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Fulfillment of Higher-order Psychological Needs through Technology: The case of Smart Thermostats

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Continued advances in information and communication technologies have led to the continuous introduction of different types of smart home technologies (SHTs). SHTs span a very broad range of innovative products that can provide security and access controls, home healthcare, smart appliances, as well as heating and cooling systems, among others. Industry estimates suggest that smart home technologies will represent a $137 billion market opportunity by 2023 (Markets and Markets 2017). Despite the practical importance of this market, there has been relatively little academic research on the factors that influence SHT adoption. Smart thermostats are an important type of device in the smart home ecosystem because they promise to simultaneously accomplish the dual goals of 1) improving the home experience and 2) reducing energy expenditures through optimization of the home heating and cooling systems. The commercial market for smart thermostats is expected to reach $5.9 billion by 2020 (Markets and Markets 2017).

Smart thermostats offer a unique combination of potential functional, experiential and esthetic benefits to prospective owners. This breadth of benefits is unlikely to be captured by traditional utility-focused technology adoption models (Venkatesh et al. 2016), but little is known about factors that may affect the adoption of smart thermostats and similar technological artifacts. To address this knowledge gap in our knowledge, and in recognition of recent calls for context-specific theory development (Hong et al. 2013), we conduct a three-stage study. Our research progresses through 1) the elicitation of salient perceived benefits and concerns associated with smart thermostats, 2) exploratory factor analysis (EFA) of the elicited perceived benefits and concerns, and 3) confirmatory factor analysis (CFA) within a broader nomological network, wherein we evaluate the effects of the emergent constructs on the smart thermostat adoption intention.

We find that performance expectancy (*perceived usefulness*), which is traditionally emphasized in information technology adoption research (Venkatesh et al. 2016), has a relatively minor effect in our context and effort expectancy (*perceived ease of use*) has no effect at all. We identified a new construct, which we term t*echno-coolness*, as the key predictor of the smart thermostat adoption intention. *Techno-coolness* is a multidimensional construct that captures the capacity of innovative technology to make the person's home appear more modern and to make the person using the technology appear more technologically savvy and advanced. We also find that *compatibility concerns*, which are a relatively neglected construct in information systems, also play a key role in influencing the smart thermostat adoption intention reflecting interoperability as a core concern in the smart home ecosystem.

References

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