Utilities Board was most heavily influenced by a belief that other people they respect and believe to be 'like them' (perceived social norm) were engaging in the water conservation behaviors.

We believe that knowledge of these key behavioral influencers can make behavior change campaigns more effective both in Singapore and other countries. However, it is important to recognize that Singapore's water planning system does not operate

independently – its establishment and operation have been heavily influenced by a number of social, economic, political, and physical factors. This is precisely an 'organized complexity' problem Jane Jacobs discusses in her seminal work, *The Life and Death of Great American Cities* (1961). She notes that solving problems in cites is hard because planners are "dealing simultaneously with a sizable number of factors which are interrelated into an organic whole" (p. 563) (organized complexity).

Although this paper focuses on 'behavior' variables that impact water planning and management, it does so with the acknowledgement of many other variables that exist in Singapore that also contribute to their bottom line results. For example, one such variable is their unique political context, or more specifically, the fact that Singapore is a 'soft' authoritarian regime ruled by 'benevolent' dictator (Prime Minister Lee Hsien Loong). The civil and political liberty tracker, Freedom House, ranks Singapore as 'Partly Free" (4 on the 1-7 scale, with 7 as *not* free), while other nearby countries such as China are considered 'Not Free' (with a score of 7) (Freedom House, 2015). This translates into policies that allow for control of press and lack of freedom to assemble, which of course could have a huge influence on a range of public opinions (for fear of retribution).

Singapore's 'soft' authoritarian rule operates with a distinctively modernist worldview, which has resulted in a built environment that is reflective of its positivistic, technocratic, and rationalistic government. Thus, something like NEWater could be viewed as yet another Singapore government initiated technological fix that aims to dominate nature, which could, in turn, be reflective of their desire to dominate their own citizens. Several articles already rightly point out that any democratic country attempting to copy Singapore's reclaimed water success story is at huge risk of garnering very

different results (Khoo, 2009). Future research should focus on working through this organized complexity with an eye toward the cultural barriers to replication of Singapore's innovative water management strategies.

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3.11 References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. http://doi.org/10.1016/0749-5978(91)90020-T

Ajzen, I. (2013). Constructing a Theory of Planned Behavior Questionnaire. Retrieved from http://people.umass.edu/~aizen/pdf/tpb.measurement.pdf

Alston, L. J., Eggertsson, Þ., & North, D. C. (1996). *Empirical Studies in Institutional Change*. Cambridge University Press.

Amelang, J. (2007). Comparing cities: a Barcelona Model? *Urban History*, *34*(02), 173–189. http://doi.org/10.1017/S0963926807004592

Baraldi, C., Borsari, A., & Carli, A. (2011). *Hybrids, Differences, Visions: On the Study of Culture*. Aurora, Colo: The Davies Group, Publishers.

Barringer, F. (2012, February 9). Treated Wastewater Used for Drinking Supplies. *The New York Times*. Retrieved from http://www.nytimes.com/2012/02/10/science/earth/despite-yuck-factor-treated-wastewater-used-for-drinking.html

Brisbane Times. (2013). Toowoomba voted no, but recycled water may still be in town's future. Retrieved July 21, 2014, from http://www.brisbanetimes.com.au/queensland/toowoomba-voted-no-but-recycled-water-may-still-be-in-towns-future-20131016-2vm4j.html

Bulkeley, H. (2006). Urban sustainability: learning from best practice? *Environment and Planning A*, *38*(6), 1029–1044. http://doi.org/10.1068/a37300

Ching, L. (2010). Eliminating "Yuck": A Simple Exposition of Media and Social Change in Water Reuse Policies. *International Journal of Water Resources Development*, *26*(1), 111–124. http://doi.org/10.1080/07900620903392174

Clifton, J. (2012, November 21). Singapore Ranks as Least Emotional Country in the World. Retrieved from http://www.gallup.com/poll/158882/singapore-ranks-least-emotional-country-world.aspx

Cooley, H., Gleick, P., & Wolff, G. (2006). *Desalination, with a Grain of Salt: A California Perspective*. Pacific Institute.

Curtis, V., de Barra, M., & Aunger, R. (2011). Disgust as an adaptive system for disease avoidance behaviour. Philosophical Transactions of the Royal Society of London B: Biological Sciences, 366(1563), 389-401.

Dear, M. (2005). Comparative Urbanism. *Urban Geography*, *26*(3), 247–251. http://doi.org/10.2747/0272-3638.26.3.247

Dolnicar, S., Hurlimann, A., & Grün, B. (2011). What affects public acceptance of recycled and desalinated water? *Water Research*, *45*(2), 933–943. http://doi.org/10.1016/j.watres.2010.09.030

Faludi, A. (1983). Critical Rationalism and Planning Methodology. *Urban Studies*, *20*(3), 265–278. http://doi.org/10.1080/00420988320080521

FOCUS: Singapore pumps reclaimed water into reservoirs. (2014). *The Free Library*. Retrieved from http://www.thefreelibrary.com/FOCUS%3a+Singapore+pumps+reclaimed+water+into+reservoirs.-a097399913

Freedom House. (2015). *Freedom in the World*.

Haidt, J. (2001). The emotional dog and its rational tail: a social intuitionist approach to moral judgment. Psychological review, 108(4), 814.

Haidt, J. (2013). *The Righteous Mind: Why Good People Are Divided by Politics and Religion* (Reprint edition). New York: Vintage.

Hannerz, U. (1996). *Transnational Connections: Culture, People, Places*. London and New York: Routledge.

Harzing, A.-W. (1997). Response Rates in International Mail Surveys: Results of a 22-Country Study. *International Business Review*, *6*(6), 641–665.

Heath, C., & Heath, D. (2010). *Switch: How to Change Things When Change Is Hard* (1 edition). New York: Crown Business.

Hofstede. (1998). Attitudes, Values and Organizational Culture: Disentangling the Concepts. *Organization Studies*, *19*(3), 477–493. http://doi.org/10.1177/017084069801900305

Hofstede. (2001). *Culture's Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*. SAGE.

Hofstede, G. (2015). Singapore. Retrieved December 15, 2015, from http://geert-hofstede.com/singapore.html

Institute of Policy Studies. (1995). *Survey on Perceptions of Singapore's History*.

Jacobs, J. (1961). *The death and life of great American cities*. New York: Modern Library.

Kaiser, F. G., Hübner, G., & Bogner, F. X. (2005). Contrasting the Theory of Planned Behavior With the Value-Belief-Norm Model in Explaining Conservation Behavior1. *Journal of Applied Social Psychology*, *35*(10), 2150–2170. http://doi.org/10.1111/j.1559-1816.2005.tb02213.x

Kaiser, F. G., & Schultz, P. W. (2009). The Attitude–Behavior Relationship: A Test of Three Models of the Moderating Role of Behavioral Difficulty1. *Journal of Applied Social Psychology*, *39*(1), 186–207. http://doi.org/10.1111/j.1559-1816.2008.00435.x

Khoo, T. C. (2009). Singapore Water: Yesterday, Today and Tomorrow. In P. A. K. Biswas, C. Tortajada, & R. Izquierdo (Eds.), *Water Management in 2020 and Beyond* (pp. 237–250). Springer Berlin Heidelberg. Retrieved from http://link.springer.com/chapter/10.1007/978-3-540-89346-2_12

Kluckhohn, F., & Strodtbeck, F. L. (1961). *Variations in Value Orientations* (New edition edition). Westport, Conn: Greenwood Press,London.

Kollmuss, A., & Agyeman, J. (2002). Mind the Gap: Why do people act environmentally and what are the barriers to pro-environmental behavior? *Environmental Education Research*, *8*(3), 239–260. http://doi.org/10.1080/13504620220145401

Lee, P. O. (2005). Water management issues in Singapore. Water in Mainland Southeast Asia, 29.

Matsumoto, D. R., & Juang, L. P. (2012). *Culture and psychology*. Belmont, CA: Wadsworth Cengage Learning.

McDonald, R. I., Green, P., Balk, D., Fekete, B. M., Revenga, C., Todd, M., & Montgomery, M. (2011). Urban growth, climate change, and freshwater availability. *Proceedings of the National Academy of Sciences*, *108*(15), 6312–6317. http://doi.org/10.1073/pnas.1011615108

Minkov, M., & Hofstede, G. (2011). The evolution of Hofstede's doctrine. *Cross Cultural Management: An International Journal*, *18*(1), 10–20. http://doi.org/10.1108/13527601111104269

Ngerng, R. (2015, January 12). The Singapore Prime Minister's Press Secretary and State-Controlled Media Lied about What My Lawyer and I Said. Retrieved from http://thehearttruths.com/2015/01/12/the-singapore-prime-ministers-press-secretary-and-state-controlled-media-lied-about-what-my-lawyer-and-i-said/

Pahl-Wostl, C., Tàbara, D., Bouwen, R., Craps, M., Dewulf, A., Mostert, E., … Taillieu, T. (2008). The importance of social learning and culture for sustainable water management. *Ecological Economics*, *64*(3), 484–495. http://doi.org/10.1016/j.ecolecon.2007.08.007

Rapoport, A. (2005). *Culture, architecture, and design*. Chicago: Locke Science Pub. Co.

Roy, A. (2011). Commentary: Placing Planning in the World--Transnationalism as Practice and Critique. *Journal of Planning Education and Research*, *31*(4), 406– 415. http://doi.org/10.1177/0739456X11405060

Rozin, P., Millman, L., & Nemeroff, C. (1986). Operation of the laws of sympathetic magic in disgust and other domains. *Journal of Personality and Social Psychology*, *50*(4), 703–712. http://doi.org/10.1037/0022-3514.50.4.703

Schensul, J. J. (2009). Community, Culture and Sustainability in Multilevel Dynamic Systems Intervention Science. *American Journal of Community Psychology*, *43*(3-4), 241–256. http://doi.org/10.1007/s10464-009-9228-x

Singapore Ministry of Manpower. (2016). Summary Table: Income [Singapore Government]. Retrieved from http://stats.mom.gov.sg/Pages/Income-Summary-Table.aspx

Singapore Public Utilities Board. (2013). The Singapore Water Story [Government]. Retrieved from http://www.pub.gov.sg/water/Pages/singaporewaterstory.aspx

Singapore Public Utilities Board. (2016). The Singapore Water Story. Retrieved from http://www.waterclimateforum.org/wp/wp-content/uploads/2016/01/1530_Seah.pdf

Thompson, M., Ellis, R. J., Wildavsky, A., & "Wildavsky, T. M. (1990). *Cultural Theory* (1st edition). Boulder, Colo: Westview Press.

United Nations. (2006). *Human Development Report: Beyond scarcity: Power, poverty and the global water crisis*. Retrieved from http://hdr.undp.org/en/content/human-development-report-2006

United Nations. (2015). *Water for a Sustainable World* (The United Nations World Water Development Report).

Water Corporation. (2015). Water Corporation of WA - Solutions to Perth's water supply. Retrieved November 4, 2015, from http://www.watercorporation.com.au/water-supply-and-services/solutions-to-perths-water-supply

Wester, J., Timpano, K. R., Çek, D., Lieberman, D., Fieldstone, S. C., & Broad, K. (2015). Psychological and social factors associated with wastewater reuse emotional discomfort. *Journal of Environmental Psychology*, *42*, 16–23. http://doi.org/10.1016/j.jenvp.2015.01.003

Yew, L. K. (2011). *Hard Truths to Keep Singapore Going*. Singapore: Straits Times Press.

CHAPTER 4: DISCERNING THE ROLE OF NATIONAL CULTURE IN INNOVATIVE SUSTAINABLE PLANNING STRATEGIES: THE CASE OF SINGAPORE'S NEWATER AND WATER CONSERVATION PROGRAMS

4.1 Abstract

Singapore is well known worldwide for their successful approaches to integrated water management. In this exploratory study we explicitly link Singapore's water management and planning practices to their national culture. Ethnographic fieldwork that included interviews and participant observation was conducted over a period of 9 months in Singapore and analyzed using Hofstede's dimensions of national culture. We find that Singapore's exhibited national culture dimensions were ideal for top-down initiated water management practices. High levels of power distance, uncertainty avoidance, collectivism, long-term orientation all work together to form beliefs that support an individual's willingness to engage in water conservation behaviors and acceptance of reclaimed water for drinking. It is likely that differences in specific national cultural dimensions could act as barriers to successfully translating Singapore's success to different countries. Planners can more accurately predict an individual's behavioral response to an intervention with knowledge of their underlying cultural predispositions – or comparing their national culture with the national culture of the best practice they are trying to learn from.

4.2 Introduction

Water scarcity is an issue that directly affects almost 1.2 billion people worldwide. This represents the number of people who lack adequate potable water to meet their daily needs (McDonald et al., 2011). Water scarcity is not geo-specific nor scale dependent, it

can be tracked to every continent on the globe from large geopolitical areas to cities and neighborhoods. Addressing this important issue at the city level requires municipalities to address both supply and demand pressures.

Before looking for additional and expensive sources for additional clean water supply (e.g., desalination, imported water), it is logical for most cities to first address potable water demand – including population growth, industrial growth, and water-intensive diets. Within the past 10 years there has been an increasing concentration on municipal water conservation by encouraging individual residents to reduce their use of water with varying levels of success. Water conservation and sustainability practices have become a worldwide endeavor (e.g., especially Australia, United States, Mexico, and Europe) including extensive study on potential approaches and their likely impacts. A range of interventions have been analyzed including normative information (Corral-Verdugo & Frías-Armenta, 2006), media (Moore, Murphy, & Watson, 1994), water use information (Seyranian, Sinatra, & Polikoff, 2015), and pricing (S. M. Olmstead & Stavins, 2009; Ruijs, Zimmermann, & van den Berg, 2008).

Many have advocated for more social diffusion of sustainable water strategies through a process of social learning in order to extend best-practices to other, needy places (Albert, Zimmermann, Knieling, & von Haaren, 2012; McKenzie-Mohr, 2011). Due to the increased transnational nature of this sharing via growing communicative interconnectivity however, in practice, innovative solutions and expertise are now more frequently based in vastly different contexts than the analysis and original projected outcomes. This presents a problem. Current research indicates that culture plays a key role in the *successful implementation* of strategy outcomes, yet its tacit nature makes it an

elusive component for urban planning practitioners to understand (Bulkeley, 2006; Pahl-Wostl et al., 2008). Further, the interplay of culture with more explicit institutional factors (such as governance structures) adds to the complexity and emergent potential, making contextualization exceedingly difficult (Belt, 2004).

The purpose of this study is to help discern the role of cultural context in innovative water management planning strategies. It is anticipated that a greater understanding of the tacit elements of context, such as culture, will help urban planners understand potential barriers to replicating sustainable water innovations found in urban areas outside their own. Moreover, a dynamic framework that models the interactions between culture and more explicit contextual elements (e.g., budgets, governance structures) will help manage complexity involved with these inherently dynamic variables. Will the water planning and management interventions that work well in one part of the world achieve similar results in a vastly different context? An important component of critically examining sustainable water based strategies (via the social learning process) is recognizing the institutional and cultural context it takes place in (Pahl-Wostl et al., 2008, p. 486). But how can we pull out culture (something that is often just tacitly understood) from the real-life strategies we learn from?

In order to understand how planners can discern the role of cultural context in innovative sustainable planning strategies, we use qualitative and quantitative methods to uncover key institutional components that have influenced successful sustainable water planning processes in Singapore. Singapore, in particular, was chosen due its emergence as a global hub for innovation exchange in relation to their successful water conservation planning, programs, and technologies. This paper will address the key question: *What are*

the key cultural barriers to translating Singapore's successful water management and planning strategies? In order to operationalize this broad question, we first ask what role Singapore's national culture plays in their high public acceptance rate of reclaimed water and adoption of water conservation behaviors? In other words, are the cultural mores of Singapore so unique that any translation of programs cannot succeed in other contexts? Or are there cultural elements that would enable a successful translation if they were better understood. Second, how might key differences between national cultures and behavior act as barriers to translating sustainable water strategies to other places?

In this exploratory study we explicitly link Singapore's water management and planning practices to their national culture. We first explore the role of culture in the creation of planning *bright spots* and its role in replication and translation to other places. Ethnographic fieldwork that includes interviews and participant observations are presented along with an analysis of the *dimensions of national culture* theoretical framework (Hofstede, 1998) and its applicability to planning oriented problems. We draw upon these dimensions to analyze and discuss the role of culture in the successful implementation of Singapore's water programs and it probable success in other places. We conclude with a discussion of the broader issue of the role of culture in understanding the barriers to translating sustainability oriented planning solutions.

4.3 Urban 'Bright Spots' and National Culture

In order to produce a workable water management plan, city planners often start by hunting for urban 'bright spots' – or best practices that are worth emulating (Heath & Heath, 2010). Singapore's nation-wide implementation of reclaimed water (marketed as 'NEWater') has acted as such a bright spot for many water scarce cities..

Singapore has become a global hub for innovation exchange in relation to their successful water conservation planning, programs, and technologies. It is a unique case, in that it has the third highest population density in the world, expanding industry, a growing populace, no natural large aquifers or lakes, and a goal of becoming water self-sufficient by 2061. Much to the world's surprise they are well on their way to meeting their goal of independence from imported Malaysian water through adoption of numerous intensive sustainable water strategies (such as behavioral change campaigns and high public acceptance of their reclaimed water plants, marketed as NEWater).

Singapore's resounding successes in water planning and management have been recognized as a leading best practice around the world. In fact, the Singapore Public Utilities Board has been awarded a United Nations Water Best Practice Award in 2014 for their public engagement processes, as well as the 2007 Stockholm Industry Water Award. Global learning of this kind becomes critical at the large scale urban water systems operate on, as cities within similar contexts don't always offer the most progressive solutions to water scarcity problems. But would Singapore's 'best practice' processes actually produce similar results if they were implemented in a vastly different cultural context?

Approaches to water management have typically included the application of these best management practices without a critical understanding of the complex relationships that underlie the systems to which they are being applied - often resulting in failed outcomes when they are applied outside the contexts where they were first developed. Past research has widely acknowledge dsocial learning benefits that can be garnered from referencing best practices (Amelang, 2007; Dear, 2005). Many however, are also critical

of using 'imported ideas' that operate within vastly different cultures, climates, and political systems (Bulkeley, 2006; Roy, 2011). The critics claim that an incomplete understanding of key social and behavioral factors that contribute to the success of a best practice in one local can lead to a failed translation, or unintended consequences, in another. For example, Toowoomba, Australia's initial attempts to build a copy-cat of the Singaporean recycled water plant failed due to public backlash centered around the psychological 'yuck factor' of "toilet to tap drinking water" (Brisbane Times, 2013; Ching, 2010). Similarly, the San Diego Water Authority's initiative to implement reclaimed water in 2004 was dismissed by City Council and 63 percent of residents (Barringer, 2012).

4.3.1 National Culture

The term "culture" has a variety of different meanings and uses. Different disciplines have developed use a large range of definitions - from short statements that culture is the "glue that holds societies together" (Hofstede's, 1998), to more nuanced and complex views that culture is "a unique meaning and information system, shared by a group and transmitted across generations, that allows the group to meet basic needs of survival, pursue happiness and wellbeing, and derive meaning from life" (Matsumoto & Juang, 2012). Most research takes the view that there is no right or wrong definition of culture, but that the *best* conceptualization is the one that is most helpful for understanding a given social system or phenomena. Therefore, for the purposes of this study, we use a conceptualization of culture as defined by Amos Rapoport, "the way of life of a people including their ideals, norms, rules, routinized behaviors, etc." (2005, p. 78).

It should be noted that culture differs from the more comprehensive term, "institution," which refers to both formal constraints (e.g., laws) and informal constraints (e.g., norms). To most, culture refers to solely informal constraints that are often learned through language and symbols, and are always adapted for survival (Alston, Eggertsson, & North, 1996, p. 344).

The concept of culture is often criticized in academic circles for being too general and abstract to be useful. A careful "unpacking" of the term however, has proved to be an effective way to operationalize the term for research purposes. This 'unpacking' process unveils an array of different human phenomena that make up "culture" and it is important to think of culture as a package of variables (or constructs), rather than just one stand-alone variable (Minkov & Hofstede, 2011, p. 12). In fact, many think of culture as multi-level, consisting of macro (national), meso (organizational), and micro (individual) (Schensul, 2009).

Culture is seen as both an individual and social phenomenon that can be measured at multiple scales. National-level culture, in particular, is believed to start developing in early childhood. Early on, children are exposed to a shared set of *family values*, which are then reinforced overtime both inside and outside the family construct (i.e. in schools, community organizations, universities, etc.) (Hofstede, 2001). The idea of transnational culture differs from the notion of *deep culture* described above (deep culture deal with the feelings and attitudes that we learn by being a member of a particular group). Ideas of transnational culture suggest that there is a 'world culture' in the sense that many local cultures are becoming more interconnected through globally available brands (e.g., iPhone), technology, industrial standards (ISO), etc. and are not anchored to one

geographic location as in the past (Hannerz, 1996, p. 106). Often the symbols of transnational culture are thought to be, "translated, domesticated, indigenized, and repackaged" at the local level (Baraldi, Borsari, & Carli, 2011, p. 3). Traditional national cultures are consider currently in flux, as many personal identities (using numerous 'sources of self') and jurisdictions begin to overlap toward transnationalism (Baraldi et al., 2011, p. 8).

Because cultures are only meaningful (or even exist) when they are compared one to another, some critiques of cultural studies note that they might promote ethically questionable ideas of stereotyping (i.e., a fixed notion about persons in a certain category, with no distinctions made about individuals) and ethnocentrism (i.e., "the exaggerated tendency to think the characteristics of one's own group or race superior to those of other groups or races") (Hofstede, 2001, p. 17).

4.3.2 A National Culture Analysis Framework

Culture can therefore be examined on a multitude of levels, with different dimensions more relevant at each (nested) level. General characterizations of national culture have been attempted by many different authors (Kluckhohn & Strodtbeck, 1961; Thompson, Ellis, Wildavsky, & Wildavsky, 1990), however, Hofstede's 1998 conceptualization has proven to be the most robust and therefore widely used in the area of environmental management (Pahl-Wostl et al., 2008, p. 486).

Hofstede's original 53-country study has been refined and revised over time to include 93 nations.(Hofstede, 1998, 2001; Hofstede, Neuijen, Ohayv, & Sanders, 1990; Minkov & Hofstede, 2011). These values, or 'cultural dimensions,' have been found

useful in delineating key differences in national values. They are typically categorized into 6 distinct areas:

1. **Power Distance** – "the extent to which the less powerful members of organizations and institutions accept that power is distributed unequally. The basic problem involved is the degree of human inequality that underlies the functioning of each particular society" (Hofstede, 2001, p. xix).
2. **Individualism vs. Collectivism** – "the degree to which individuals are supposed to look after themselves or remain integrated into groups, usually around the family. Positioning itself between these poles is a very basic problem all societies face."
3. **Masculinity vs. Femininity** – "the distribution of emotional roles between genders, which is another fundamental problem for any society to which a range of solutions are found; it opposes "tough" masculine to "tender" feminine societies."
4. **Uncertainty Avoidance** – "the extent to which a culture programs its members to feel either uncomfortable or comfortable in unstructured situations. Unstructured situations are novel, unknown, surprising, different from usual. The basic problem involved is the degree to which as society tries to control the uncontrollable."
5. **Long-term vs. Short-term Orientation** – extent to which a society prefers to "maintain time-honored traditions and norms while viewing societal change with suspicion, opposed to those that encourage thrift and efforts in modern education as a way to prepare for the future."

6. **Indulgence vs. Restraint** – "Indulgence stands for a society that allows relatively free gratification of basic and natural human drives related to enjoying life and having fun. Restraint stands for a society that suppresses gratification of needs and regulates it by means of strict social norms." (Hofstede, 2001)

This characterization of national culture can greatly aid cross-cultural communication, and to help us understand key cultural barriers to translating sustainable ideas in urban planning. These dimensions are further described within Appendix C in relation to Singapore and the United States (for comparison purposes). They will be used below to frame an ethnographic analysis of Singapore's water management planning strategies.

4.4 Ethnography and Qualitative Data Collection

Interview and participant observation were the main forms of qualitative data collection used within this study. The participant observation component commenced in September 2014 with the relocation of the lead author into a Singaporean public housing estate located in Serangoon Central, and staying until June 2015 (for a total of 9 months). Prior to relocation, an ethnographic field note template and procedural schedule was established. Jottings and photographs were taken in Evernote app and then used to type fieldnotes while volunteering at the Waterways Watch Society, on the Public Utilities Board Learning Trails and water-related events, and during normal, everyday life. Due to reserved, risk-adverse nature of many Singaporeans the majority of the rich, descriptive data was collected were through candid conversations during this participant observation component of the research.

Interviews regarding Singapore's water conservation programs and behaviors were conducted with members of a local Singaporean NGO, the Waterways Watch Society, and officials from the Singaporean Public Utilities Board. Contact with participants was first requested via email, and then by non-random snowball sample. This technique was the most practical for this particular study, however, limitations for generalization to the entire population and external validity should be acknowledged. The interview protocol was loosely structured around the national culture theoretical framework (Hofstede, 2001) in relation to Singapore's NEWater and water conservation behavior programs. Each interviewee was briefed on the study, given an informed consent form to sign, and asked if the interview could be recorded. Basic questions about themselves (such as their education and work experience) were asked first, followed by more specific questions about their opinions regarding NEWater and water conservation.

Interview data was then transcribed word for word and inputted into NVivo qualitative analysis software, along with any additional pieces of qualitative data (e.g. field notes, photographs). All data was memoed and coded into themes using a line-by-line method. All names have been changed in order to protect the identity of the research participants

4.4.1 Ethnography

4.4.1.1 Study Setting

My lived experience in Singapore was based in a 4-bedroom Housing Development Board (HDB) apartment that was shared with four additional people north of the city center in a New Town called Serangoon Central (See Figure 4.1, Photos 1 and 2). 'HDB apartments' are the national public housing that approximately two thirds of the

population reside in. My neighbors were almost entirely Singaporean nationals who were ethnically Chinese, Indian, and Malay. Each week I split up my time traveling to volunteer at the Waterways Watch Society, my office at the Singapore-MIT Alliance for Research and Technology, and visit key water-related sites and events such as the NEWater Visitor Centre, Marina Barrage, World Water Day, and the majority of Singapore's 17 reservoirs (see Figure 4.2).

Figure 4.1: Photo 1 and 2: Apartment in Serangoon Central; Photo 3: The Waterways Watch Society; Photo 4: The Singapore-MIT Alliance for Research and Technology

Figure 4.2: Photo 1: Marina Barrage; Photo 2: NEWater Visitor Center; Photos 3 and 4: MacRitchie Reservior

The purpose of this research was to understand how Singapore's national culture might impact their successful water management strategies, and how key differences between national cultures could act as barriers to replicating their results. Hofstede's cultural dimensions framework and corresponding secondary data (Hofstede, 2015) was used as a guide to collect interview and field note data.

4.4.1.2 Overview of Singaporean Water Management Strategies

Singapore's approach to water management and planning is multi-faceted – consisting of a multitude of programs, prompts, and structured school syllabi that have been rolled out over the course of many years. One water sector professional described the PUB's struggle in education and engagement because "…on one hand, we… tell them to conserve water. On the other hand, we ensure there's enough water in Singapore [through NEWater, desalination, imported water, and local catchments]." Below key behavioral components of Singapore's water planning and management program -

changing mindsets, promoting NEWater, and encouraging water conservation behavior – are discussed.

4.4.1.3 Changing Mindsets

The main goal of the Singapore Public Utilities Board is to achieve water security both terms of having enough water, and having enough high quality water. Their approach to achieving this goal is spelled out in their tagline – *Conserve, Value, Enjoy* – i.e. Singaporeans who enjoy the water will value it, and then therefore conserve it. I found that Singapore has approached water conservation through a vast array of mechanisms. On a broad level, PUB's Active, Beautiful, Clean programs have improved the Singaporean relationship with water by improving accessibility and by making their waterways more attractive to residents.

Early on during my time in Singapore I learned that two-thirds of Singapore acts as a rainfall catchment that is channeled into their 17 different reservoirs through a system of canals, rivers, and stormwater drains. The PUB started the Active, Beautiful, Clean program in 2006 to inspire citizens to value water, which they in turn hope will lead to more conservation and less pollution. When I asked Justin[*], a water sector employee, he confirmed "it's our most popular thing…we had all these huge canals which people hate because they're ugly. And then we have a park next to the canal. So we thought, why don't we re-naturalize the canal? So that people can get into the water. So we did. We did Bishan[1]. Fantastic. People love it. And yes, it works like a charm. It's wonderful. Everyone comes to visit the ABC, foreigners…but it's kind of hard for them

[*] All names have been changed in order to protect the identity of the research participants.
[1] Bishan is a New Town in Singapore. The PUB re-naturalized a portion of the Kallang River that traverses the area.

to do it." I asked him if he thought that Singaporeans actually value water more now, and his immediate reply was "I think so, yes. I think the message has gotten through with years of nagging [laughter]…It's part of the national psyche."

The PUB is not alone in their efforts. The non-governmental organization where I frequently volunteered – the Waterway Watch Society (WWS) – has a similar mission in helping monitor, protect, and conserve Singapore's water. The WWS focuses on creating an experience that is intended to stay with the participant over time. They regularly lead 'learning trails' on bike, school talks, kayak clean-ups, and water-related games in an effort to share information about the reservoirs in Singapore and how humans impact the waterways. Other means of getting people to think about water – such as water conservation competitions and awards - are also prevalent. Throughout my time in Singapore I saw everything ranging from water doodling competitions organized by a prominent hotel to the formal PUB Watermark Awards.

My time engaging Singaporeans over the course of this study suggests to me that they have a strong understanding of their water issues (shortages, importation problems), which is likely the result of their ongoing education campaign and national standards that are targeted at shifting mindset instead of just relying on fines and laws. The importance of this can be summed up by Justin, who readily acknowledges that the "message that we are short of water, that we have to find alternative supply, has always been in the public mind for a long time." He explained that a mindset of water scarcity is has seeped deeply into the national psyche – so much so that they "knew consciously we had to tackle [it]. So that was right up there together with national defense."

The state-led water education guidelines in Singapore's are an important mechanism for helping to shape water behaviors. The guidelines include an attempt to integrate competencies in social emotional learning in order to motivate more sustainable water behaviors. One water education leader, Michelle stated "it's not just about facts – it's about changing an entire nation's values." In order to do this, they are teaching place-based inquiry with the hope that it will "foster a sense of national identity, pride as Singaporeans, and emotional rootedness to the nation." I saw that place-based inquiry in Singapore takes many forms, but it is most prevalent in the PUB's learning trails, which act as a type of outdoor classroom. Michelle emphasized that place-based memories are "very important" to conservation efforts because "with no connection they don't care about it."

Furthermore, this nationally mandated curriculum was evident in the weekly Waterways Watch Society presentations for school age children and corporations. I participated in several over the course of my stay. During these presentations the audience is typically asked questions such as "how many reservoirs are there in Singapore?" (there are 17) and "what are the '4 national taps?" – referring to their national water sources - (1. Imported water, 2. NEWater, 3. Desalination, and 4. Catchment water). The vast majority of primary and secondary students can answer these questions easily. I asked Amos*, a leader in one of the Singaporean water education programs, how the students consistently did so well with these seemingly obscure questions? He replied, "this is the national propaganda. Our four national taps…What

* All participants' names have been changed in order to protect their identity.

they don't know are the relative sizes of the taps and how much they cost. See, they don't know that."

4.4.1.4 Promoting NEWater

The initial public educational campaign that started nearly 15 years ago surrounding NEWater was a long, phased approach that involved a media tour to existing reclaimed water plants in California and Europe, the production of a reclaimed water documentary, and a series of briefings for key stakeholder groups. While I was living in Singapore, a survey conducted by the Institute of Policy Studies (IPS) released a study on NEWater. They found that 90% of individual Singaporeans consider the launching of the NEWater program as a significant national event. They suggested in the media releases that this indicates "individual Singaporeans recognize the strategic importance played by the technological and cost breakthrough [NEWater] was for Singapore as a nation state" (Institute of Policy Studies, 1995).

It's clear Singaporeans know what NEWater is and find its launch memorable, but how effective has their bid been for overall public acceptance? Amos believes Singaporeans understand the national water situation, and so in terms of public acceptance, he finds "there's no particular issue." He went on to say that he, like most Singaporeans, "accept it readily…I had totally no problems drinking NEWater. It's totally pure. There's nothing in it, so why won't you drink it [chuckles]?" In the next breath, however, he said "but my mother, I've never asked her this, but I suspect maybe she won't. If she had a choice, she probably won't, or she'll boil it first [laughter]. You see. You see, even today, my mother, she'll boil the tap water. She knows perfectly well it's

safe to drink, but she will boil it because it's a habit. Because when she grew up, you can't drink the tap water."

4.4.1.5 Encouraging Water Conservation Behavior

In several interviews I conducted the participant mentioned PUB's 3-pronged approach to water demand management, which includes 1) water pricing, 2) Efficiency mandates, and 3) facilitation of programs that encourage water conservation practices. Although Singapore has been proactive in requiring installation of increasingly efficient hardware (washing machines, faucets, etc.), they have become most well-known globally for their behavior change efforts. The Public Utilities Board has used various mediums to remind or 'nudge' citizens to more specific water conserving behaviors such as taking shorter showers and washing clothes / dishes. Generally, people I spoke with believed that the PUB's water conservation campaign posters and videos did make a difference, as the visual nature of these mediums helped people understand the issue.

Every person I interviewed regarding water conservation agreed on one thing – that reducing per capita water consumption through behavior change is difficult. Amos explained, "we are quite clear that most people will not waste water deliberately. But to get them to take a shorter shower, to have a bit of inconvenience, that is a bit more difficult, but we are quite clear that most people will not just waste water, because the psyche of our people over the years has been that water is a precious resource, not something that we have a lot of…" Although the PUB targets small wins in residential water behavior change through their various media sources (transit signage, a magazine, YouTube videos, etc.), they readily acknowledge that "water's not as exciting…we have to find a spin to it…"

One of the most popular 'spins' the PUB uses is communication through it's incredibly popular mascot, Water Wally. Just about any public place in Singapore near water features signage with the mascot that explains what acceptable behavior is in relation to the body of water. On many days I didn't just see Water Wally on signage, but also dangling from keychains on young Singaporeans' backpacks. Justin explained that he thought Water Wally was one of the best things produced by the PUB in terms of behavior change because the mascot is "adorable." See Figure 4.3.

Figure 4.3: Photos 1-4 depict different places I found Water Wally in Singapore.

There was overwhelming consensus amongst the people I interviewed and casually spoke with that water pricing did not have a large impact on overall consumption in Singapore. Amos explained, "if you shower one minute less and you actually save ten liters of water, so what? How much is that? That's two cents - two Singapore cents. Who bothers about two cents, right?...Certainly saving money is not a great motivation. Even if you make it ten times more expensive, you save ten liters, you save 20 cents. So what

[chuckles]?..Even if we make it a hundred times more, it's $2. It's still nothing. So how much can you move the price ahead? I don't think so. I don't think pricing is of any leverage at all. So we have to think how someone would consciously want to use less water."

Because they found that the price of water has little impact on consumption, leaders in the Singaporean water sector have looked into how people could consciously want to use less water. They hope that by providing online and hardcopy water consumption information to residents (in regards to both their use *and* their neighbors) they can help people change their behavior. Currently, the PUB provides a bar chart on everyone's bill to show consumption for the past six months and a national average. A government official I interviewed acknowledged, however, that many don't look at their bill in a meaningful way. They hope to move to real-time water consumption information in the future so residents will be able to tell exactly how much they are using at any given time and react accordingly.

Amos explained, "personally, I think smart metering could be a game changer, and I'm challenging our guys to do it. But of course there are obstacles. First, the meter itself, the smart meter is a lot more expensive than the regular meter. And then it needs to have a battery. The battery needs to last a long time. So there are technical challenges, and then how are you going to transmit the data? But all of these will eventually be resolved, so yeah, I'm looking toward smart metering. And what other things can we do to make people change their behavior? So again, we have to do research. We have to do behavioral research." While in Singapore, the PUB launched a pilot smart metering

project in 2,600 households that pushed real-time water consumption (and energy) data to a monitor portal located within each individual residence.

4.5 Cultural Dimensions

Singapore's 'soft' authoritarian rule operates with a distinctively modernist worldview, which has heavily influenced its development pattern over the past 50 years. Prior to the establishment of the Housing Development Board in 1959, Singapore had some of the arguably largest slums in the world. The government solution to these slums was the construction of public housing high-rises situated in 23 New Towns - a development pattern reminiscent of Le Corbusier's Towers in the Park concept. This built environment reflects positivistic, technocratic, and rationalistic view held by the government.

NEWater could be viewed as yet another Singapore government initiated technological fix that aims to dominate nature, which could, in turn, be reflective of their desire to dominate their own citizens. Several articles already rightly point out that any democratic country that attempts to copy Singapore's reclaimed water success story is at huge risk of garnering very different results (Khoo, 2009). These barriers to replication in terms of formal constraints (laws) are already well known. What is not well understood are how the informal constraints (culture) have played a part in public acceptance of NEWater.

4.5.1 Power Distance

Hofstede describes the power distance dimension as "the degree to which the less powerful members of a society accept and expect that power is distributed unequally"

(Hofstede, 2015). Societies that have a high score in this dimension accept considerable differences in equality and hierarchical power. Societies with low scores, in contrast, strive toward a more equal distribution of power. Singapore falls into the high end of this spectrum with a score of 74 out of 100, indicating the acceptance of power differences.

The vast majority of Singaporeans are ethnically Chinese (76 percent) and have a Confucian background that emphasizes the need for a stable society that is structured around unequal relationships. This is reflected in the central government's first defined 'shared value,' which is "Nation before community and society above self." It is also reflected in the workplace where the power structures are hierarchical and "control is expected and attitude towards managers is formal. Communication is indirect and the information flow is selective" (Hofstede, 2015).

4.5.1.1 Racial and Religious Discrimination

Severely underpaid immigrant workers (e.g., gardeners, domestic helpers, etc.) are the social norm in Singapore. The median monthly gross wage for the 55,000 cleaners is $850, whereas the national median is $3,949 (Singapore Ministry of Manpower, 2016). Although the Singaporean government strongly promotes racial and religious harmony in the workplace and other public spheres, in the private realms I witnessed open stereotyping and discrimination. For instance, while looking for housing online, I came across listings that openly stated "no Indians, no PRCs [People's Republic of China]." I later found out that this is incredibly common and is reflective of a deeply ingrained stereotype that certain immigrant groups take care of rented apartments better and cook food that will not leave lingering smells in the residence.

Hints of discrimination and stereotyping also peppered many of the days I participated in various water sector volunteer activities. Rachael, a middle-aged woman who has lived in Singapore her entire life, confided that she worried Singaporean culture was going to be overtaken by the Muslim culture and reasoned that Singaporeans should have more children. Lee, a man in his late 60s or 70s described the differences he perceived between the children of different races, stating that the Indians tend to be more inquisitive, Chinese less so, and he said the Malaysians have the hardest time and are the quietest and less engaged. Even some white expats expressed dissatisfaction with the way they were treated. A European expat I spoke with also described his struggles keeping his relationship with a Singaporean woman secret from her family because "her dad does not approve of her dating a white person" and her "grandparents pray for her to find and marry and nice Chinese boy."

4.5.1.2 Politics and Freedom of Speech /Press

The media in Singapore is largely state controlled. Defaming the government openly and publically is not permitted. Public demonstrations are sequestered to one small plaza. National headlines from The Straits Times during the period of my fieldwork were flooded with information about the Singaporean government lawsuit against a young Singaporean, Roy Ngerng, who strongly criticized Prime Minister Lee Hsien Loong, claiming he misappropriated Central Provident Fund savings. Although the Straits Times stated that the High Court ordered him to pay Mr. Lee $29,000, in a follow up blog post Ngerng stated "The prime minister's press secretary Chang Li Lin and state-controlled media lied about what my lawyer and I said at the pre-trial conference

today…the prime minister has applied to ask me to pay at least $250,000" (Ngerng, 2015).

More than one interviewee expressed the sentiment that government-led water conservation campaigns were "for show" or "Wayng" (Malay for all fake). John, a water sector leader lamented that there were no smart political leaders in Singapore, and that current leaders were listening to the wrong people and are being shown places that are like movie sets - only painted on one side where the Minister's path is. Other participants in water conservation-based NGOs criticized the government for not letting them do things without their approval.

4.5.1.3 Water and Power Distance

The majority of my interviews and interactions pointed toward the fact that water planning and management was aided heavily by the power distance between the government and the people, and strong political will. Changing residential water conservation behavior can, and has since the 1970s, been largely influenced with state-controlled media (the Straits Times) and national education policy. One interviewee described the power distance situation in Singapore succinctly by saying "we have a unitary government. Had this for a long time. And unitary governments are either very good or very bad. So we have North Korea, maybe very bad. We have had a very strong PAP government, and there was a lot of trust, a lot of confidence, and time and again the government has delivered on its promises. So it was quite easy for us to do things in a big way." Others agreed saying, "I think that the key thing was that the government was behind it [NEWater]. And at least during the period of 2000, when government comes up and says, 'This is a good product, this is good' Generally, most people accepted that.

That was the power of the government ….” Still another said, “…And at least during that time, the year 2000, there was a lot of public trust in the government. And because the government says this is a good product, it carries a lot of weight.”

In addition to the government backing, several interviewees mentioned that the tension between Singapore and Malaysia over water catalyzed a nationalistic fervor, which made it easier to get citizens to support NEWater. One government official said, “We answered everybody's questions. It was very transparent, with the signs and all, and we built the NEWater Visitor Centre. It's a pillar of the education for NEWater, and we came up with very simple graphics to explain how it works.”

The people I interviewed and interacted with throughout my field study have varied perceptions of exactly how accepted NEWater is by Singaporean citizens. High-ranking leaders in the water sector largely were the most optimistic in their perception of overall public acceptance and felt that the citizens should be grateful. For instance, Amos said “we assume a confidence in the high 90s. Because nobody else ever, for the last ten years, or five years at least - I don't recall anyone saying anything bad about NEWater, complaining about NEWater, or having anything to say.” He went on to say, “it's easy to understand. And we actually hardly had any resistance. There kind of was a lot of support for NEWater. I think it's a bit of timing also. If you do it today, maybe with social media and all that, you may not get it. It may not be as easy as it was… we bottle it for sampling and we've done more than 20 million bottles since we started.”

Other, younger professionals in the water sector who were interviewed noted that although they personally drink NEWater, they knew many people who would not. Lee noted, “for me, I’m ok. Because I understand. Because I went to the NEWater plant and I

don't know. There are some people who go to the NEWater plant and still think nah… it's a psychological thing." Another junior employee who works with Amos noted that many people within their own office refuse to drink NEWater.

Lee was quick to note the role power and government had in the implementation of NEWater. He acknowledged, "we all got force fed. [speaking from the Public Utilities Board perspective] If you don't want to drink it it's ok, but we're going to give it to you anyway. Come to our national day parade we're going to give it to you, come for whatever big public events – hey we're just giving it to you. You want to drink it – up to you. But some…still don't really want to drink it, some of us don't feel comfortable drinking it." Others who I interacted with in the field were so suspicious of the government controlled water system that they thought it was possible the Singaporean government was putting fluoride in the water – not for healthy teeth – but to "poison them" and make them "stupid."

Most, however, agree that power distance was the key ingredient to success. This is summed up nicely by Amos' statement, "Yeah, so whether we needed to do so much work, I'm not sure, but it was something we had to make sure that it worked, so we didn't really want any fumble. We wanted to address any concerns out there. We were lucky it was quite small. In fact, even the Muslims, because, is it kosher? They endorsed it, although we don't make a song and dance out of it, but even the Muslims." Overall, it is clear that Singapore has the ability to implement aggressive top-down approaches to address the national issue of water scarcity.

4.5.2 Individualism vs. Collectivism

The Individualism vs. Collective dimension is defined by Hofstede as the level of preference for societal interdependence. Singapore is a collectivist nation with a score of 20 out of 100 (100 being the most individualistic), which highly influences their level of receptiveness to water campaigns. The success of groups, organizations, and families are deemed more important than the individual, and people within groups will aid one another in exchange for loyalty. Collectivism has commonalities with a key Confucian teaching, which Hofstede summarizes as:

> *The family is the prototype of all social organizations. A person is not primarily an individual; rather, he or she is a member of a family. Children should learn to restrain themselves, to overcome their individuality so as to maintain the harmony in the family. Harmony is found when everybody saves face in the sense of dignity, self-respect, and prestige. Social relations should be conducted in such a way that everybody's face is saved. Paying respect to someone is called giving face (Hofestede, 2015).*

This collectivist ideal has been promoted by first Prime Minister and founding father of independent Singapore, Lee Kuan Yew. In his book, *Hard Truths to Keep Singapore Going*, he stated that "a sense of self, a sense of identity. That you're prepared to die for your country, to die for each other" was the key tipping point in when he considered Singapore a nation (Yew, 2011).

Although using less water, or changing their existing water habits, may be an inconvenience – people with a collectivist mentality will be less bothered by their own loss, so long as it serves the greater whole. In one of the water education sessions Michelle, the leader, had students play a game where multiple students legs were tied together and told to race to a finish line. The resulting groups of leg-tied students struggled to walk while attached to their classmates. Michelle expressed her dismay, saying that they were "not of the same mind." She was "hoping to see you take steps together" to get quickly across the room. She reiterated that "we need to be one mind." At a different water educational session, the lecturer - Min - asked students if they agreed or disagreed with the following statement: "Alone I can make a lot of difference" – only 1 hand in agreement went up out of a group of around 40.

Although a dominant collectivist current runs through the Singaporean culture, many of my interviews pointed to a frustration with more individualistic ideologies that seem to have appeared over time as Singapore has modernized. Lee stated, "…generally, we most of us think of ourselves as modern so we are not so tied to these kinds of cultural things anymore. That's the feeling I get lah. And that's good and bad lah, because now it's all about oneself – it's very individualistic – everyone is just out for himself or herself – no one else was here living that kind of thing." A different interviewee who also worked within the water sector said that there was a "not my problem mentality" while also asserting that the national water education is not comprehensive enough and that many slip through without getting the hands-on lessons such as those provided by Waterways Watch Society.

4.5.3 Masculinity vs. Femininity

The Masculine vs. Feminine dimension relates to a society's dominant motivational factors for action – liking what you do (feminine) or wanting to be the best (masculine). High masculine scores, show a societal preference for competition, achievement and material rewards for success; whereas low, feminine scores, indicate a preference for consensus, cooperation, and quality of life. Singapore scores at the middle of this spectrum with as score of 48 (just slightly leaning toward the feminine side).

Although my public and private interactions with Singaporeans support Hofstede's observations that being seen as humble and in favor of consensus are valued and important traits, it is clear that many Singaporeans – especially the younger generations have an increasing pressure and expectation to obtain a high level of education and a well-paying job that may run counter. When I asked John, a water sector leader, where Singapore would fall in the spectrum between liking what you do and wanting to be the best, he told me that there has been a cultural shift to emphasizing making good money over socially responsible behavior. He believes many are apathetic to environmental concerns and a mindset change is needed to adequately address the water scarcity issue – the country can't just rely on fines and laws.

Lee explained to me how he thought overly masculine mindsets (i.e., a preference for achievement and material success) could translate to less successful water conservation practices in the future. He rationalized, "what we should do is if you can convince them to value water – you know what I mean – and they're not just doing it for businesses…basically tell them that this clean water is not going to last forever if we keep acting like this.... So, imagine if the programs target the kids, and also the adults, it

becomes holistic and when the kids grow up with these kind of values, not matter what business that they are working at – even if it does not make business sense to save water or to do anything for the environment they will still do it."

The masculine / feminine dimension may also affect imported water negotiations with Malaysia and a desire to be a global leader in the water industry. Amos conceded "half of our drinking water comes from Malaysia. We have two agreements. One has lapsed. We still have another. The other one has another 45 years to run. Everyone knows this, and once in a while the Malaysians will threaten us. They will threaten to cut the water. If they can they will cut it. The reason why they don't is because they know that the consequences of this action is just too painful, and they know that. And we made it very clear to them. We told them as much, that if they touch our water, we will go to war. Basically that's what we told them."

4.5.4 Uncertainty Avoidance

The Uncertainty Avoidance dimension refers to "the extent to which the members of a culture feel threatened by ambiguous or unknown situations and have created beliefs and institutions that try to avoid these" (Hofstede, 2015). Singapore's low score on this metric (8 out of 100) is reflective of their very low cultural threshold for uncertainty, which is exhibited by their general intolerance for "unorthodox behavior and ideas." This cultural dimension directly relates to Singapore's proactive approach to addressing their water supply and demand issues. Their aggressive approach to educating the population is one such example. While volunteering at educational presentations conducted by the Waterways Watch Society it was clear that their educational guidelines were working -

students showed a clear understanding of water supply through easily articulating water sources (17 reservoirs and the '4 national taps').

Michael, a water sector leader, would agree with Hofstede's uncertainty avoidance assessment for Singapore. He said, "Singaporeans are generally risk adverse, have a narrow comfort zone, and are not outgoing. No one wants to be a hero. They want to go along with the flow and not get in trouble with their superiors." Lee reflected that risk aversion was prevalent even while he was in secondary school – "Even before that I remember when I was 16 or 17 I was in the green club or something lah of my secondary school. So we were trying to push for a recycle bin…we actually came clash on with the school admin and they refused to budge because they said – no that's a fire hazard."

Amos acknowledges that NEWater is a pillar of Singapore's water sustainability due to the countries' lack of natural aquifers and groundwater. He explained that their reliance of rainfall from catchments and raw water imported from Malaysia "are subject to the vagaries of nature, leaving Singapore vulnerable." He expressed concern with continuous improvement, however, because "it's very conservative here…In general the water business is a very conservative business. And that's a big obstacle for us because we're short of water. And we need to find alternative sources, and we need to find ways to make it cheaper. So we have to innovate. This is our solution. We have to innovate. But the water business is so conservative."

That being said, some might find it surprising that Singapore doesn't implement strict water rationing. Lee explained to me that he personally thought water rationing should be implemented in Singapore because "our population is increasing, our water usage per person is dropping, which is good, but the population increase is more. Which

is not good. I think as long as the kids, the younger generation, do not feel all that kind of hardship that their grandparents and parents faced where are they really have to collect water and store it and value it we will never get to a stage where we voluntarily use water sparingly. No way. For our country it just doesn't work. It's all a lie."

He went on to tell me about a meeting he went to with high-level water officials where they discussed the possibility of water rationing where the majority of people argued that "water rationing is a sadistic experiment just to torture citizens and we should never do it…" During this meeting "they were debating why do you want to make it so hard for them? Can we give people rewards instead for people who save water? They are trying the soft approach…So they are saying let's change favor – instead of always being so hard on the people can we encourage them? Which is all nice and fine lah did you have the time for that. Which I personally think there isn't enough."

Lee went on to describe PUB's short experiment in water rationing that was very unpopular amongst Singaporean residents. He thought that the citizens' "grumbling" deterred politicians from pursuing the option further. He explained, "they were too scared that they would lose political power. So they decided to do away with that and say don't worry PUB is going to take care of it. You know what I mean? But the fact is that their head is still in the clouds lah. There's may ways, I didn't think of that you know not compulsory rationing but more a voluntary rationing… There will be times you will need it so during the happy, peaceful times you should appreciate it and you should conserve it."

4.5.5 Long Term Orientation

The long-term orientation dimension refers to how societies prioritize the goals of maintaining links with their past (i.e., resisting societal change by holding onto tradition and norms – distinguished by a low score) while also dealing with current and future challenges (i.e., encouraging sustained thrift and change to prepare for the future – distinguished by a high score). A high score on this metric (72 of 100), suggests that Singapore is very receptive to change – taking pragmatic approaches in various sectors to address their current and future situations. Singaporeans have "cultural qualities supporting long-term investment such as perseverance, sustained efforts, slow results, thrift; being sparse with resources, ordering relationship by status and having a sense of shame (see also again the Confucian teaching)" (Hofstede, 2015).

This is of course very evident in the PUB's consistently evolving water campaigns and techniques to change residential water behavior, their adoption of new technology, and their dramatically changing environment. For example, the last two reservoirs constructed – Serangoon Reservoir and Punngol Reservoir – were dammed in 2011 resulting in a severely altered landscape, but with an eye toward providing more catchment water for their growing population.

NEWater is yet another example of Singapore's dominant pragmatic, long-term orientation. My visit to the NEWater visitor center explained that their first water masterplan was completed in 1972 and the first pilot plant was established in 1974. The cost and unreliability of the membranes was prohibitive until the 1990s; and in 1998 a team was established to further research the technology and its feasibility in Singapore. By May 2000, the first full-scale plant was built. Currently there are four NEWater plants

that meets 30 percent of Singapore's water demand. They plan to increase its capacity to meet 55 percent of water demand by 2060. The vast majority of people I spoke with throughout my field study agreed that NEWater was the right decision for Singapore. Multiple people I interviewed from the water industry stated, "we had no other choice."

Although the majority of the people I interacted with seemed to agree with the future-oriented stance of the PUB and Singaporean government in general, not everyone had a favorable view. One older Singaporean woman in particular was adamant that "Singapore is changing too fast." One of the newly released water conservation advertisements the PUB put out linked their water conservation efforts to their past hard times. When posted on YouTube, it was clear the commercial had an overwhelmingly positive response with 125 likes and only 1 "thumbs down" – and the vast majority of comments saying that it was heartwarming, beautiful, and touching. One response, however, was less than positive saying that was "… a contrived emotional commercial [that] is not going to get us to conserve water. It will please PUB and people who misinterpret the commercial as 'making Singapore feel like home/heartwarming' but it is not going to get us to conserve water. Nostalgia is no match for the take-water-for-granted selfie-obsessed brats that Singapore has raised in the last 50 years. For missing or worse, ignoring that glaring fact, this commercial is money down the drain."

4.5.6 Indulgence vs. Restraint

Hofstede's Indulgence vs. Restraint dimension refers to a society that either "allows relatively free gratification of basic and natural human drives related to enjoying life and having fun" or "suppresses gratification of needs and regulates it by means of strict social norms" (Hofstede, 2015). Or, more simply, national cultures that have strong

control over desires and impulses are 'restrained,' while cultures with weak control are 'indulgent.' Singapore is slightly restrained with a score of 46 out of 100.

Based on my experiences while living there, however, I would expect Singapore to fall more deeply on the restrained side of the spectrum. The majority of the workforce and the primary / secondary school children are suppressed by strict social norms. Those whom I observed in the more formal corporate industries seemed far less concerned with enjoying life and having fun and had far more long hours in the office. Positive emotions, in general, are not freely expressed. In fact, in 2012, a Gallup poll indicated that Singaporeans expressed the least positive emotions of the countries surveyed (Clifton, 2012).

Water conservation campaigns would logically be more successful in a restrained culture. Several interviewees I spoke with mentioned that the key challenge to a successful water conservation campaign is having residents forgo something that they believe adds comfort to their lifestyle (in this case, water). The relatively recent advances in Singapore's water distribution and technology has increased the convenience of getting clean water – and changed expectations drastically for younger generations. John, a Singaporean water sector employee, described how his grandparents had to boil water before it was consumed. He felt that the convenience of access to clean water has led people to become less appreciative, and therefore more indulgent. Lee, a water educator, confessed that he even has trouble conserving water even though it is what he teaches all day. He exclaimed, "There's no 'we can do it!" "make it fun!" Bathe 4-5 minutes – no way lahhhh. Even myself I'm struggling to cut my shower time. Hey look, if I'm telling

the kids to behave a certain way and I'm not doing it myself I'm the biggest hypocrite in the world. It's painful!"

That being said, I rarely came across blatantly wasteful water behaviors while in Singapore – excessive outdoor watering, leaving taps on, etc. I would have to agree with Amos' statement that "we are quite clear that most people will not waste water deliberately…because the psyche of our people over the years has been that water is a precious resource, not something that we have a lot of."

4.6 Discussion

The purpose of this research was to understand the key cultural barriers to translating Singapore's successful water planning and management practices. We used Hofstede's national culture framework to analyze the qualitative data that was collected over a period of 9 months in Singapore. This exploratory study is the first to explicitly link Singapore's water management and planning practices to their national culture dimensions.

National culture can work at the macro scale to affect individual beliefs. As such, national culture impacts all aspects of an individual's life, including their perception, reception - and ultimately their actions - to water management programs like NEWater. For instance, we know from Azjen's behavioral framework (1991) that an individual's volitional actions are influenced by their attitude, their perception of social norms, and how much perceived control they have. What is less often discussed, however, are the beliefs that shape these behavioral elements (see Figure 4.4). Planners can perhaps more accurately predict an individual's behavioral response to an intervention with knowledge

of their underlying culture – or comparing their national culture with the national culture of the best practice they are trying to learn from.

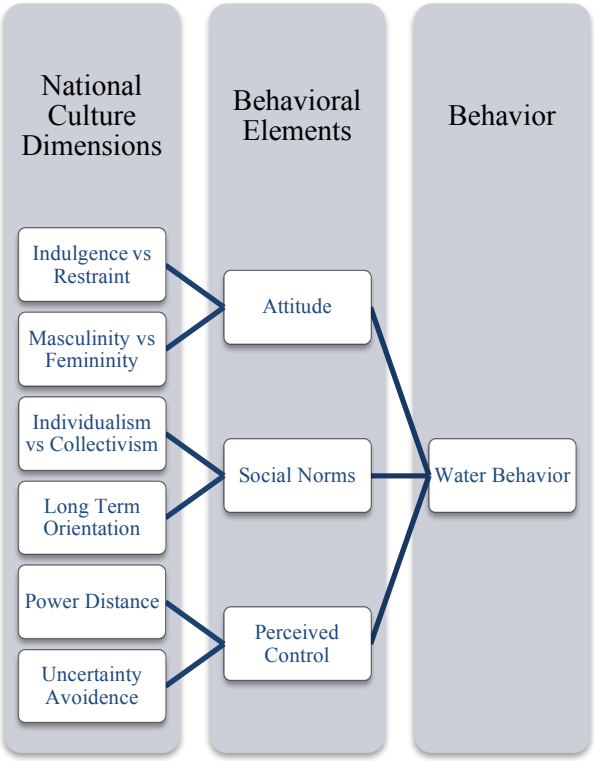

Figure 4.4: National culture and its effect on volitional behavior

In the case of Singapore, we found that their exhibited national culture dimensions were ideal for top-down initiated water management practices. High levels of power distance, uncertainty avoidance, collectivism, long-term orientation all work together to form individual beliefs that support the willingness to engage in water conservation behaviors and acceptance of reclaimed water for drinking. Furthermore, Hofstede's data indicates that Singapore's culture is moderately restrained, meaning they oppose natural desires and emotions. We found that Singaporeans are perhaps even more restrained than what is reflected by Hofstede, which helps explain overcoming emotions such as disgust that make acceptance to reclaimed water difficult.

Culture's impact as a basic, foundational building block of beliefs that form behavior is rarely explicitly understood by planning practitioners. This ethnographic study allowed us to pull out, and highlight, the cultural beliefs that have aided Singapore's successful water management and planning practices. However, we understand that not every practitioner has the luxury of exploring the cultural nuances of a country they wish to adopt a best practice from through nine months of ethnographic fieldwork! We suggest this is not necessarily necessary. We suggest a good starting point would be asking key questions that help planners critically think if, and how, differences in cultural dimensions would act as barriers to the implementation of a targeted sustainable planning strategy. Such questions might include:

1. How does your national culture compare to the culture of the best practice? [this information is easily accessible online at www.geert-hofstede.com]
2. Where are the largest dimensional differences between the two?
3. How could these cultural dimensions have this aided in the successful result?
4. What can be done to mitigate for this potential cultural barrier?

Asking these questions, with an understanding of the key dimensions of national culture, can help avoid common pitfalls of learning from international best practice.

4.7 Conclusion

This study combines insights from urban planning, psychological, and sociological theory help discern the role of culture in innovative sustainable planning strategies. Most existing research advocates for slow examination of sustainability strategies (Roy, 2011a), yet few practitioners understand how to identify culture in practice. Moreover,

use of global learning often paradoxically takes place in fast-paced organizational contexts, where practitioners might feel they only have time to superficially contextualize the models they reference, if at all (Bulkeley, 2006).

This exploratory study explicitly links Singapore's successful water management and planning practices to their national culture. We find that Singapore's culture has helped form their foundational beliefs, which act as building blocks for volitional sustainable behavior. Singapore's high acceptance rate of reclaimed water, for instance, was heavily influenced by their national culture – particularly their high levels of power distance, uncertainty avoidance, collectivism, and long-term orientation. Thus, Singapore's national culture has played a significant role in the overall success of their water management and planning strategies.

Differences in specific national cultural (such as power distance and individualism) could act as barriers to successfully translating Singapore's success to different countries and should be considered when attempting to translate specific interventions to different cultures and contexts. A clear understanding of how cultural dimensions can relate to the pro-environmental intervention can help urban planning practitioners better understand the often tacit and elusive cultural component that make many sustainable strategies referenced from abroad successful in their original context.

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4.9 References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179–211. http://doi.org/10.1016/0749-5978(91)90020-T

Alston, L. J., Eggertsson, Þ., & North, D. C. (1996). *Empirical Studies in Institutional Change*. Cambridge University Press.

Amelang, J. (2007). Comparing cities: a Barcelona Model? *Urban History*, *34*(02), 173–189. http://doi.org/10.1017/S0963926807004592

Baraldi, C., Borsari, A., & Carli, A. (2011). *Hybrids, Differences, Visions: On the Study of Culture*. Aurora, Colo: The Davies Group, Publishers.

Barringer, F. (2012, February 9). Treated Wastewater Used for Drinking Supplies. *The New York Times*. Retrieved from http://www.nytimes.com/2012/02/10/science/earth/despite-yuck-factor-treated-wastewater-used-for-drinking.html

Brisbane Times. (2013). Toowoomba voted no, but recycled water may still be in town's future. Retrieved July 21, 2014, from http://www.brisbanetimes.com.au/queensland/toowoomba-voted-no-but-recycled-water-may-still-be-in-towns-future-20131016-2vm4j.html

Bulkeley, H. (2006). Urban sustainability: learning from best practice? *Environment and Planning A*, *38*(6), 1029–1044. http://doi.org/10.1068/a37300

Ching, L. (2010). Eliminating “Yuck”: A Simple Exposition of Media and Social Change in Water Reuse Policies. *International Journal of Water Resources Development*, *26*(1), 111–124. http://doi.org/10.1080/07900620903392174

Clifton, J. (2012, November 21). Singapore Ranks as Least Emotional Country in the World. Retrieved from http://www.gallup.com/poll/158882/singapore-ranks-least-emotional-country-world.aspx

Corral-Verdugo, V., & Frías-Armenta, M. (2006). Personal Normative Beliefs, Antisocial Behavior, and Residential Water Conservation. *Environment and Behavior*, *38*(3), 406–421. http://doi.org/10.1177/0013916505282272

Dear, M. (2005). Comparative Urbanism. *Urban Geography*, *26*(3), 247–251. http://doi.org/10.2747/0272-3638.26.3.247

Hannerz, U. (1996). *Transnational Connections: Culture, People, Places*. London and New York: Routledge.

Hofstede. (1998). Attitudes, Values and Organizational Culture: Disentangling the Concepts. *Organization Studies*, *19*(3), 477–493. http://doi.org/10.1177/017084069801900305

Hofstede. (2001). *Culture’s Consequences: Comparing Values, Behaviors, Institutions and Organizations Across Nations*. SAGE.

Hofstede, G. (2015). Singapore. Retrieved December 15, 2015, from http://geert-hofstede.com/singapore.html

Hofstede, G., Neuijen, B., Ohayv, D. D., & Sanders, G. (1990). Measuring Organizational Cultures: A Qualitative and Quantitative Study Across Twenty Cases. *Administrative Science Quarterly*, *35*(2), 286–316. http://doi.org/10.2307/2393392

Institute of Policy Studies. (1995). *Survey on Perceptions of Singapore's History*.

Kluckhohn, F., & Strodtbeck, F. L. (1961). *Variations in Value Orientations* (New edition edition). Westport, Conn: Greenwood Press,London.

Matsumoto, D. R., & Juang, L. P. (2012). *Culture and psychology*. Belmont, CA: Wadsworth Cengage Learning.

McDonald, R. I., Green, P., Balk, D., Fekete, B. M., Revenga, C., Todd, M., & Montgomery, M. (2011). Urban growth, climate change, and freshwater availability. *Proceedings of the National Academy of Sciences*, *108*(15), 6312–6317. http://doi.org/10.1073/pnas.1011615108

Minkov, M., & Hofstede, G. (2011). The evolution of Hofstede's doctrine. *Cross Cultural Management: An International Journal*, *18*(1), 10–20. http://doi.org/10.1108/13527601111104269

Moore, D. S., Murphy, M., & Watson, R. (1994). A longitudinal study of domestic water conservation behavior. *Population and Environment*, *16*(2), 175–189. http://doi.org/10.1007/BF02208782

Ngerng, R. (2015, January 12). The Singapore Prime Minister's Press Secretary and State-Controlled Media Lied about What My Lawyer and I Said. Retrieved from

http://thehearttruths.com/2015/01/12/the-singapore-prime-ministers-press-secretary-and-state-controlled-media-lied-about-what-my-lawyer-and-i-said/

Olmstead, S. M., & Stavins, R. N. (2009). Comparing price and nonprice approaches to urban water conservation. *Water Resources Research*, *45*(4), W04301. http://doi.org/10.1029/2008WR007227

Osbaldiston, R., & Schott, J. P. (2012). Environmental Sustainability and Behavioral Science Meta-Analysis of Proenvironmental Behavior Experiments. *Environment and Behavior*, *44*(2), 257–299. http://doi.org/10.1177/0013916511402673

Pahl-Wostl, C., Tàbara, D., Bouwen, R., Craps, M., Dewulf, A., Mostert, E., … Taillieu, T. (2008). The importance of social learning and culture for sustainable water management. *Ecological Economics*, *64*(3), 484–495. http://doi.org/10.1016/j.ecolecon.2007.08.007

Rapoport, A. (2005). *Culture, architecture, and design*. Chicago: Locke Science Pub. Co.

Roy, A. (2011a). Commentary: Placing Planning in the World--Transnationalism as Practice and Critique. *Journal of Planning Education and Research*, *31*(4), 406– 415. http://doi.org/10.1177/0739456X11405060

Roy, A. (2011b). Commentary: Placing Planning in the World--Transnationalism as Practice and Critique. *Journal of Planning Education and Research*, *31*(4), 406– 415. http://doi.org/10.1177/0739456X11405060

Ruijs, A., Zimmermann, A., & van den Berg, M. (2008). Demand and distributional effects of water pricing policies. *Ecological Economics*, *66*(2–3), 506–516. http://doi.org/10.1016/j.ecolecon.2007.10.015

Schensul, J. J. (2009). Community, Culture and Sustainability in Multilevel Dynamic Systems Intervention Science. *American Journal of Community Psychology*, *43*(3-4), 241–256. http://doi.org/10.1007/s10464-009-9228-x

Seyranian, V., Sinatra, G. M., & Polikoff, M. S. (2015). Comparing communication strategies for reducing residential water consumption. *Journal of Environmental Psychology*, *41*, 81–90. http://doi.org/10.1016/j.jenvp.2014.11.009

Singapore Ministry of Manpower. (2016). Summary Table: Income [Singapore Government]. Retrieved from http://stats.mom.gov.sg/Pages/Income-Summary-Table.aspx

Thompson, M., Ellis, R. J., Wildavsky, A., & "Wildavsky, T. M. (1990). *Cultural Theory* (1st edition). Boulder, Colo: Westview Press.

Yew, L. K. (2011). *Hard Truths to Keep Singapore Going*. Singapore: Straits Times Press.

CHAPTER 5: CONCLUSIONS & SYNTHESIS

5.1 Overview

The current 'status quo' patterns of development used around the globe are "profligate, extravagant, inequitable…[and] when projected into the not-too-distant future lead to biophysical impossibilities" (Goodland, 1995). Natural systems that sustain human life are under threat from a growing human population that is projected to increase by almost 2 billion from 2014 to 9.6 billion in 2050 (United Nations, 2012a). This population explosion, coupled with steady increases in material and resource consumption (e.g., burning fossil fuels, producing concrete) and deforestation are increasing net global carbon dioxide emissions. As many are now aware, these emissions are trapping excess radiant heat in the earth's atmosphere, causing global climate changes that are projected to increase land temperatures 2.7-8.1 degrees Fahrenheit, increased ocean acidification by 0.1 percent, increase ocean temperatures 0.2 degrees Fahrenheit, and increase the intensity of rain, snow, and hail storms (IPCC, 2013). Urban populations, in particular, are vulnerable to these natural system changes, as much of their large infrastructure (e.g. water) and industry are reliant upon relative geographic and temporal consistency.

The need for a shift to a more sustainable management paradigm is exceptionally apparent in the area of urban water management. Over the past century, existing water-related problems (e.g., flooding, water scarcity, water pollution) and predicted worst-case scenarios have predominantly been addressed using solely engineering-based technological solutions. Using only technology to control natural hydrological processes is based on a worldview that encompasses the idea that collective human behaviors are an external condition and not an "integral part of water management" (Pahl-Wostl et al., 2008, p. 485). These linear approaches to development do not simultaneously "take a whole range of trade-offs into account and that

involve stakeholders in the whole management process" and often produce adverse unintended consequences (Pahl-Wostl et al., 2008, p. 484).

5.1.1 Social Learning and Planning Practice

In order to address these pressing environmental issues many have advocated for social diffusion of urban sustainability strategies and social learning (Albert, Zimmermann, Knieling, & von Haaren, 2012; McKenzie-Mohr, 2011). Due to the increased transnational nature of this sharing via growing communicative interconnectivity, however, innovative solutions and expertise are now more frequently based in vastly different contexts than those who are referencing them. This presents a problem considering existing research indicates that behavior and culture both play a key role in successful strategy outcomes, yet its tacit nature makes it an elusive component for urban planning practitioners to understand (Bulkeley, 2006; Pahl-Wostl et al., 2008).

5.1.2 Operationalizing Culture

The concept of culture is often criticized in academic circles for being too general and abstract to be useful, however, careful "unpacking" of the term has proved to be a way to operationalize the term for research. This 'unpacking' process unveils a vast array of different human phenomena that make up "culture"; thus, it is important to think of culture as a package of variables (or construct), rather than just one stand-alone variable, that are only meaningful, or only exist, when they are compared (Minkov & Hofstede, 2011, p. 12). In fact, many think of culture as multi-level, consisting of macro (national), meso (organizational), and micro (individual) (Schensul, 2009).

Thus, culture can be examined on a multitude of levels and different dimensions will be more relevant and each nested level. General characterizations of national culture have been

attempted by many different authors (Kluckhohn & Strodtbeck, 1961; Thompson, Ellis, Wildavsky, & "Wildavsky, 1990), however, Hofstede's conceptualization has proven to be the most widely used, and helpful framework for environmental management (Pahl-Wostl et al., 2008, p. 486).

5.1.3 Operationalizing Behavior

Due to the fact that this study is particularly interested in culture as related to sustainable planning, it is also necessary to understand pro-environmental behaviors on the scale of the individual, which can then be aggregated to the level of the collective (i.e., culture). Ultimately social, behavioral, and cognitive psychological theories have indicated that a wide variety of dynamic factors can influence pro-environmental behavior, or "behavior that consciously seeks to minimize the negative impact of one's actions on the natural and built world (e.g., minimize resource and energy consumption…)" (Kollmuss & Agyeman, 2002, p. 240).

Many theoretical models have been developed that contribute to our conceptual understanding of the underlying human causes of direct and indirect pro-environmental behaviors, however, the Theory of Planned Behavior (TPB) has arguably the highest explanatory power. TPB states that an individual's intention to behave a certain way is the best predictor of pro-environmental behavior. Behavioral intentions are thought to be a function of three interconnected elements – attitude, subjective norms, and perceived control (Ajzen, 1991).

5.2 Importance of this Study

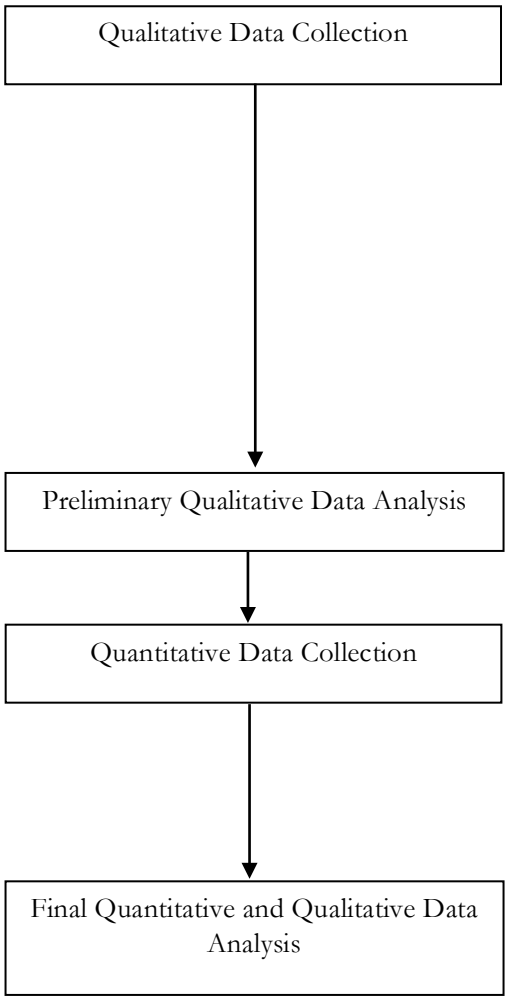
The purpose of this study was to help discern the role of cultural and behavior in innovative sustainable planning strategies. A greater understanding of the tacit elements of context, such as culture, will help urban planners understand potential barriers to replicating sustainability

innovations found in urban areas outside their own. I used the example of sustainable urban water management in Singapore to conduct a mixed-methods exploratory study. An existing sociological framework for national culture (Hofstede, 2001) and social psychological framework for human behavior (Ajzen, 1991) were utilized to unpack the traditionally tacit role culture plays in Singapore's innovative sustainable water strategies.

5.3 Study Design

In order to understand 1) how planners use and process international sustainability strategies, and 2) how planners can discern the role of culture and behavior in innovative sustainable planning strategies, I used a combination of qualitative and quantitative methods as outlined in Figure 5.1.

Figure 5.1: Overall Dissertation Study Design



The successful sustainable water planning processes Singapore, in particular, were chosen due to the fact that they have become a global hub for innovation exchange in relation to their successful water conservation planning, programs, and technologies.

5.4 Key Research Findings

We found through our interviews with planners from the Stockholm, Singapore, and Chicago (described in Chapter 2) that comparison can be a helpful means to acquire this new

knowledge. We saw that planners learn comparatively from symbolic, verbal, and live international models of sustainability to varying degrees. Sometimes, this comparative approach acted as an affirmation of existing ideas, while in other cases it was a catalyst for new ideas or inspired close to exact replication in a different context. I argue that the implementation success rate of sustainable urban planning solutions would improve if a more thorough understanding of potential barriers were readily acknowledged and understood during the reflection process. For example, none of the planners mentioned culture as a barrier they reflect upon – which is historically one of the key reasons for unsuccessful adaptations (Nasr & Volait, 2003; Roy, 2011; Sanyal, 2005).

The interview findings suggest that a structured reflection process should take place after planners experience live, verbal, or symbolic sustainability models. This reflection process should more fully explore the potential factors that influence international idea adaptation. For the planners we interviewed, only a few potential factors came easily to mind. We argue that factors that do not easily come to mind should also be reflected upon and analyzed. These typically are the factors that have the most potential impact on implementation and that are most likely to cause problems down the road – or to provide the best rationale for implementation.

In Papers 2 and 3 we further examined comparative planning using the specific example of Singapore's internationally acclaimed water management practices – specifically their high public acceptance of reclaimed water and successful water conservation strategies. The purpose of this research was to make international comparison more useful to planners by uncovering a means to identify key cultural and behavioral barriers replicating successful results in different contexts.

Chapter 3 identifies key behavioral factors that have influenced Singaporeans toward more sustainable action using a national mail survey (n=218). This survey utilized the social psychological framework for human behavior (Ajzen, 1991). Analysis of the data indicated that 74 percent of Singaporeans generally approve of NEWater, 16 percent are neutral, and 10 percent generally disapprove. *Attitude* toward drinking NEWater had the most influence over overall approval. The survey also indicated that of the 7 water conservation habits Singaporean Public Utilities Board specifically encourages residents to adopt, fixing water leaks promptly (80.8%) and monitoring water bills (80.3%) were the most widely adopted habits, while washing dishes under a filled sink (11.7%) was the least adopted. Residents reported finding television to be the most influential water conservation communication medium (63.6%). Path analysis showed that *perceived social norms* were the most influential element in trying to conserve water.

In Chapter 4, I dig deeper into the results of Chapter 3 by investigating how national culture has worked at the macro scale to affect the individual beliefs that formed reported water behaviors. The purpose of this exploratory study was to understand the key cultural barriers to translating Singapore's successful water planning and management practices. Hofstede's national culture framework was used to analyze the qualitative data (collected over a period of 9 months) that explicitly linked Singapore's water management and planning practices to their national culture dimensions.

I found that national culture impacts an individual's perception, reception - and ultimately their actions - to water management programs. For instance, we know from Azjen's behavioral framework (1991) that an individual's volitional actions are influenced by their attitude, their perception of social norms, and how much perceived control they have. What is less often

discussed, however, are the beliefs that shape these behavioral elements. In the case of Singapore, we found that their exhibited national culture dimensions were ideal for top-down initiated water management practices. High levels of power distance, uncertainty avoidance, collectivism, long-term orientation all work together to form individual beliefs that support the willingness to engage in water conservation behaviors and acceptance of reclaimed water for drinking.

5.5 Limitations of the Research

This dissertation research is subject to several limitations that should be acknowledged. First and foremost, as someone who is studying culture, it is important to highlight the fact that I have my own cultural biases that could affect how all data was collected and analyzed. The qualitative data collected in this study was generated from relatively low sample sizes and therefore generalizability to the larger population is not statistically possible. The survey data collected would have also benefited from a larger sample size. It excludes the younger portion of the Singapore population (e.g., teenagers) who are likely most heavily affected by the PUB's water education strategies due to their likely enrollment in postsecondary school. Furthermore, the interviews and survey instruments collected self-reported data that cannot be independently verified.

5.6 Implications for Planning Practice

Learning from other city's' successes and mistakes is key to helping urban planners implement much needed solutions to critical urban sustainability issues such as climate change, water scarcity, and urban sprawl. Planners ability to learn from each other gets easier everyday through websites, social media, and communication technologies. Our increased connectivity however, has also led to rapid changes in personal values and in professional practices, which

require a constant search for new knowledge as what was learned 10-20 years ago can now be irrelevant, if not obsolete.

This overall body of work helps identify factors that influence the success of international sustainability solution adaptation using the case of Singapore's water planning and management. Behavioral components of sustainable water programs (described in Chapter 3) are often only monitored by planners with polls on current public opinion and reported behavior, if at all. However, using the Theory of Planned behavior to tell us *why* public support and behavior exists is vital knowledge for planners who need to estimate which interventions were successful when many have been implemented simultaneously, and helps planners from other countries pinpoint which intervention would work best for them.

The results from Chapter 4 show us that culture is a basic, foundational building block of beliefs that form behavior, yet it is rarely explicitly understood by planning practitioners (shown in Chapter 2). Planners can more accurately predict an individual's behavioral response to an intervention with knowledge of their underlying culture – or comparing their national culture with the national culture of the best practice they are trying to learn from. We suggest key questions for planners to ask as they critically think if, and how, differences in cultural dimensions would act as barriers to the implementation of a targeted sustainable planning strategy. This information can help guide practitioners' thinking when attempting to adapt an international idea for their own local use and will assist them in taking advantage of the countless possibilities of international idea exchange.

5.7 Future Areas of Research

The logical next step in this research agenda is to further explore the interplay of culture with more explicit institutional factors (such as governance structures). The interactions between

variables are often too complex for the human mind to grasp, making complete contextualization of urban sustainability strategies exceedingly difficult (Belt, 2004) (see Figure 5.2).

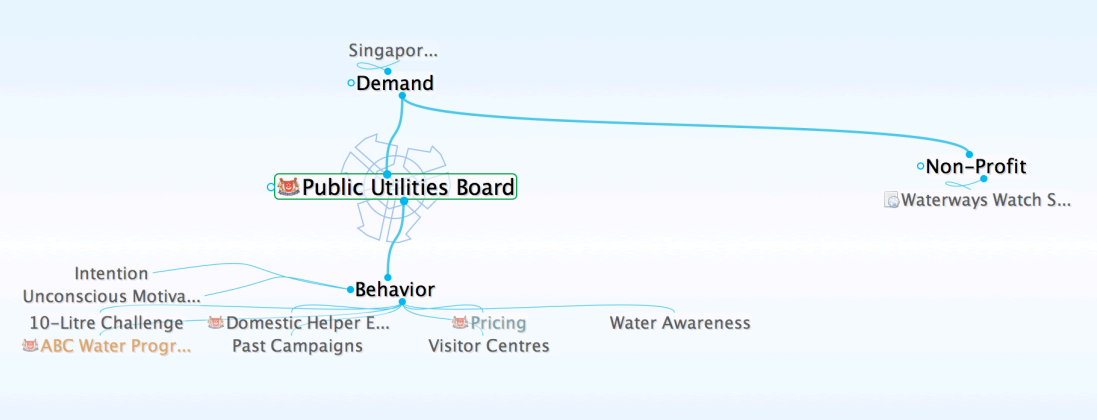


Figure 5.2: Modeling Singapore's water management practices.

The cultural and behavioral knowledge acquired in this study can be used to help develop a dynamic framework that addresses feedback loops, randomness, and time lags associated with the Singaporean water sustainability efforts, which can then be generalized for use by other countries. This framework could help manage complexity involved with these inherently dynamic variables by: 1) adding to a critical understanding of the role of culture in planning for more sustainable urban areas, 2) help urban planners better understand their specific cultural barriers to adopting sustainable practices, and 3) inform more successful exchange of experience between cities in different contexts.

APPENDIX A: INSTITUTIONAL REVIEW BOARD LETTERS OF APPROVAL

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Office of Vice Chancellor for Research

Institutional Review Board
528 East Green Street
Suite 203
Champaign, IL 61820

March 1, 2013

Brian Deal
Urban & Regional Planning
111 Temple Buell Hall
611 Lorado Taft Dr
M/C 619

RE: *Learning Transnationally: How Practicing Urban Planners Adapt Sustainability Ideas for Local Contexts*
IRB Protocol Number: 13623

Dear Dr. Deal:

Thank you for submitting the completed IRB application form for your project entitled *Learning Transnationally: How Practicing Urban Planners Adapt Sustainability Ideas for Local Contexts*. Your project was assigned Institutional Review Board (IRB) Protocol Number 13623 and reviewed. It has been determined that the research activities described in this application meet the criteria for exemption at 45CFR46.101(b)(2).

This determination of exemption only applies to the research study as submitted. **Exempt protocols are approved for a maximum of three years.** Please note that additional modifications to your project need to be submitted to the IRB for review and exemption determination or approval before the modifications are initiated.

We appreciate your conscientious adherence to the requirements of human subjects research. If you have any questions about the IRB process, or if you need assistance at any time, please feel free to contact me or the IRB Office, or visit our website at http://www.irb.illinois.edu.

Sincerely,

Dustin L. Yocum, Human Subjects Research Exempt Specialist, Institutional Review Board

c: Stephanie Timm

MIT Committee On the Use of Humans as Experimental Subjects

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
77 Massachusetts Avenue
Cambridge, Massachusetts 02139
Building E 25-143B
(617) 253-6787

To:	Joseph Ferreira 9-532
From:	Leigh Firn, Chair COUHES
Date:	04/01/2015
Committee Action:	Amendment to an Exempt Protocol
COUHES Protocol #:	1412006763
Study Title:	Conserving Water Through City-wide Behavior Changes: the Barriers and Benefits to Translating Successful Behavior-Change Campaigns to Different Cultures

The amendment to the above-referenced protocol has been APPROVED following expedited review by the Committee on the Use of Humans as Experimental Subjects (COUHES).

This approval covers the following change(s)/modification(s):

-The survey is revised to include additional questions about demographic information, personal behaviors and attitudes/opinions relating to water conservation and consumption.
-The survey cover letter and consent document are revised with minor vocabulary, grammar and content updates including revised time commitment.

If the research involves collaboration with another institution then the research cannot commence until COUHES receives written notification of approval from the collaborating institution's IRB.

It is the Principal Investigator's responsibility to obtain review and continued approval before the expiration date. Please allow sufficient time for continued approval. You may not continue any research activity beyond the expiration date without COUHES approval. Failure to receive approval for continuation before the expiration date will result in the automatic suspension of the approval of this protocol. Information collected following suspension is unapproved research and cannot be reported or published as research data. If you do not wish continued approval, please notify the Committee of the study termination.

Adverse Events: Any serious or unexpected adverse event must be reported to COUHES within 48 hours. All other adverse events should be reported in writing within 10 working days.

Amendments: Any changes to the protocol that impact human subjects, including changes in experimental design, equipment, personnel or funding, must be approved by COUHES before they can be initiated.

Prospecitve new study personnel must, where applicable, complete training in human subjects research and in the HIPAA Privacy Rule before participating in the study.

COUHES should be notified when your study is completed. You must maintain a research file for at least 3 years after completion of the study. This file should include all correspondence with COUHES, original signed consent forms, and study data.

INFORMED CONSENT TO PARTICIPATE IN WATER SURVEY

Research Description

A research project on water attributes is being conducted by Stephanie Timm, a PhD Candidate in the Department of Urban and Regional Planning at University of Illinois at Urbana-Champaign and Fulbright Fellow at the Singapore-MIT Alliance for Research and Technology. The purpose of the study is to examine water-related attitudes and behaviors in Singapore. This research will help increase our understanding of effective water conservation strategies.

Survey Description

You are being asked to take part in this study by completing the attached questionnaire. Your participation will take approximately seven minutes. Please be aware that you are not required to participate in this research and you may discontinue your participation at any time without penalty. You may also omit any items on the questionnaire(s) you prefer not to answer. Your responses will be provided anonymously to protect your privacy.

Confidentiality and Benefits

Your participation in this research will be kept completely confidential and will not be shared with any external party (landlord, etc.) Results of the study will be reported anonymously in aggregate. Possible outlets of distribution may include a published report, journal article or presentation. It is not expected that participation in this research will directly benefit you personally, but it will help us better understand how to improve water conservation in Singapore.

Contact Information

If you have questions about this project, you may contact Stephanie Timm (E: stimm2@illinois.edu) or the Principle Investigator, Brian Deal (deal@illinois.edu). If you have any questions about your rights as a participant in this study or any concerns or complaints, please contact either the

- University of Illinois Institutional Review Board at +1-217-333-2670 (collect calls will be accepted if you identify yourself as a research participant) or via email at irb@illinois.edu.

- Chairman of the Committee on the Use of Humans as Experimental Subjects, M.I.T., Room E25-143b, 77 Massachusetts Ave, Cambridge, MA 02139, phone +1-617-253-6787.

If you agree to voluntarily participate in this research project as described, please indicate your agreement by completing and returning the attached questionnaire. Please retain this consent cover form for your reference, and thank you for your participation in this research.

AMENDMENT APPROVED 1-APR-2015

Exemption Granted on 15-DEC-2014

Hello Neighbor!

You have an opportunity to participate in important research about your water resources in Singapore!

My name is Stephanie Timm and I am PhD Candidate at the University of Illinois in Regional Planning. I am conducting water-related research in Singapore that is supported by a merit-based U.S. Fulbright scholarship. The purpose of the study is to examine water strategies in Singapore.

As a randomly selected resident of Singapore, you have been given the opportunity to participate in this research study by completing the attached questionnaire. ***Your responses are greatly valued and are necessary for me to carry out my research objectives.***

This questionnaire should take no longer than 7 minutes of your time. This is an anonymous survey to protect your privacy, so please do not write your name or address on any of the response materials. You may choose to skip any questions you do not want to answer. Please return the completed questionnaire in the pre-stamped, addressed envelope by Friday, xxx.

Thank you for taking the time to read this letter, completing the questionnaire, and participating in this research project about your water use!

Sincerely,

Stephanie Timm

Doctoral Candidate in Regional Planning

Return Information:
Please return questionnaire no later than Friday, xx to:

SMART Headquarters
Attention: Stephanie Timm
1 Create Way, #10-01 CREATE Tower
Singapore 138602

ILLINOIS
UNIVERSITY OF ILLINOIS AT URBANA-CHAMPAIGN

FULBRIGHT

AMENDMENT APPROVED 1-APR-2015
Exemption Granted on 15-DEC-2014

Subject: IRB #15419 Minor Modifications
Date: Monday, March 23, 2015 at 10:36:51 PM Singapore Standard Time
From: St Clair, Rose Kathryn
To: Timm, Stephanie N, Deal, Brian M

Good morning,

Thank you for letting the IRB know about the modifications to your study. This message serves to supply UIUC IRB approval for the minor modifications being made to your exempt application IRB #15419, *Conserving Water Through City-wide Behavior Changes: the Barriers and Benefits to Translating Successful Behavior- Change Campaigns to Different Cultures*:

- Revised survey to include additional questions, including questions about demographic information, personal behaviors and attitudes/opinions relating to water conservation and consumption for a total of 32 questions.
- Revised survey cover letter with minor vocabulary, grammar, and content updates, including the revised time commitment (no more than 7 minutes vs. the previous 5 minutes).
- Revised survey consent document with minor vocabulary, grammar, and content updates, including the revised time commitment as well as the contact information for the MIT Chairman of the Committee on the Use of Humans as Experimental Subjects.

EXPIRATION DATE: December 10, 2017

None of the revisions have affected the risk determination for this study. Therefore, the study will remain approved under Exempt category 2. You are now free to continue your study with the above revisions.

Please save a copy of this email for your records as the IRB notice of approval of these modifications and that they have been documented satisfactorily. If you have any questions, please don't hesitate to ask.

Best,

Rose

Rose St. Clair, BA
Assistant Human Subjects Research Specialist | Office for the Protection of Research Subjects
University of Illinois at Urbana-Champaign
528 E. Green Street, Suite 203, MC-419 | Champaign, IL 61820
Direct: (217) 244-3254 | Fax: (217) 333-0405 |Email: rstclai2@illinois.edu
IRB Email: irb@illinois.edu | IRB Website: http://irb.illinois.edu/

From: Timm, Stephanie N
Sent: Monday, March 23, 2015 2:48 AM
To: St Clair, Rose Kathryn
Subject: Question IRB #15419

Hi Rose,

I have finalized the survey that was attached as a draft version to approved IRB exemption #15419 (attached). I added / reworded quite a few questions and therefore was wondering if this needed to be reviewed again? The research method, overarching questions, and process has not changed from what was previously submitted.

Cheers,
Stephanie

Stephanie Timm, MCRP, M.S., LEED AP BD+C

Doctoral Candidate in Regional Planning
Fulbright Fellow - Singapore
University of Illinois, Urbana-Champaign
Email: stimm2@illinois.edu
Website | Blog | LinkedIn

SMART
Singapore-MIT Alliance for Research and Technology

17 December 2014

Rose St. Clair
Assistant Human Subjects Research Specialist
Office for the Protection of Research Subjects
University of Illinois at Urbana-Champaign
528 East Green Street
Suite 203
Champaign, IL 61820

Dear Ms St. Clair

Conserving Water Through City-wide Behavior Changes: the Barriers and Benefits to Translating Successful Behavior-Change Campaigns to Different Cultures

Project activities dealing with human subjects, carried out by Massachusetts Institute of Technology (MIT) Principal Investigators at the Singapore-MIT Alliance for Research and Technology (SMART) Centre Interdisciplinary Research Groups (IRGs), come under the jurisdiction of MIT Committee On the Use of Humans as Experimental Subjects (COUHES).

The above-referenced protocol has undergone review and is considered exempt by the MIT Committee on the Use of Humans as Experimental Subjects pursuant to Federal regulations, 45 CFR Part 46.101 (b)(2).

SMART thus verifies that it is acceptable for this particular research activity, as submitted to the MIT COUHES, to be carried out in Singapore, provided all regulations set out by the MIT COUHES and SMART EHS Guidelines are adhered to.

For and on behalf of
Singapore-MIT Alliance for Research and Technology Centre

Dr John Desforge
Executive Director

MIT Committee On the Use of Humans as Experimental Subjects

MASSACHUSETTS INSTITUTE OF TECHNOLOGY
77 Massachusetts Avenue
Cambridge, Massachusetts 02139
Building E 25-143B
(617) 253-6787

To:	Joseph Ferreira 9-532
From:	Leigh Firn, Chair COUHES
Date:	12/15/2014
Committee Action:	**Exemption Granted**
Committee Action Date:	12/15/2014
COUHES Protocol #:	1412006763
Study Title:	Conserving Water Through City-wide Behavior Changes: the Barriers and Benefits to Translating Successful Behavior-Change Campaigns to Different Cultures

The above-referenced protocol is considered exempt after review by the Committee on the Use of Humans as Experimental Subjects pursuant to Federal regulations, 45 CFR Part 46.101(b)(2) .

This part of the federal regulations requires that the information be recorded by investigators in such a manner that subjects cannot be identified, directly or through identifiers linked to the subjects. It is necessary that the information obtained not be such that if disclosed outside the research, it could reasonably place the subjects at risk of criminal or civil liability, or be damaging to the subjects' financial standing, employability, or reputation.

If the research involves collaboration with another institution then the research cannot commence until COUHES receives written notification of approval from the collaborating institution's IRB.

Any changes to the protocol that impact human subjects, including changes in experimental design, equipment, personnel or funding, must be approved by COUHES before they can be initiated. You should retain a copy of this letter for your records.

UNIVERSITY OF ILLINOIS
AT URBANA-CHAMPAIGN

Office of the Vice Chancellor for Research

Office for the Protection of Research Subjects
528 East Green Street
Suite 203
Champaign, IL 61820

12/11/2014

Brian Deal
Urban & Regional Planning
611 Taft Dr
M/C 619

RE: *Conserving Water Through City-wide Behavior Changes: the Barriers and Benefits to Translating Successful Behavior- Change Campaigns to Different Cultures*
IRB Protocol Number: 15419

EXPIRATION DATE: December 10, 2017

Dear Dr. Deal:

Thank you for submitting the completed IRB application form for your project entitled *Conserving Water Through City-wide Behavior Changes: the Barriers and Benefits to Translating Successful Behavior-Change Campaigns to Different Cultures*. Your project was assigned Institutional Review Board (IRB) Protocol Number 15419 and reviewed. It has been determined that the research activities described in this application meet the criteria for exemption at 45CFR46.101(b)(2).

******Please note: supply IRB approval from the Singapore-MIT Alliance for Research and Technology once obtained.***

This determination of exemption only applies to the research study as submitted. Please note that additional modifications to your project need to be submitted to the IRB for review and exemption determination or approval before the modifications are initiated.

We appreciate your conscientious adherence to the requirements of human subjects research. If you have any questions about the IRB process, or if you need assistance at any time, please feel free to contact me at the OPRS office, or visit our website at http://www.irb.illinois.edu.

Sincerely,

Rose St. Clair, BA
Assistant Human Subjects Research Specialist, Office for the Protection of Research Subjects

c: Stephanie Timm

APPENDIX B: SURVEY INSTRUMENT

Final Questions…

26) It is important that I do my part to help achieve Singapore's national goal of water security.

False: 1 2 3 4 5 6 7 : *True*

27) I am a certain kind of person, and there's not much that can be done to really change that.

False: 1 2 3 4 5 6 7 : *True*

28) The amount of water I use everyday is something very basic about me that I can't change very much.

False: 1 2 3 4 5 6 7 : *True*

29) My household income is approximately $_____ Singapore Dollars per year.

30) My ethnicity is (check all that apply):

( ) Chinese ( ) Indonesian ( ) Thai ( ) European ( ) Other
( ) Indian ( ) Malaysian ( ) Filipino ( ) American

31) My permanent home is a:

( ) HDB ( ) Condo ( ) Landed Property ( ) Student Housing ( ) Other

32) How often do you engage in the following activities in or near Singapore's waterways / beaches? ***Circle the closest approximate frequency.***

Activity	Frequency			
Enjoy views of the ocean, a river, or a reservoir	Almost never	At least a couple times a year	At least once a month	At least once a week
Swimming / Wading	Almost never	At least a couple times a year	At least once a month	At least once a week
Fishing	Almost never	At least a couple times a year	At least once a month	At least once a week
Boating / Kayaking	Almost never	At least a couple times a year	At least once a month	At least once a week

Thank you for your participation in this survey!

Survey: YOUR Water Opinions and Behaviors

The following questions aim to understand your personal behaviors and opinions relating to various aspects of water conservation and consumption. Please be as honest as possible in all your responses – there are no 'right' answers!

1) How many years have you lived in Singapore? _____ years

2) My age is: _____years old

3) I am a:

( ) Singapore Citizen ( ) Singapore Permanent Resident ( ) Singapore Work Pass Holder ( ) Other

4) My sex is: ( ) Male ( ) Female

5) Do you pay for your water bill directly?

( ) Yes ( ) No (e.g., the cost is included in your rent)

Water Conservation

6) Which of these 7 habits do you regularly engage in at home? ***Check all that apply.***

- ☐ I monitor my water bill
- ☐ I wash dishes in a filled sink (instead of under a running tap)
- ☐ I fill my washing machine on a full load
- ☐ I collect rinse water from my washing machine to use for washing floors or flushing the toilet
- ☐ I repair water leaks promptly when I see them
- ☐ Use a half toilet flush for liquid waste
- ☐ I take 5 minute showers (or less)

Note: Please be as honest with your response to this question. Don't worry – most people do not engage in all of them!)

7) Have any of the following influenced you to reduce your water use? *Check all that apply.*

- ☐ Newspaper or Magazines
- ☐ Television
- ☐ Websites
- ☐ Social Media (youtube, twitter, facebook, etc.)
- ☐ Water Wally Messages
- ☐ Posters or public advertisements
- ☐ Friends or Family Members
- ☐ Other _____

The following series of questions aim to understand how you would feel if you had to reduce the amount of water you use by **10 litres**. Please circle the number that best describes your honest personal opinions. ***For reference, please note you can save 9 litres of water by reducing shower time by 1 minute, 14 litres by washing dishes in a filled sink instead of running tap, or 11 litres by turning off the tap while you brush your teeth.***

8) Reducing the amount of water I use by 10-litres per day (on average) would be:

Bad: 1 2 3 4 5 6 7 : *Good*

Pleasant: 1 2 3 4 5 6 7 : *Unpleasant*

10) Most people who are important to me would approve of me reducing the amount of water I use by 10-litres per day (on average):

Agree: 1 2 3 4 5 6 7 : *Disagree*

11) Most people like me are trying to reduce the amount of water they use by around 10-litres per day (on average)

Unlikely: 1 2 3 4 5 6 7 : *Likely*

12) I am confident that I could reduce the amount of water I use by 10-litres per day (on average)

True: 1 2 3 4 5 6 7 : *False*

13) Reducing the amount of water I use by 10-litres per day (on average) is up to me

Disagree: 1 2 3 4 5 6 7 : *Agree*

14) I intend to reduce the amount of water I use by 10-litres per day (on average)

Likely: 1 2 3 4 5 6 7 : *Unlikely*

15) Over the past three months, I have tried to reduce the amount of water I use at home:

False: 1 2 3 4 5 6 7 : *True*

Water Technology

These questions relate to NEWater, *Singapore's water technology that purifies used water (from taps, showers, toilets, etc.) and is then put into the city reservoirs that are treated for drinking water*. Please circle the number that best describes your honest personal opinions.

16) How familiar are you with Singapore's reclaimed water named NEWater?

I have never heard about it before: 1 2 3 4 5 6 7 : *I am familiar*

17) Drinking NEWater is:

Bad: 1 2 3 4 5 6 7 : *Good*

Pleasant: 1 2 3 4 5 6 7 : *Unpleasant*

19) Most people who are important to me approve of drinking NEWater:

Agree: 1 2 3 4 5 6 7 : *Disagree*

20) Most people like me approve of drinking NEWater

Unlikely: 1 2 3 4 5 6 7 : *Likely*

21) Drinking NEWater is up to me

True: 1 2 3 4 5 6 7 : *False*

22) I intend to drink NEWater in the next 3 months

Likely: 1 2 3 4 5 6 7 : *Unlikely*

23) Over the past three months, I have drank NEWater

False: 1 2 3 4 5 6 7 : *True*

24) In general, I approve of NEWater

False: 1 2 3 4 5 6 7 : *True*

25) How have you learned about NEWater? (check all that apply)

- ☐ Television
- ☐ Newspapers or Magazines
- ☐ Websites
- ☐ Water Wally Messages
- ☐ Social Media (Youtube, twitter, facebook, etc.)
- ☐ Friends or Family Members
- ☐ Posters or public advertisements
- ☐ NEWater Visitor Centre

APPENDIX C: NATIONAL CULTURE COMPARISON

TABLE 1: National Dimensions of Culture (adapted directly from Hofstede, 2014)

	Singapore	Sweden	United States (for reference)
Power Distance *This dimension deals with the fact that all individuals in societies are not equal – it expresses the attitude of the culture towards these inequalities amongst us. Power distance is defined as the extent to which the less powerful members of institutions and organisations within a country expect and accept that power is distributed unequally.*	Singapore scores high on this dimension (**score of 74**). With a Confucian background (the Chinese) they normally have a syncretic approach to religion, which is also the dominant approach in Singapore. One of the key principles of Confucian teaching is the stability of society, which is based on unequal relationships between people. Confucius distinguished five basic relationships: ruler-subject; father-son; older brother-younger brother; husband-wife; and senior friend-junior friend. These relationships are based on mutual and complementary obligations. Here we can see the high PDI as a consequence. Power is centralized and managers rely on their bosses and on rules. Employees expect to be told what to do. Control is expected and attitude towards managers is formal. Communication is indirect and the information flow is selective. We can see the high PDI also in the government's defined five "shared values": 1) Nation before community and society above self.	Sweden scores low on this dimension (**score of 31**) which means that the following characterises the Swedish style: Being independent, hierarchy for convenience only, equal rights, superiors accessible, coaching leader, management facilitates and empowers. Power is decentralized and managers count on the experience of their team members. Employees expect to be consulted. Control is disliked and attitude towards managers are informal and on first name basis. Communication is direct and participative.	The fairly low score on Power Distance (**40**) in combination with one of the most individualistic (**91**) cultures in the world reflects itself in the following: • The American premise of "liberty and justice for all." This is evidenced by an explicit emphasis on equal rights in all aspects of American society and government. • Within American organisations, hierarchy is established for convenience, superiors are accessible and managers rely on individual employees and teams for their expertise. • Both managers and employees expect to be consulted and information is shared frequently. At the same time, communication is informal, direct and participative to a degree. • The society is loosely-knit in which the expectation is that people look after themselves and their immediate families only and should not rely (too much) on authorities for support. • There is also a high degree of geographical mobility in the United States. Americans are the best joiners in the world; however it is often difficult, especially among men, to develop deep friendships. • Americans are accustomed to doing business or interacting with people they don't know well. Consequently, Americans are not shy about approaching their prospective counterparts in order to obtain or seek information. In the business world, employees are expected to be self-reliant and display initiative. Also, within the exchange-based world of work we see that hiring, promotion and decisions are based on merit or evidence of what one has done or can do.
Individualism *The fundamental issue addressed by this dimension is the degree of interdependence a society maintains among its members. It has to do with whether people's self-image is defined in terms of "I" or "We".* *In Individualist societies people are supposed to look after themselves and their direct family only. In Collectivist societies people belong to 'in groups' that take care of them in exchange for loyalty.*	Singapore, with a **score of 20** is a collectivistic society. This means that the "We" is important, people belong to in-groups (families, clans or organisations) who look after each other in exchange for loyalty. Here we can also see the second key principle of the Confucian teaching: The family is the prototype of all social organizations. A person is not primarily an individual; rather, he or she is a member of a family. Children should learn to restrain themselves, to overcome their individuality so as to maintain the harmony in the family. Harmony is found when everybody saves face in the sense of dignity, self-respect, and prestige. Social relations should be conducted in such a way that everybody's face is saved. Paying respect to someone is called giving face. Communication is indirect and the harmony of the group has to be maintained, open conflicts are avoided. A "yes" doesn't necessarily mean "yes"; politeness takes precedence over honest feedback. The relationship has a moral basis and this always has priority over task fulfilment. The face of others has to be respected and especially as a manager calmness and respectability is very important.	Sweden, with a **score of 71** is an Individualistic society. This means there is a high preference for a loosely-knit social framework in which individuals are expected to take care of themselves and their immediate families only. In individualistic societies offence causes guilt and a loss of self-esteem, the employer/employee relationship is a contract based on mutual advantage, hiring and promotion decisions are supposed to be based on merit only, management is the management of individuals.	
Masculinity *A high score (masculine) on this dimension indicates that the society will be driven by competition, achievement and success, with success being defined by the winner / best in field – a value system that starts in school and continues throughout organisational behaviour.* *A low score (feminine) on the dimension means that the dominant values in society are caring for others and quality of life. A feminine society is one where quality of life is the sign of success and standing out from the crowd is not admirable. The fundamental issue here is what motivates people, wanting to be the best (masculine) or liking what you do (feminine).*	Singapore **scores 48** and is in the "middle" of the scale but more on the feminine side. This means that the softer aspects of culture such as leveling with others, consensus, sympathy for the underdog are valued and encouraged. Being modest and humble is seen as very important; thus showing that one knows it all and therefore has come to educate the counterparts is not liked. Conflicts are avoided in private and work life and consensus at the end is important. During discussions being cautious is important, not to being too persistent. We can also see the feminism in the governments defined five "shared values" again: 3) Community support and respect for the individual.	Sweden **scores 5** on this dimension and is therefore a feminine society. In feminine countries it is important to keep the life/work balance and you make sure that all are included. An effective manager is supportive to his/her people, and decision making is achieved through involvement. Managers strive for consensus and people value equality, solidarity and quality in their working lives. Conflicts are resolved by compromise and negotiation and Swedes are known for their long discussions until consensus has been reached. Incentives such as free time and flexible work hours and place are favoured. The whole culture is based around 'lagom', which means something like not too much, not too little, not too noticeable, everything in moderation. Lagom ensures that everybody has enough and nobody goes without. Lagom is enforced in society by "Jante Law" which should keep people "in place" at all times. It is a fictional law and a Scandinavian concept which counsels people not to boast or try to lift themselves above others.	The score of the US on Masculinity is high at **62**, and this can be seen in the typical American behavioral patterns. This can be explained by the the combination of a high Masculinity drive together with the most individualistic drive in the world. In other words, Americans, so to speak, all show their masculine drive individually. The British, however, have the same culture in this respect. The question, therefore, should be: is the same drive not normally to be seen on the surface? This difference is a reflection of the higher score of the US on Uncertainty Avoidance than of the UK. In other words, in both societies we find the same drive, but Americans show it up-front whereas the British will take you by surprise. This American combination reflects itself in the following: • Behavior in school, work, and play are based on the shared values that people should "strive to be the best they can be" and that "the winner takes all". As a result, Americans will tend to display and talk freely about their "successes" and achievements in life. Being successful per se is not the great motivator in American society, but being able to show one's success • Many American assessment systems are based on precise target setting, by which American employees can show how well a job they did. • There exists a "can-do" mentality which creates a lot of dynamism in the society, as it is believed that there is always the possibility to do things in a better way • Typically, Americans "live to work" so that they can obtain monetary rewards and as a consequence attain higher status based on how good one can be. Many white collar workers will move to a more fancy neighborhood after each and every substantial promotion. • It is believed that a certain degree of conflict will bring out the best of people, as it is the goal to be "the winner". As a consequence, we see a lot of polarisation and court cases. This mentality nowadays undermines the