Smart Grid Acceptance in the United States: A sociological framework evaluation

By Sri Dattha Palwai
Candidate for Master of Science in Industrial Engineering

Abstract

Consumers play a vital role as decision makers in technology adoption. Successful diffusion of new inventions or system upgrades heavily rely on consumer acceptance. Advanced Metering Infrastructure (AMI), generally referred to as smart meters, are the end-user visible portion of the “Smart Grid” technology. End users have largely opposed smart meter adoption by associating smart meters to perceptions of degraded privacy, increased cost, illness, and other factors created by early users. However, United States Government emphasizes smart grid as a tool for resilience improvement in energy systems management. Presidential Policy Directive 21 states that improvement in energy sector provides an “enabling function” across 15 other critical infrastructure sectors (for example, healthcare, information technology and transportation systems to name a few) identified by Department of Homeland Security.

The social rejection of Smart Meters is posing a significant threat to rollout of Smart Grid implementation project estimated at United States utilities’ $29 billion effort. This research study adopts the Unified Theory of Acceptance and Use of Technology (UTAUT), a prominent model in technology acceptance, to investigate the factors that influence consumers’ acceptance and use of smart grid technology in achieving energy system resilience. A survey study was analyzed in evaluating UTAUT for assessment of validity, reliability and correlation using Cronbach’s alpha, factor and regression analyses. The results supported all hypotheses of modified UTAUT developed in this research for Smart Grid acceptance context, with non-significant moderating influences of age, and experience. The results from this study contribute recommendations for utilities and policy makers to develop appropriate environment that can have a significant impact on consumers’ acceptance and use of Smart Meters.

Thursday, May 28, 2015
8:00 am, Rogers 226

Oregon State University
College of Engineering
School of Mechanical, Industrial, and Manufacturing Engineering