

Maximizing Return on Research Investment: The Role of Repeatable Sample Frame Development Processes

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Introduction

Maximizing return on research investments is a key tenet in ensuring the prudent use of ratepayer funds. Nevertheless, research studies and program evaluations are continually conducted in a manner where primary data collection efforts, including sampling design and sample frame development, are repeated study-by-study—even when examining the same population. This is costly and inefficient, especially when dealing with large, ill-defined populations. Further, some populations are difficult to define and the development of a complete, accurate, and up-to-date sample frame is a complex undertaking due, among other things, to the availability, quality, and completeness of the population data. This makes comparability across studies questionable.

Repeatable sample frame development processes are essential to upholding the maximization of return on research investment. These types of studies, where steps undertaken are clearly delineated and unit of analyses are clearly defined, enable: (1) true comparability among existing and future research studies, (2) the potential for more valid and reliable leveraging of past efforts to streamline future research, and (3) the refinement of research design and accurate, lower-cost budgeting. This poster presents our efforts to develop a reliable and valid sample frame for a population of significant interest to the energy efficiency field—HVAC contractors and technicians in California.

Approach

There has been and continues to be substantial interest in better understanding the California HVAC industry as it remains one of the most promising industries in which significant gains can be made in terms of energy efficiency. However, this industry has always been difficult to study because it is large, ill defined, and constantly in flux. In 2012, Energy Market Innovations (EMI) was tasked by the California utilities to conduct the California HVAC Contractor and Technician Behavior Study. This study was aimed at gaining a better understanding of field behaviors and practices of HVAC contractors and technicians. In conjunction with this behavior research, EMI was also tasked with developing “a sampling frame and a repeatable sampling frame definition process that best defines and characterizes the true population of California HVAC contractors” to determine valid and reliable estimates of several key rates that, to-date, have been quite elusive. These include:

- The incidence of contractors who are actively working in the HVAC industry
- The incidence of contractors who offer installation, maintenance, and/or service to their customers

- The incidence of contractors working in the residential, small commercial, and large commercial markets

Methods

This research was conducted as a two-phase study, where the above rates were determined from brief telephone surveys (the Incidence Study), where we also collected email addresses in order to conduct follow-up web surveys to explore the behaviors and practices (the Behavior Study—not discussed here).

The sample frame for the telephone surveys was developed from the list of contractors contained in the California Contractors State License Board (CSLB) active C-20 (Warm-Air Heating, Ventilating and Air-Conditioning Contractor) licensee list, obtained on December 17, 2011 from the CSLB. The C-20 database was considered the appropriate starting point for developing the sample frame because HVAC contractors are required to be licensed to conduct business in California. The greatest challenge of using this list was that individuals hold licenses, not firms, and many firms had multiple licenses associated with it. Since the contractor firm was the unit of analysis for this study, significant effort went into processing the file to ensure the “contractors” only showed up once in the final sample frame. The original file of 10,806 C-20 licenses was de-duped by company address and phone number and the resulting file of 10,486 cases defined the sample frame of California HVAC contractors for the telephone survey. EMI completed 496 total surveys to determine incidence rates.

Findings

In this poster we address: (1) the specific steps undertaken to develop the sampling frame, which defines the repeatable sampling frame definition process and a subsequent incidence study that best defines and characterizes the true population of California HVAC contractors, (2) the challenges encountered in this process, (3) the lessons learned through this process, and (4) the benefits of the research for not only understanding HVAC contractor and technician maintenance and installation behavior, but how this work maximizes the return on research investment for future HVAC contractor and technician studies in California. Some key findings are:

- Up-to-date population data is a key along with a clear understanding of the content of the data, and an understanding of what the limitations are with regards to what the data contains—and what it does not contain!
- A clear definition and understanding of the unit of analysis governs all sample frame development steps, and also affects how useful the sample frame is for future work.
- Automating sample processing steps with text recognition algorithms would be time-saving and offer the potential to reduce data processing errors
- Overall, a well-designed and processed sample frame—or a repeatable process for developing the sample frame—can be used for multiple studies, which offers numerous benefits, not limited to the following:
 - Generalizability and comparability of results across multiple research efforts
 - Significant cost efficiencies in conducting the research
 - Significant time efficiencies associated with reducing the number of tasks necessary to conduct research studies.