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The Innovation issue

Eight trends shaping our industry's future.

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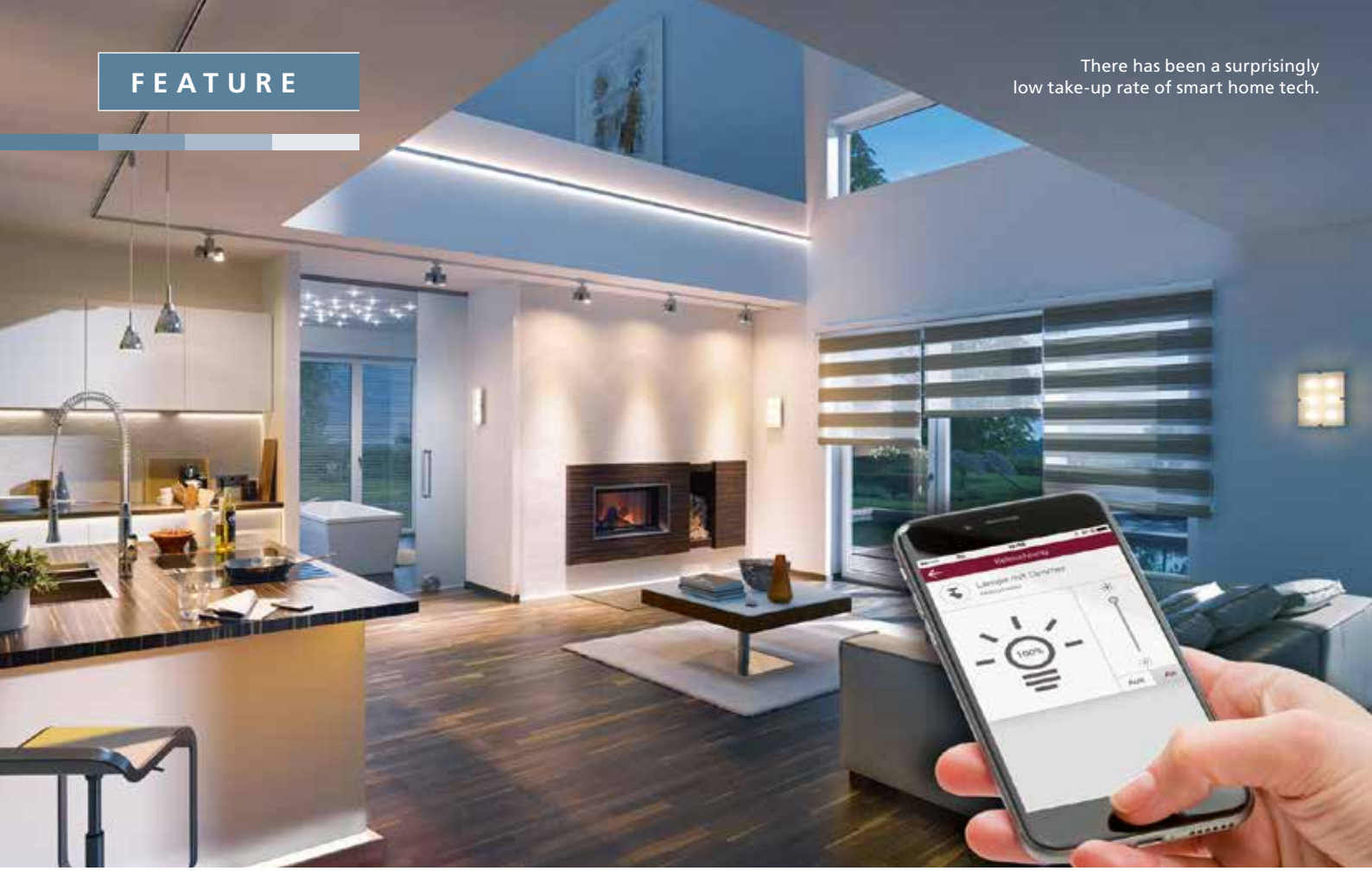

There has been a surprisingly low take-up rate of smart home tech.

Utopia, Dystopia, or some place between?

Consumer interest in smart homes hasn't lived up to the hype. Dr Yolande Strengers and Dr Larissa Nicholls from RMIT University's Centre for Urban Research explore why.

There were eighty million smart home devices delivered worldwide in 2016, a 64 per cent increase from 2015. Despite these impressive numbers, growth and consumer interest is consistently less than expected.

Slow uptake is commonly attributed to high cost, lack of awareness of the value and benefit of smart home technology, privacy concerns, and confusion about how to use smart devices in the home. Even so, the media is constantly reporting on the coming "smart home revolution".

With so much resting on this vision for future domesticity, it is timely to ask what the point of the smart home is, why we might want to live in one, and whether it can or will save energy.

WHAT IS A SMART HOME?

You would be forgiven for being confused what a smart home is. After analysing more than 270 online and magazine articles about the smart home, we found the term being used in a dizzying array of contexts – from Tesla homes with battery packs and electric cars, through to connected lightbulbs you can buy from Harvey Norman or Bunnings. However, despite the diversity of applications for smart technology and the plethora of devices now calling themselves "smart", the ultimate goal of the smart home is to efficiently improve and enhance our lifestyles.

Importantly, it's not all about saving energy, as many believe – particularly once you step outside the bounds of the energy industry. Other key qualities of the smart home include simplicity and convenience, new aesthetic experiences enabled through improved comfort and mood lighting, peace-of-mind through enhanced security and privacy, highly customised settings, and the ability to manage and control the home from anywhere in the world.

Lutron home automation has coined the term "pleasance" to describe how the smart home vision can deliver a "feeling" involving "comfort, romance and peace of mind", which is realised through networked or connected technologies. These include self-learning thermostats that deliver improved comfort, security systems that send live-stream video to your smartphone, or fridges that remember to order the milk.

While the ultimate ambition is to create homes with integrated systems that take care of themselves and their occupants, most current iterations still involve considerable user involvement and control.

PLEASANCE OR IMMINENT DISASTER?

Although smart home advocates tout the benefits of pleasance in the smart home, the popular media has been busy publishing amusing stories about its funny and disturbing aspects.

Type "cat roomba riding" into Google and you'll be entertained by video footage of cats riding robotic vacuum cleaners. Conversely, googling "robot hair attack" will bring up a cluster of stories about a woman who was "attacked" by a robotic vacuum cleaner when she fell asleep on the floor.

Similarly, while internet-enabled baby monitors are touted as giving parents peace of mind about their sleeping baby, they are also accused of leaving families vulnerable to hacking, spying, burglars and insults.

The very helpful voice-activated Amazon Alexa "home assistant" was also in the news recently for ordering a dollhouse when a small child attempted to play "dollhouse" with the device. When the incident was reported on TV in the US, the statement "Alexa, order me a dollhouse" was broadcast into homes, and Alexas around the country ordered dollhouses due to a default setting enabling voice-command purchasing.

Though amusing and alarming, these stories make it difficult to separate the hype from the reality of living with smart home devices.

Our ongoing research with householders living with smart home technologies suggests that the reality is somewhat more mundane. Smart devices bring new conveniences and luxuries into the home, but like all technology they also require new forms of "digital housework" to integrate, install, upgrade, update and troubleshoot various devices[1].

CAN SMART HOMES SAVE YOU ENERGY?

A common promoted feature of smart homes is their ability to save energy, through more efficient devices, storage systems and on-site renewable power generation, or by automatically turning things off when not in use.

For example, independent studies of a particular thermostat show that this device averages 10–12 per cent energy savings on heating and 15 per cent savings on cooling[2]. It achieves these savings by learning when to adjust the set-point when people aren't home or are sleeping, thus maintaining comfort and saving energy. Another thermostat tracks householders' whereabouts, and can be set to turn on or off when householders pass a pre-set distance from the house.

However, these energy improvements sit alongside the broader pleasance vision for smart homes, which promises to enhance everyday life by providing electrically enabled and networked comfort, cleanliness, convenience, entertainment and security.

In the case of smart thermostats, these devices prioritise the use of mechanical heating and cooling systems to maintain comfort when the home is occupied. Other common "low-energy" and culturally specific methods of staying warm or cool, such as putting on more clothes or going for a swim, may be overlooked as smart thermostats "recommend" enhanced thermostatically controlled environments in homes around the world.

Additionally, some smart thermostats make it easier to pre-cool or -heat the home. As one article suggests, "If you want the air con roaring before you come home ... use the app to turn it on before you get home". Thus, smart thermostats offer new ways of using energy, as well as saving it.

There are other technologies perhaps more suited to the Australian climate and culture that could minimise mechanical heating and cooling in the smart home. For example, automated windows and blinds monitor temperatures and wind direction to let breezes and sunshine in (or keep them out).

However, these devices are commonly promoted as ways to enhance security and ambiance by, for example, opening and lowering shades to create a lived-in look when occupants are away. If involved in "new uses" such as deterring burglars rather than helping minimise mechanical cooling, these devices could also result in increased energy consumption in the home.

Another area of contention is the energy consumption associated with internet-enabled devices in the smart home. Although these figures are vague, it's clear that the smart home relies on the transmission of data over the internet and is making greater use of streamed media content, which are key components of the growing energy used by the internet.

For these reasons, it's important to be cautious about energy-saving claims made about smart homes and specific devices. ▮

LOOKING FOR PEOPLE WHO LIVE IN SMART HOMES

The authors of this article are interested in talking to people who live in smart homes or use smart home devices. If this sounds like you, please get in touch.

You can contact lead researcher Dr Yolande Strengers on yolande.strengers@rmit.edu.au or 03 9925 1916.

1 Kennedy, J, Nansen, B, Arnold, M, Wilken, R & Gibbs, M 2015, 'Digital housekeepers and domestic expertise in the networked home', Convergence, vol. 21, no. 4, pp. 408-22.

2 D York, S Nadel, E Rogers, R Cluett, S Kwatra, H Sachs, J Amann and M Kelly, 2015. *New Horizons for Energy Efficiency: Major Opportunities to Reach Higher Electricity Savings by 2030*. American Council for an Energy-Efficient Economy.