IOT IDEA BOOK

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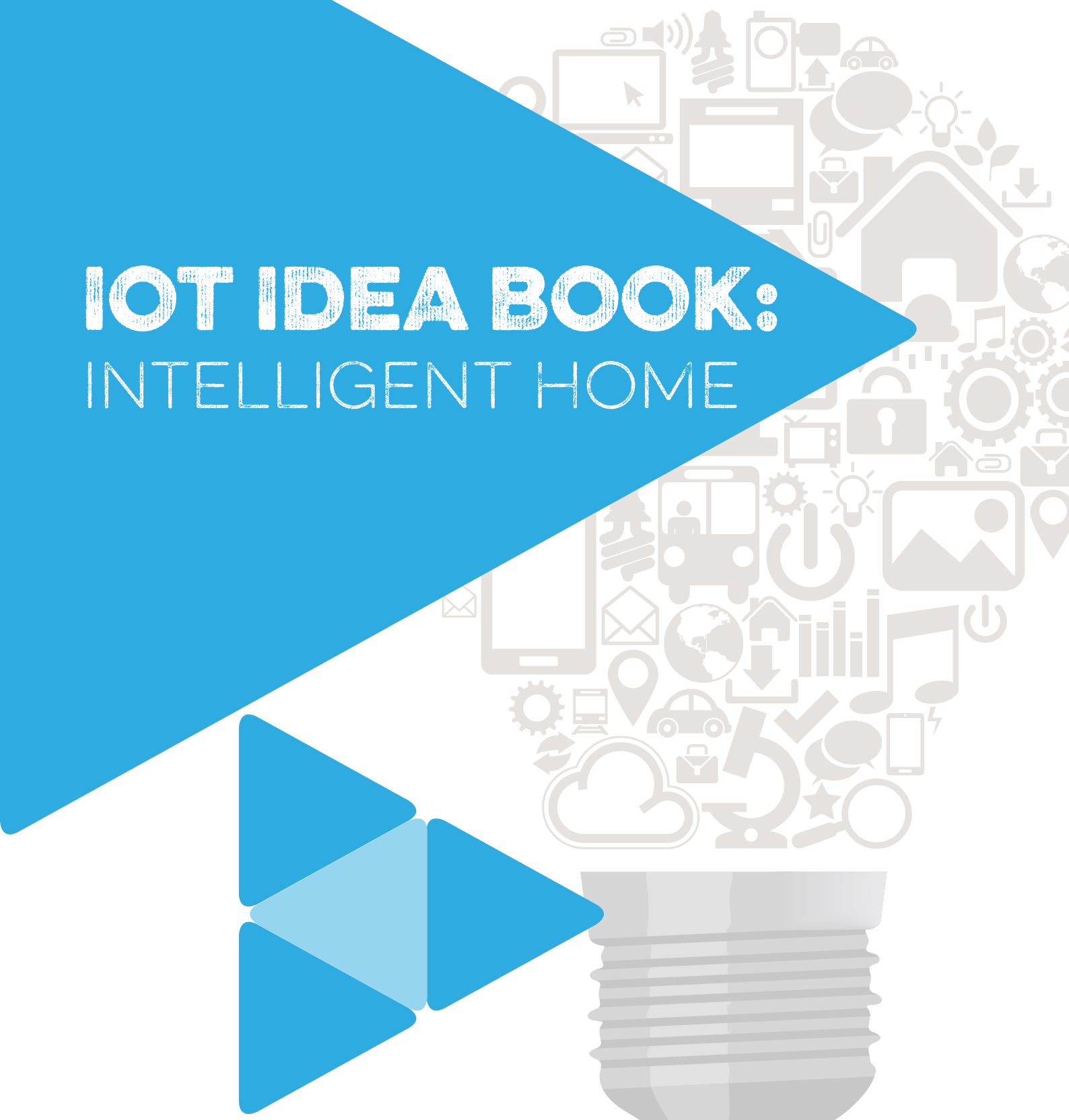
IOT IDEA BOOK:
INTELLIGENT HOME



INTELLIGENT HOME

SAFE, SECURE, SUITABLE AND SUSTAINABLE LIVING FOR EVERYONE

Home is a place where we spend quality time with our family and relax after a hectic day. Today, homes not only fulfil our basic need – shelter. We like our home to 'understand' and 'serve' us better by providing a decent living condition to us – a safe, secure and suitable living environment. With the advancement of Internet of Things (IoT), our home can become more aware, more adaptive and more responsive to its residents.

With IoT, homes will be more personalised and will elevate our living quality and experience, which also means people will become more dependent on their homes and home systems. Home life will become more engaging, more convenient, and more fun; and home will become the preferred location for core activities such as work, education and entertainment.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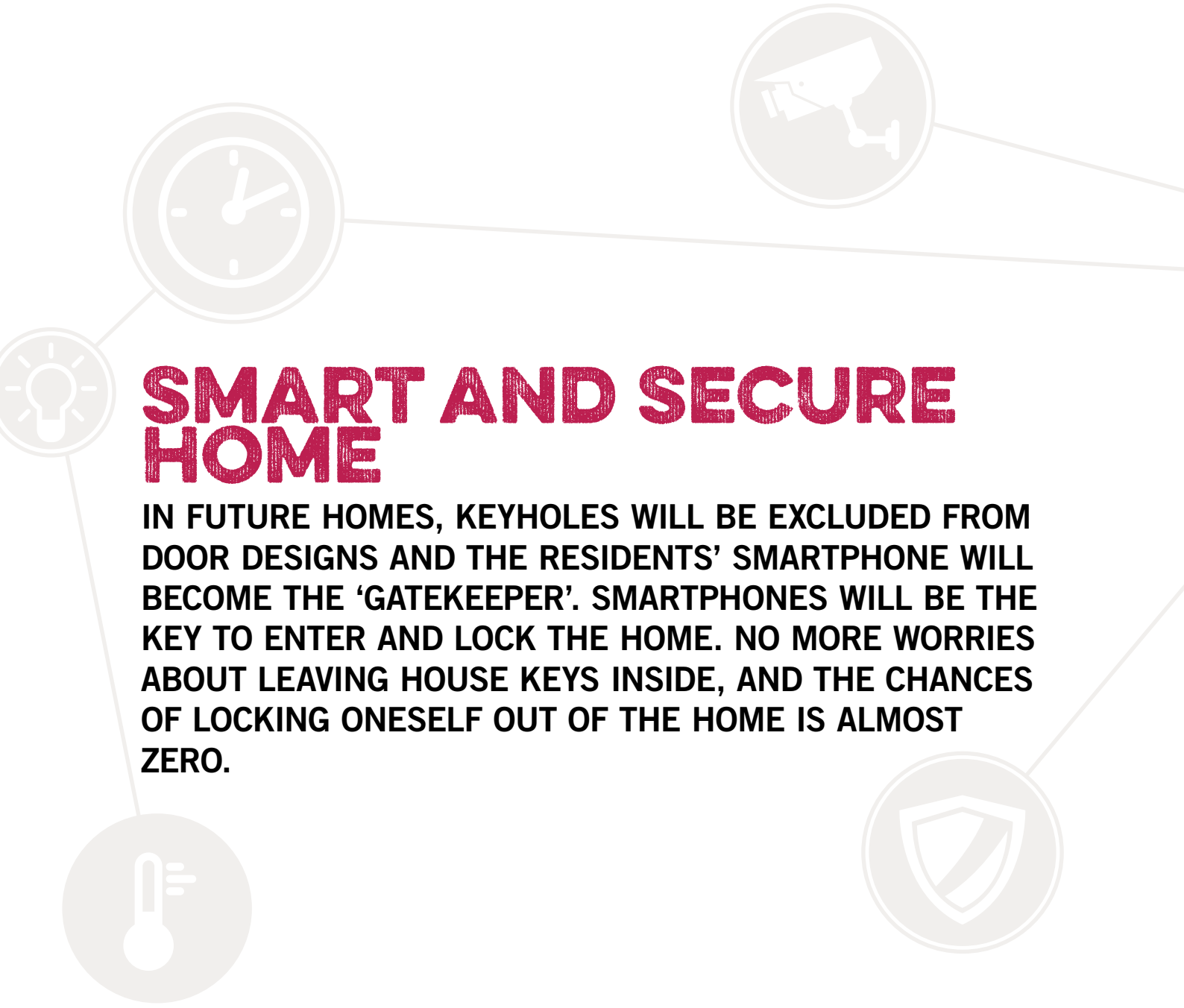
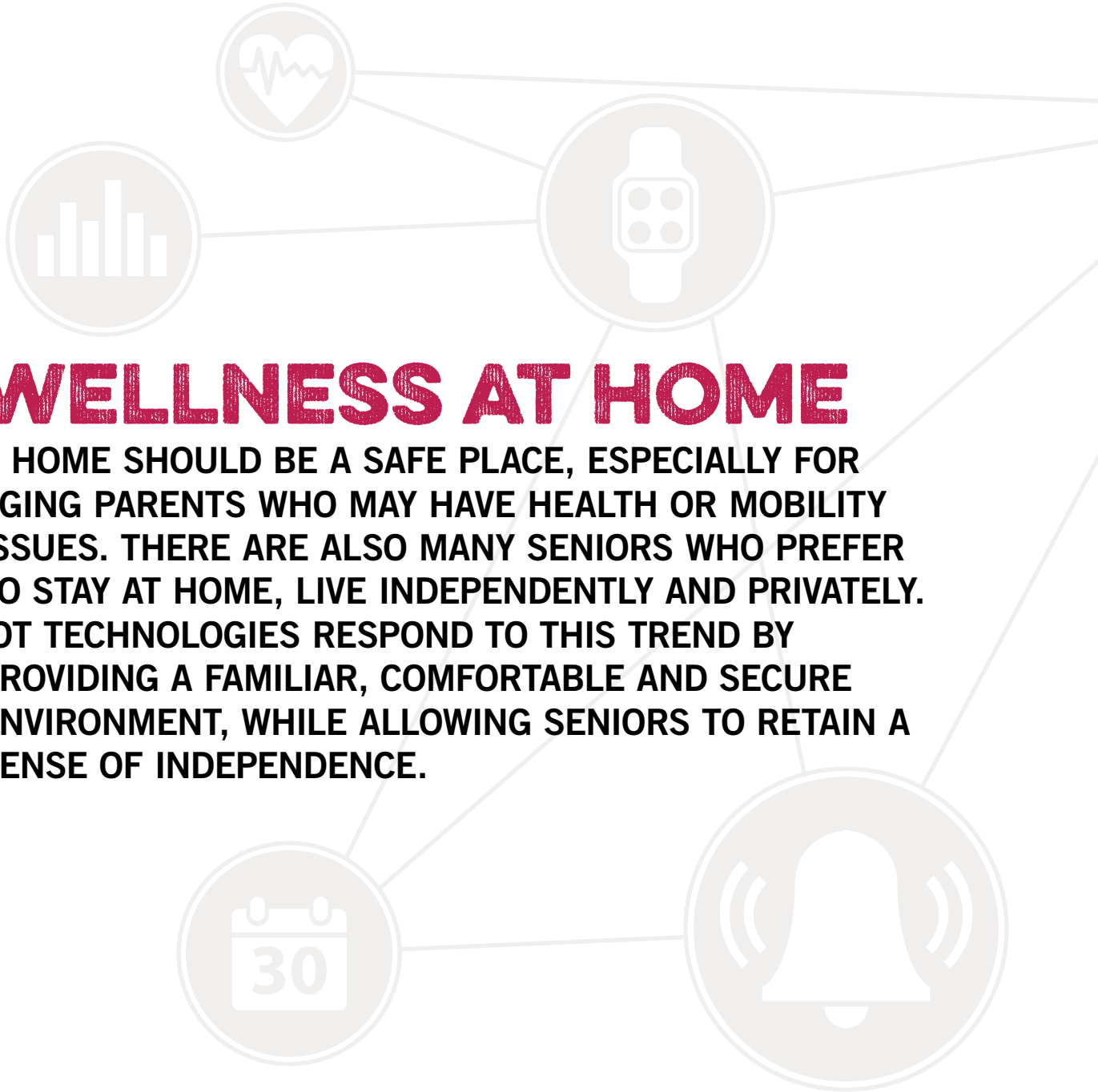


SMART AND SECURE HOME

IN FUTURE HOMES, KEYHOLES WILL BE EXCLUDED FROM DOOR DESIGNS AND THE RESIDENTS' SMARTPHONE WILL BECOME THE 'GATEKEEPER'. SMARTPHONES WILL BE THE KEY TO ENTER AND LOCK THE HOME. NO MORE WORRIES ABOUT LEAVING HOUSE KEYS INSIDE, AND THE CHANCES OF LOCKING ONESELF OUT OF THE HOME IS ALMOST ZERO.

Starting from the time one parks the car at a designated parking space, the home will start to initiate the authentication and authorisation access process to secure it from possible break-ins or unauthorised entries. When one reaches the main door of the home, the smart door will communicate with the smartphone and verify the identity. Upon verification, the door will unlock and the home will welcome and configure the internal home setting in accordance to one's profile of the day – ranging from lighting, temperature and entertainment.

If any unauthorised person attempts to enter the house from different access points, a security alarm will be triggered and messages will be sent to the security control room and the house owner. No one will be allowed to enter the home unless authorised.



WELLNESS AT HOME

A HOME SHOULD BE A SAFE PLACE, ESPECIALLY FOR AGING PARENTS WHO MAY HAVE HEALTH OR MOBILITY ISSUES. THERE ARE ALSO MANY SENIORS WHO PREFER TO STAY AT HOME, LIVE INDEPENDENTLY AND PRIVATELY. IOT TECHNOLOGIES RESPOND TO THIS TREND BY PROVIDING A FAMILIAR, COMFORTABLE AND SECURE ENVIRONMENT, WHILE ALLOWING SENIORS TO RETAIN A SENSE OF INDEPENDENCE.

As people age, many will encounter functional limitations and an increased likelihood of illnesses such as osteoporosis, arthritis, heart disease, hypertension and diabetes. A conventional home environment may not be able to meet the needs of infirm seniors, and unsuitable home environments have become a dominant cause of injuries among the elderly, where falls in the home tops the list. Failing memory among seniors have also caused a number of them to forget important tasks such as turning off the stove or putting out the candles, which can lead to home fires.

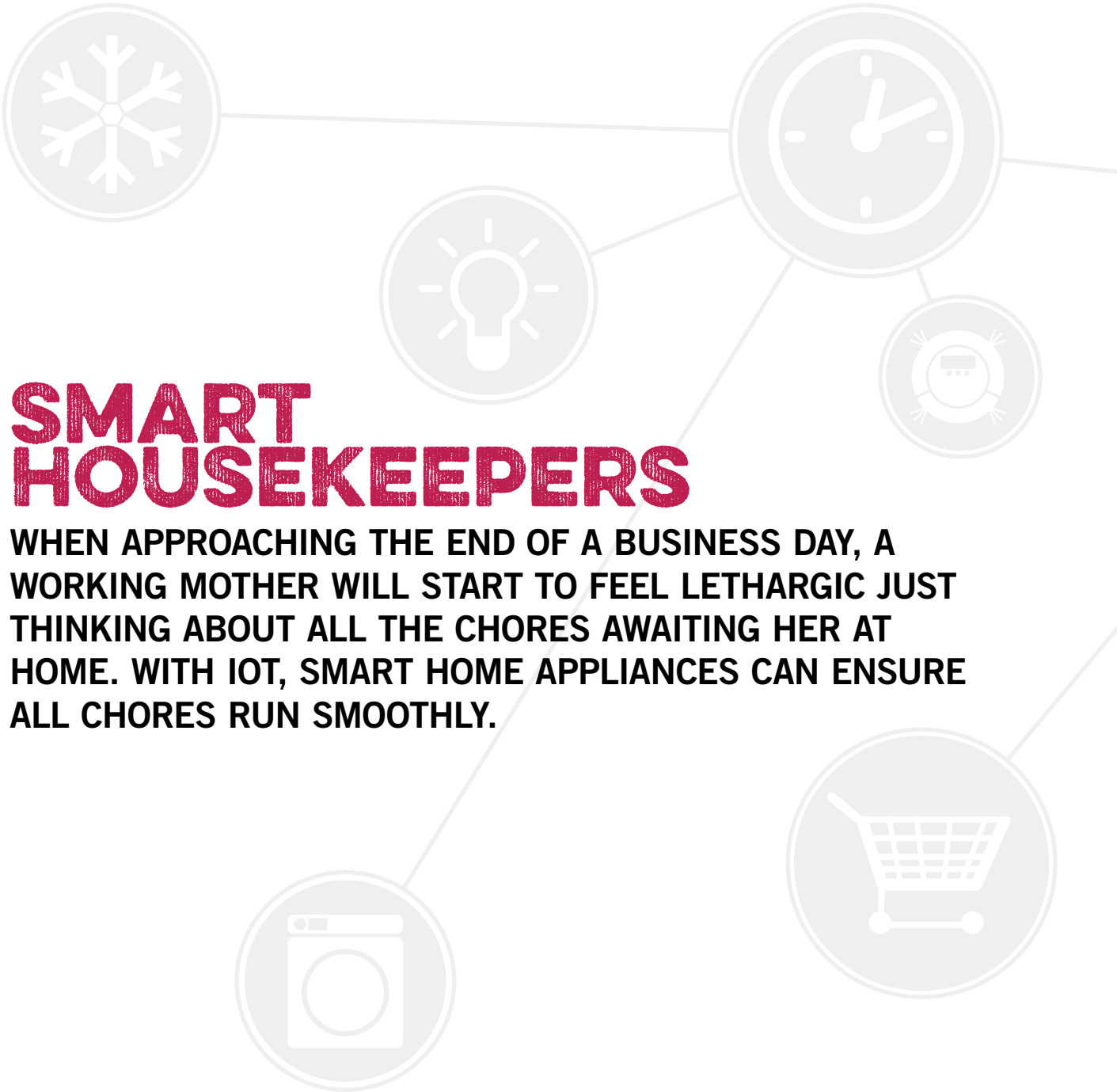
IoT technologies can be leveraged to ensure a living environment that accommodates the mental and physical decline that will most likely occur among the aged. Technology developers have already came up with appliances, gadgets and devices that can ensure safety for the aged, enhance their quality of life, as well as reduce healthcare costs through injury and disease prevention and early intervention.

IoT-enabled homes not only preserve one's sense of independence but can also provide supporting services such as:

Wearable devices that perform continuous and timely monitoring of vital signs and physical conditions of a senior. The data gathered from single or combined smart medical devices can be channelled to a medical service provider or caregiver periodically or at a specified time interval.

Gait monitoring systems that collect in-home movement patterns. When unusual movement patterns are detected, an alert will be sent to family members' communication devices and a prompt for an emergency call will be issued.

Alarm and reminder systems for stove, water tap and electrical appliances to ensure the safety of home residents.



SMART HOUSEKEEPERS

WHEN APPROACHING THE END OF A BUSINESS DAY, A WORKING MOTHER WILL START TO FEEL LETHARGIC JUST THINKING ABOUT ALL THE CHORES AWAITING HER AT HOME. WITH IOT, SMART HOME APPLIANCES CAN ENSURE ALL CHORES RUN SMOOTHLY.

The home itself can turn into a 'housekeeper' which orchestrates all appliances to perform assigned tasks, giving a peace of mind to the owner. An IoT-enabled 'housekeeper' can include smart appliances such as:

Smart washing machine which can perform full-load washing at the most cost-effective time of the day.

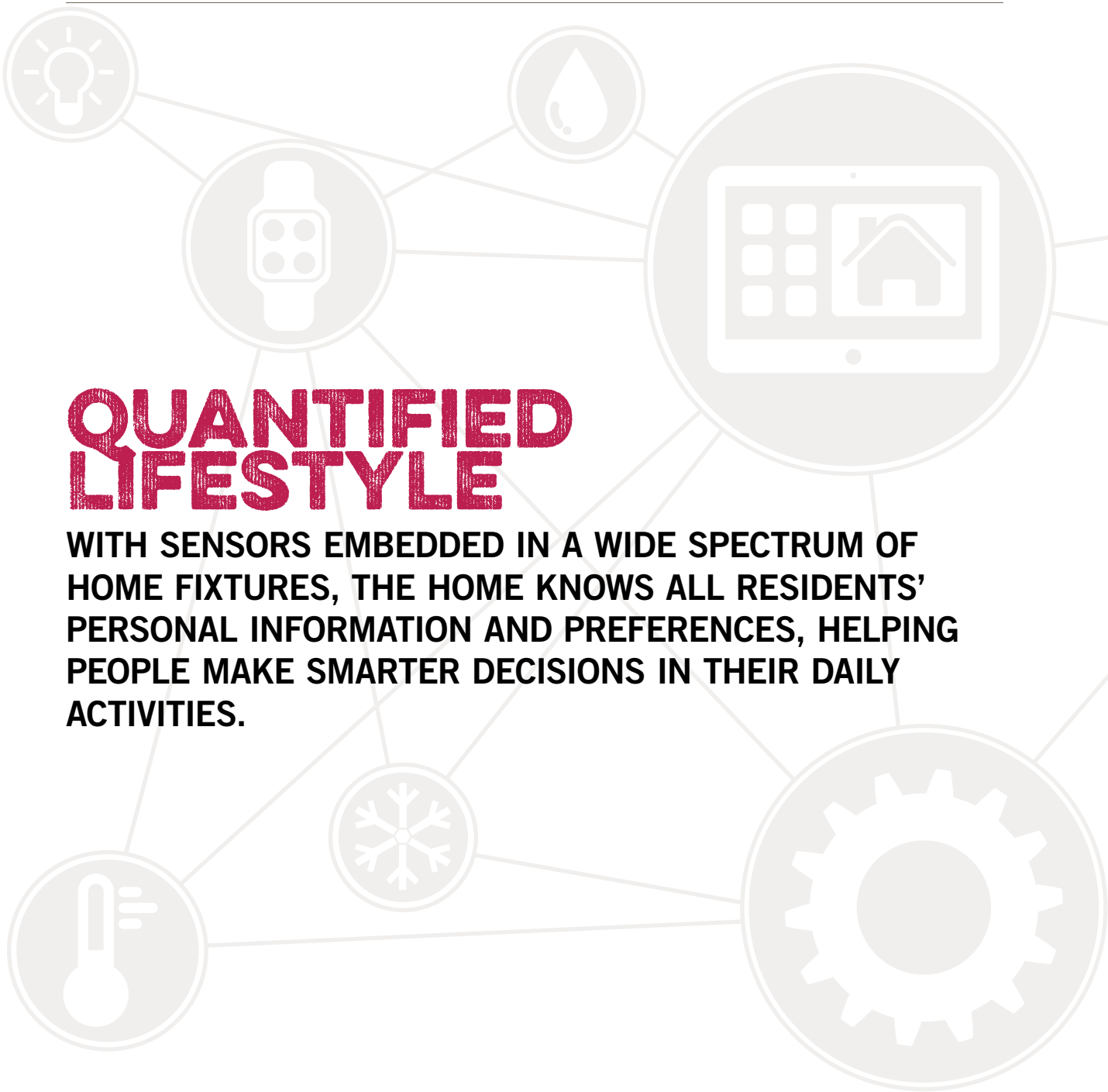
Smart vacuum cleaner which cleans and disinfects the floor as the home knows one of the family members has sensitive skin.

Smart shower that adjusts the water temperature and pressure in meeting with one's bathing needs corresponding to the activities of the day as well as environmental conditions.

Smart air-conditioning system which adjusts the house temperature to one's desired condition when one reaches home.

Smart lighting that configures the brightness and contrast of the room to suit one's mood.

Smart fridge that keeps tab on one's food and grocery inventories, and order replenishments from the grocery store.



QUANTIFIED LIFESTYLE

WITH SENSORS EMBEDDED IN A WIDE SPECTRUM OF HOME FIXTURES, THE HOME KNOWS ALL RESIDENTS' PERSONAL INFORMATION AND PREFERENCES, HELPING PEOPLE MAKE SMARTER DECISIONS IN THEIR DAILY ACTIVITIES.

The utility bill is the second largest component of consumer expenditure, accounting for 21.7 percent of total household spending; the largest component being food and beverage, which accounts for about 23 percent of total household expenditure[1].

Leveraging on IoT technologies, a household with IoT-enabled appliances can monitor energy usage and achieve substantial savings on utility bills.

A smart home dashboard can record energy consumption data and adjust a home setting accordingly, including dimming lights, tweaking heating and cooling, and turning off idling appliances to reduce energy consumption. Refrigerators can self-manage and self-adjust during peak energy times – turning up the coolness when rates are down and cutting back when they are high. In time, they may also be able to notify owners via mobile phones and tablets if the door is left open.

1 Bank Negara Annual Report 2010. Available from : http://www.bnm.gov.my/files/publication/ar/en/2010/cp01.pdf

INTELLIGENCE IN THE HOME

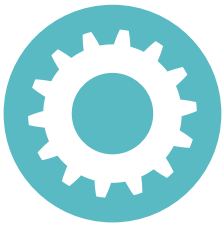
IMPROVING OUR HOME LIVING CONDITIONS BY MAKING THE HOME MORE ADAPTIVE AND RESPONSIVE TO OUR NEEDS IS NOW A REALITY. THE SMART HOME WILL ENGAGE THE HOME OWNER AND FACILITATE CORE SERVICES SUCH AS SECURITY MONITORING, WELLNESS MONITORING AND CONNECTED APPLIANCES. HERE'S HOW MIMOS TECHNOLOGIES MAKE THE HOME A ONE-STOP PLACE FOR MOST OF LIFE'S DAILY NEEDS:

Secured Entry and Smart Environment for the Home

Automated access to the home is now possible with owner ID verification using Mi-SP's video analytics that also captures possible intrusions from the home's exterior through surveillance cameras. In the home, ambient lighting and temperature will be adjusted to suit the preference set by the owner from a dormant or 'sleep' mode. Mi-Sensor senses the indoor environment and triggers feedback control through the Mi-Manage device manager.

Wellness and Monitoring in the Home

To facilitate wellness and senior living in the home, wearable devices with Mi-SIP can detect critical health parameters on a 24/7 basis within the home. Information from the device is then transmitted via Mi-MESA's high-speed wireless system to a medical provider for swift action or periodic monitoring of a person's condition. Movement within the home can also be tracked and sensed for falls, slips or mishaps through Mi-SP's intelligent surveillance.



Connected Smart Appliances

Appliances that continuously sense and adapt their usage setting to our preferences are a growing need. This is in comparison to the current appliances which are considered 'dumb' and need to be operated and maintained manually. With the embedding of Mi-SIP into these appliances, appliances such as the fridge, lighting and vacuum cleaner gain secured wireless communication capabilities and are therefore able to interact with each other as well as the owner of the home. Through Mi-Manage, the owner can program all appliances then let them run in an automated manner while the owner is in or out of the home.

Energy Usage Monitoring and Control

Appliances that are already embedded with Mi-SIP can also be programmed with Mi-Manage to go into hibernate mode and conserve energy when the owner is not in the home or operate in a low power mode to run only essential functions such as securing the home perimeter and dimming the lights in the home. The energy consumption can also be monitored through actuators and smart meters connected to the power sources spread throughout the home then sent periodically through Mi-Cloud to the home owner through text message and updated on a personal 'live' website.

TECHNOLOGIES ON SAFETY AND SERVICE IN HOME LIVING

cloud

A cloud infrastructure platform that allows virtualisation of physical hardware.

- Open and neutral architecture
- Comprehensive management modules
- Total service orchestration suite
- Hardware agnostics

manage

A control management system platform that provides web services that enables creation of applications for devices such as actuators and sensors.

- Commercial systems compatibility
- Local and remote presence
- Interaction capabilities
- Control and monitoring capabilities

mesa

A wireless multi-radio mesh broadband infrastructure appliance integrated with multi-protocol broadband connectivity and sensory system.

- IP65 robustness
- Modular design
- Long haul at high throughput
- Integrated sensor appliance
- Wireless infrastructure for surveillance systems

sensor

A solution that comprises a sensor platform and sensor elements to provide real-time feedback of physical parameters.

- Robust and reliable for outdoor usage
- Real-time data measurement
- Wireless communications

sip

A state-of-the art miniature System-on-Chip (SoC) processor with extensive radio features and low power consumption designed for IoT applications.

- Platform for application development
- Small and low profile packaging
- Energy efficient operation
- High transmit power

sp

A versatile video surveillance system with advanced video analytics that automatically detects and alerts occurrences of suspicious activity.

- Event detection video analytics
- Smart client video analytics
- Flexible architecture

MIMOS is supporting the growth and proliferation of IoT in Malaysia through Big Data IoT Technology Accelerator (BITX) which comprises core technologies that drive the development efforts in IoT in areas of Applications, Smart Devices and Network & Services.

To know more about MIMOS technologies go to: http://www.mimos.my/tech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