Are smart meters smart devices?

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This article considers what customers expect from smart devices. Based on these expectations the article concludes that when viewed from the customer's perspective, current smart meters are not smart devices.

Introduction

In the near future Australian households will be offered the option to install a 'smart meter' but will they view the meter as a smart device?

To answer this question this article considers the evolution of smart devices. It finds that smart devices allow customers to tailor the device to meet their specific requirements, for example smart phones allow users to load applications to meet their individual needs and wants.

It then considers the functionality that current 'smart meters' offer customers. Since customers are not allowed to tailor the smart meter functionality the article concludes that current meters are not smart devices.

A brief history of electricity meters

Early meters were mechanical. They consisted of a spinning disc connected to a dial. Every 3 months a meter reader visited the house to write down the reading.

During the 1990's electronic electricity meters started to replace mechanical meters. Electronic meters supported more features including the ability to add communications modems. The communications modems allowed the meter to be read remotely but the meters were still not referred to as smart meters.

Adding communications only enables remote operation it does not make a device smart

Current 'smart meters' allow utilities to better manage their electricity network. The relevant question is when viewed from the perspective of the customer do these meters qualify as smart devices?

Smart phones

Early mobile phones were quite literally phones that could be moved. They allowed users to make and receive telephone calls while away from their land line. As noted earlier only adding remote communications does not make them smart devices.

Phone manufacturers added new features including cameras, music players and headsets. Some manufacturers added internet browsers and email support so customers could receive emails while away from the office. Despite all these features the phones were still not considered smart phones. Something was still missing.

The term 'smart phone' was only introduced when customers were able to tailor the phone's functionality to suit their specific needs, for example by installing new applications (apps). Today users are able to choose from a bewildering range and number of apps each offering to tailor their phone to their individual requirements.

Modern smart phones can also be connected to external hardware. This external hardware allows users to create new smart systems not originally supported by the device manufacturer. For example adding a card reader creates a credit card processing system or connecting family smart phones together creates a fully featured family tracking system (c.f. Familo).

Smart televisions

Simple televisions have been used for entertainment for over half a century. In common with smart phones, smart televisions allow customers to tailor the functionality to suit their requirements. For example they can download apps providing instant access to their favourite movie streaming service or add the display of local weather information.

Smart televisions also allow users to add new functionality not originally included by the manufacturer. For example connecting a keyboard allows the TV to be used to send emails or adding a camera creates a video conferencing system.
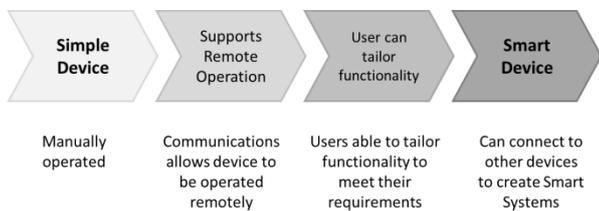
Smart Devices

The above examples suggest that the first feature distinguishing a smart device from a simple device is the ability for users to tailor its functionality to meet their requirements.

> *Smart devices allow users to tailor their functionality to meet their requirements*

The second distinguishing feature is users can connect their smart devices to other devices creating smart systems. For example connecting a camera to the smart television or a card reader to a smart phone.

> *Smart devices can be connected to other devices to create smart systems*

The evolution of smart devices from simple devices is depicted in the following way:

Evolution of a Simple Device to a Smart Device

Making usage visible

Smart Phone Data Use

When smart phones first appeared news articles exposed "Exorbitant phone bills!". The large bills were often the result of customers downloading large amounts of data without realising the costs.

Telecommunications companies responded by developing applications making data use visible. Unfortunately this proved insufficient as it relied on customers regularly checking their data use. Customers wanted automated systems to help them manage their budget.

Today customers do not have to regularly check their data use. Instead most telecommunications companies offer solutions alerting customers when

they have used a certain percentage of their budget (e.g. 75%). The alerts allow customers to set a budget and receive an alert only when they risk exceeding that budget.

Making electricity use visible

In common with early smart phone data use, electricity use is invisible. One of the benefits associated with 'smart meters' is the ability for customers to view their electricity use. In most cases customers are given access to a website where they can view their recent electricity use. Like the early apps showing mobile phone data use, utilities are relying on customers manually checking their use on the website.

The telecommunications example suggests that customers want an automatic service to alert them only when they approach their set budget. The Frequently Asked Questions for MY AGL IQ suggests this service is finally available (but probably only for Victorian customers fitted with Smart Meters).

Are Smart Meters Smart Devices?

We can now answer the question "are current 'smart meters' smart devices?". Current smart meters do not allow customers to tailor their functionality so they fail the first test of a smart device. They also fail the second test since customers can't use them to create smart systems. The conclusion is that viewed from the perspective of the customer, smart meters are not smart devices.
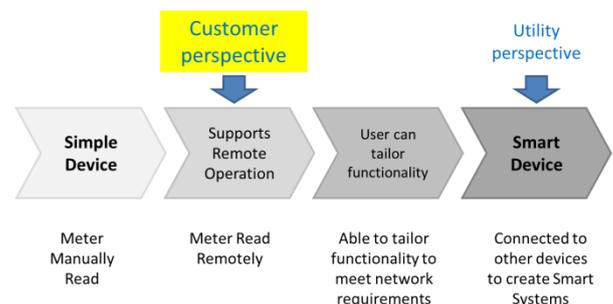
Customer and Utility perspectives of smart meters

So why are they called smart meters?

Viewing smart meters from the perspective of the utility who installed the meter the situation is quite different. The utility can tailor the meter functionality to suit their commercial requirements. Utilities can also integrate smart meters into other utility systems,

for example to help them identify power outages around their network. When viewed from the perspective of the utility, smart meters are smart devices.

Are there alternatives?

Dedicated home automation systems able to assist households to manage their electricity costs are readily available. Unfortunately most are expensive and are not sufficiently flexible to be considered smart devices. Fortunately the internet is providing smart alternatives.

Using the internet to build tailored solutions

Consider a household burglar alarm system. This device reports movement when someone enters the customer's house. Purpose built alarm systems only perform this one task. Users cannot tailor the system so they are not smart devices.

Now consider building a burglar alarm using a simple motion detector and the internet. For this example we consider connecting a WeMo motion sensor to the If This Then That (IFTTT) website. After installing the motion detector the customer selects an App[1] from the IFTTT website giving the desired functionality, for example sending an SMS to their mobile phone.
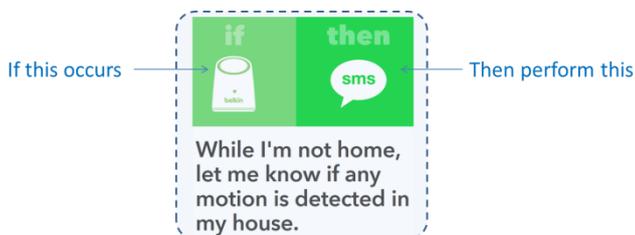
IFTTT App (recipe) for a burglar alarm

Users are free to tailor the functionality of their IFTTT burglar alarm by loading different apps. For example they could choose to create a log of all activity in their Google Drive or Dropbox.

Also unlike purpose built burglar alarms the IFTTT solution allows users to add devices to create different systems. For example a home automation system can turn on and off a light whenever motion is detected (using an internet connected light and suitable IFTTT App).

The IFTTT solution shows it is no longer necessary for consumers to install smart devices to achieve smart solutions. Instead tailored solutions can be created from simple devices connected to the internet.

> *The internet allows consumers to create tailored solutions without smart devices*

A number of vendors offer energy management applications, for example two single appliance IFTTT apps are shown below. Smart solutions offering whole house energy advice are starting to appear.

IFTTT Energy Management Apps

The important point to realise is that this is achieved without the need to install a utility smart meter.

Conclusion

This article considered the characteristics of smart devices. It found that smart devices allow users to tailor the functionality to meet their requirements and to connect them to other systems.

Modern smart meters allow the utility who installed the meter to tailor the meter's functionality to meet their commercial requirements and to integrate them with other utility systems. Viewed from the perspective of the utility modern smart meters are smart devices.

Lessons learnt from the telecommunications industry clearly demonstrate the advantages of allowing customers to tailor functionality to their needs.

From the consumer's point of view 'smart meters' only become smart devices when customers can tailor them to meet their individual energy management requirements, for example to set an energy budget. Letting customers do this might even provide incentives for households to consider taking up the option to install a smart meter.

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[1] IFTTT refers to apps as recipes but the concept is the same

Citation

Comments or Questions?

The author is happy to receive comments or questions about this article. He can be contacted at
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About Dr Martin Gill

Dr Gill specialises in the provision of advice and data analysis to the energy industry. As a consultant he has prepared advice for government regulators, distributors, retailers, consumers, asset operators and equipment vendors.

Dr Gill has lead teams researching and developing new products across a broad range of industries, including advanced communication modems, burglar alarms, high voltage fault monitors and power quality analysers. One of his teams developed the first in home display and web-portal providing Australian customers the ability to view their electricity use. This innovation was recognised with the Green Globe Award, NSW Government's Premier's Award and Best New Product by the Australian Electrical and Electronics Manufacturers Association.

Version History

Version	Date of publication	Comments
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