

# Servitization of the Home: IoT Development of Use-Visibility Measures

**Glenn Parry**

Professor of Strategy and Operations Management  
University of the West of England



# Currently we information asymmetry in the home

- Consumer has knowledge of functional activities
  - Little information is passed back to the supplier
- Suppliers lack post sale visibility of their products in use
- Contexts of use are where value is created
  - Where products are used in combination with other resource in value creating activity
  - This is the start point of the reverse supply chain

# Which is most valuable?

**Gold**



**Polystyrene**



Value as “perceived in use” means we must consider context



**The value of an offer to a consumer is only known when they integrate it into their lives**

# Use value is difficult to capture and it is perceptual, and contextual which is annoying

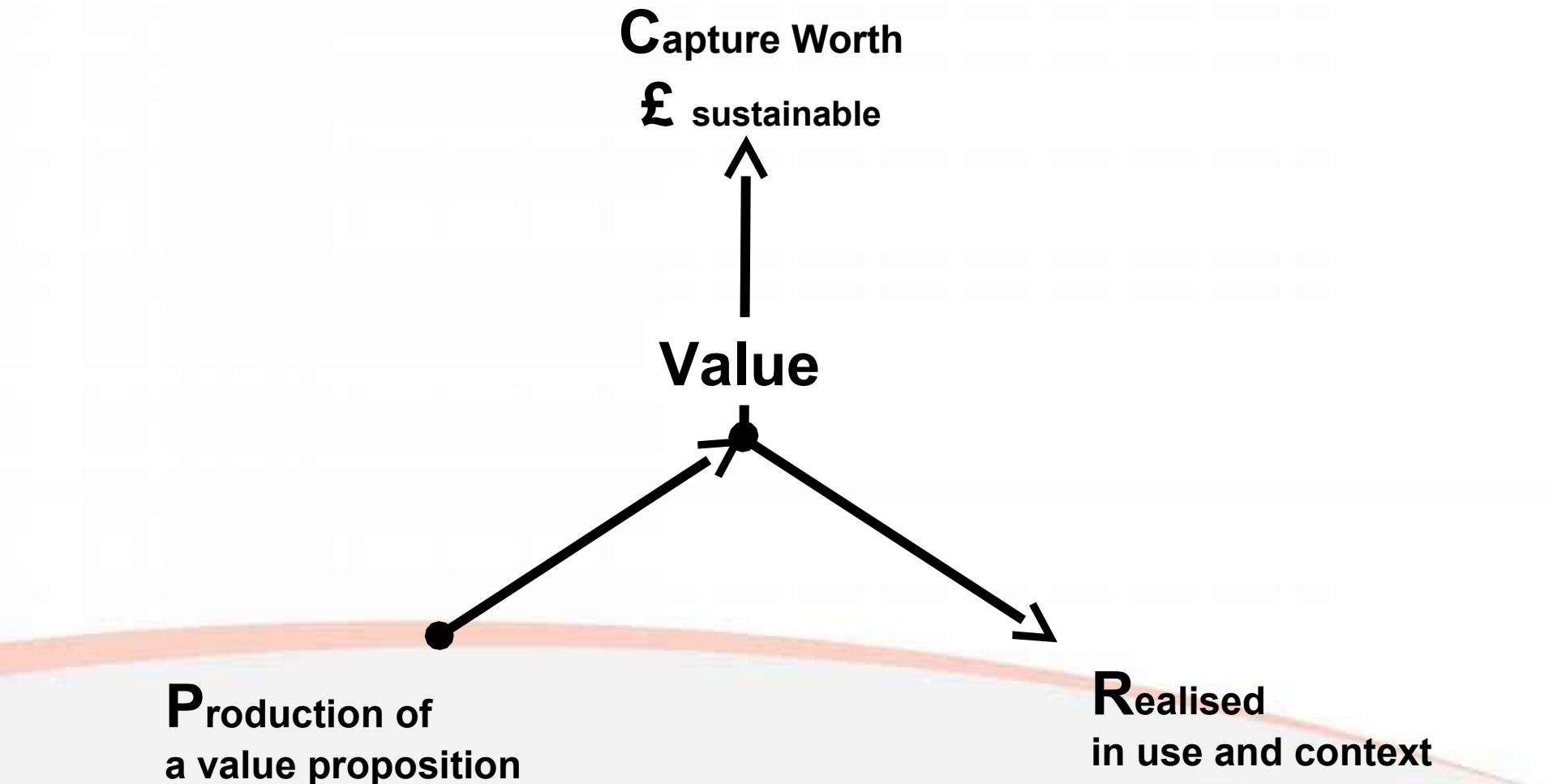
- Capturing how 'good' something is in use is difficult
- Value is perceptually determined
  - by the user in their context
- Perceptions change with context and new information
- We need a constant stream of new use information



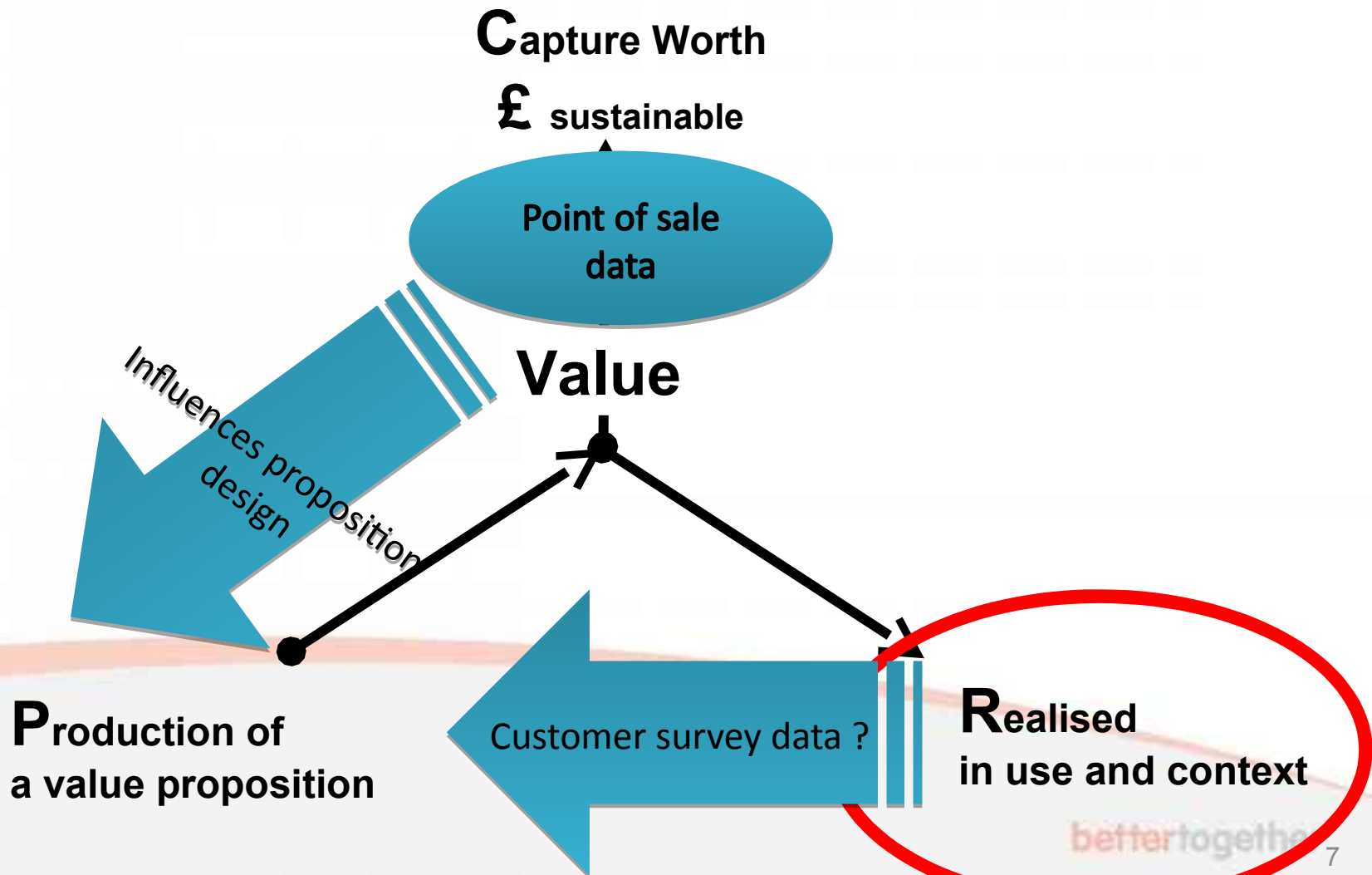
**Businesses need to understand changing patterns of use**

**In their day these were all considered to be 'good'**

# Business models show firms value creation and capture process

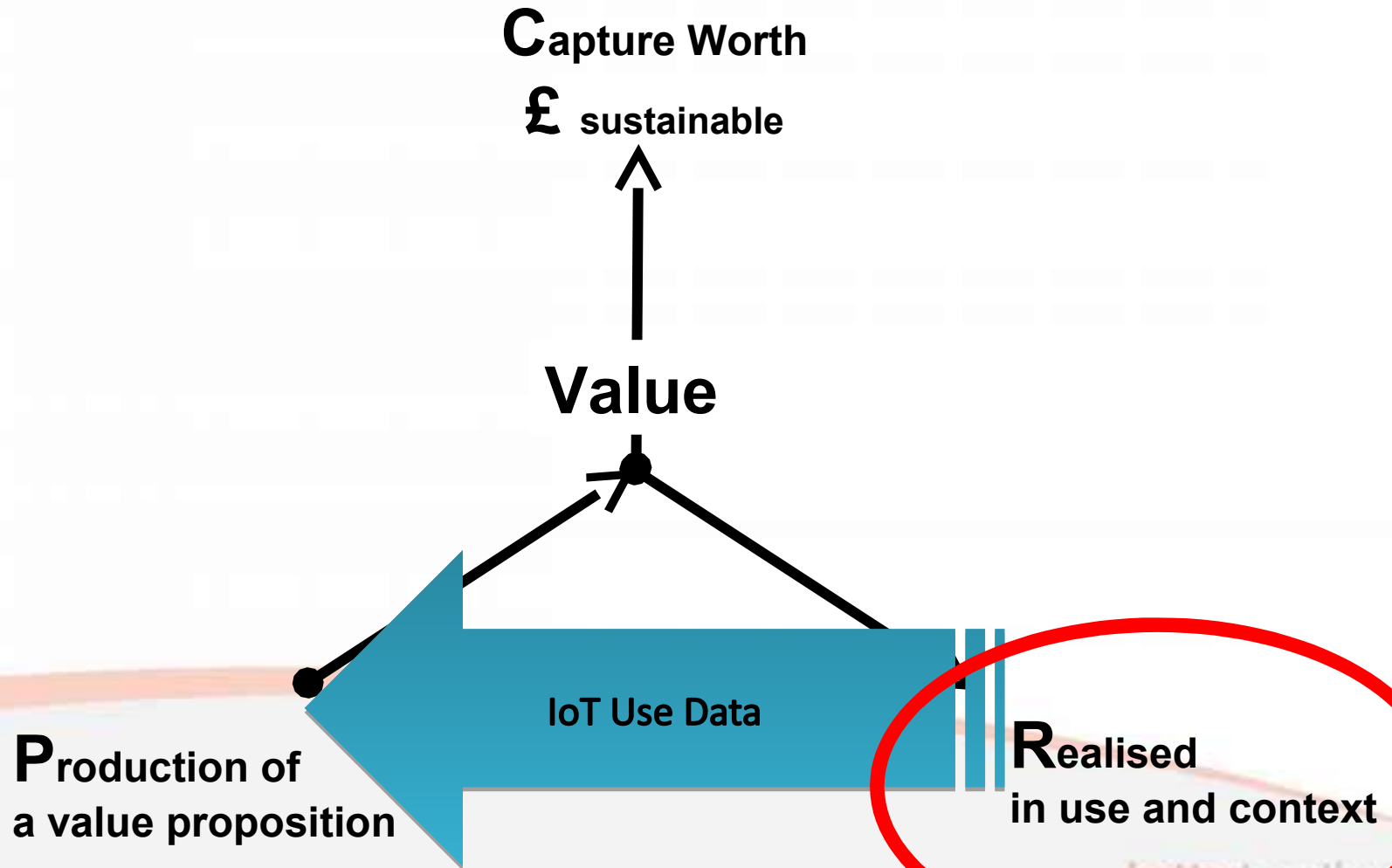


# Currently PoS data is available and measured



Note: PoS is 'point of sale'

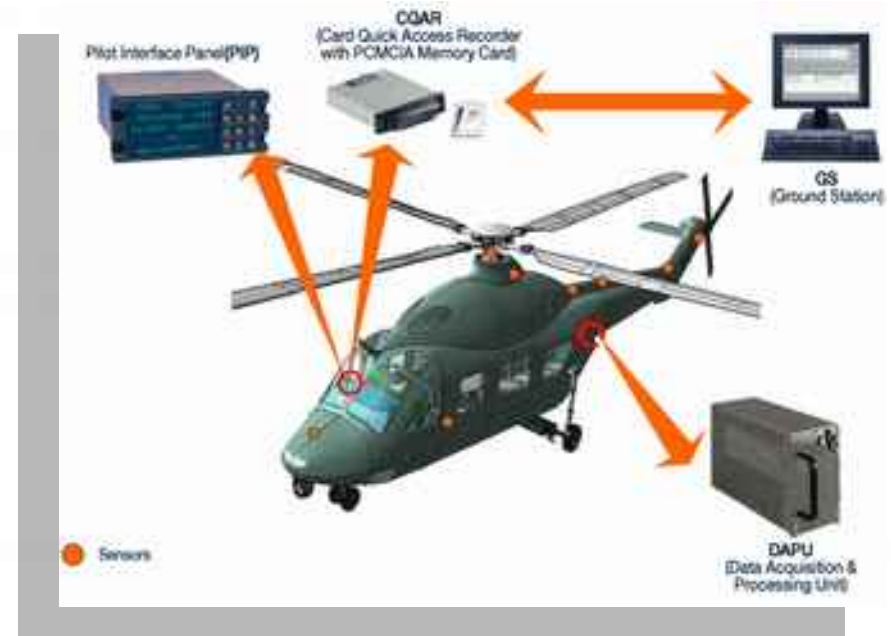
# We can get consumer use data direct from IoT devices and sensors





# This is already done in complex engineering service

- Helicopters and aircraft are now often sold as a service
  - E.g 1000 flying hours
- The provider needs to monitor condition and use
  - Health Usage Monitoring Systems [HUMS]
  - Intelligence Vehicle Health Management [IVHM]
- This changes the nature of the business model
  - often shifts responsibility and risk
  - Reliant on the provider's ability to manage complex engineering



**IoT extends this concept into the home at low cost**

# Hub of All Things is the platform repository used to collect data



*Hubofallthings.com*

- HAT is a Personal Data Microserver Account (PDMA)
- HAT collects IoT and other data
  - And makes it accessible only to you in one place
- The platform is built
  - We had 6 people collecting a lot of personal data
  - We are working now to scale up
- HAT PDMA is owned by the individual
  - Individuals share data only with those they select
  - DPO's data given to study

# We undertook an explorative case study of 6 HAT users

- Quantitative data from sensors and systems in the homes
  - Instrumentation of rooms to create data density
- Qualitative data from interviews, user process descriptions and home visits
- Focus upon showering activity (difficult space)
  - Private function in the home
  - Video not acceptable
  - “Wet” environment
  - Mains power use limited

# Identification of many resources in the shower room



# Analysis of the resources led to a categorization of data types

- **Interaction Data**

- Data from a resource/mechanism which is not transformed, diminished or depleted during single use E.g. taps, showers, doors, rooms

- **Experience data**

- Information from resource that is transformed, diminished, but not depleted E.g. towel, flannel,

- **Depletion data**

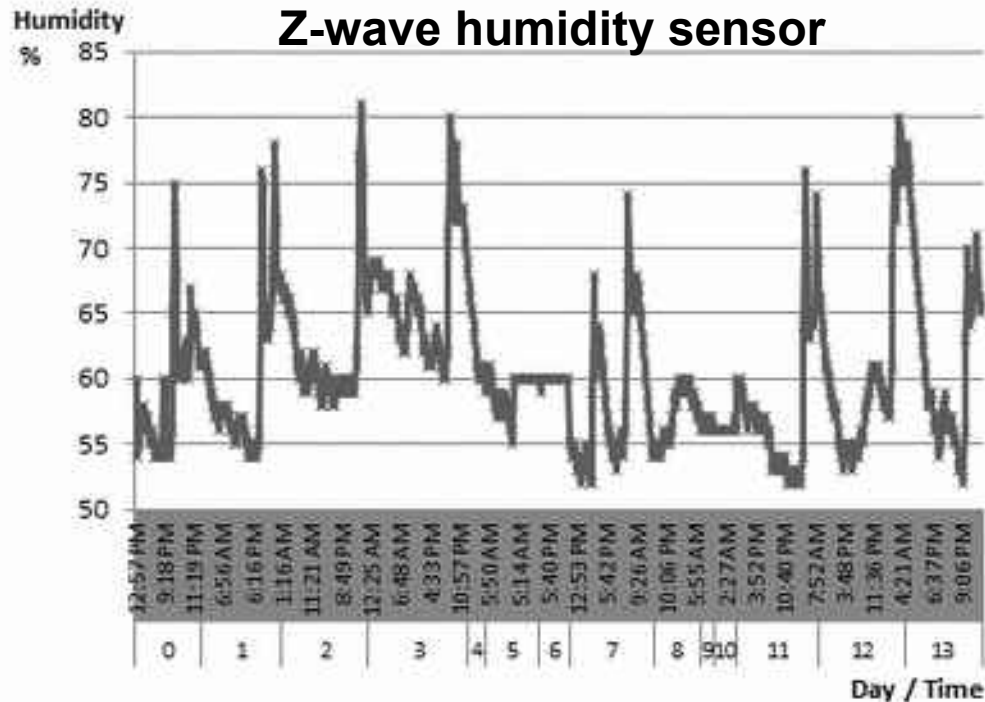
- Data on a resource which is consumed at a rate higher than it is replenished E.g. shower gel, shampoo

- **Consumption data**

- Data on resource which is replenished at the rate it is consumed E.g. water, electricity

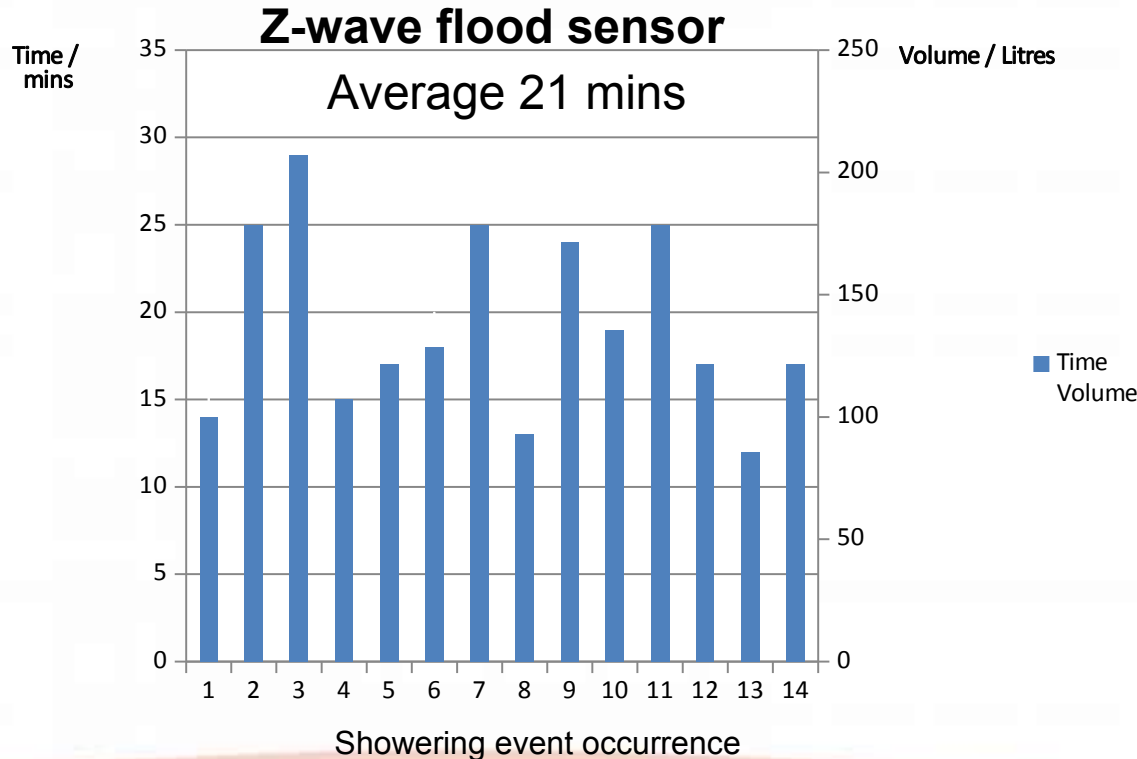
These are nested functions and categorisation is set by the chronology of a selected event

# Example of interaction data capture: the shower room



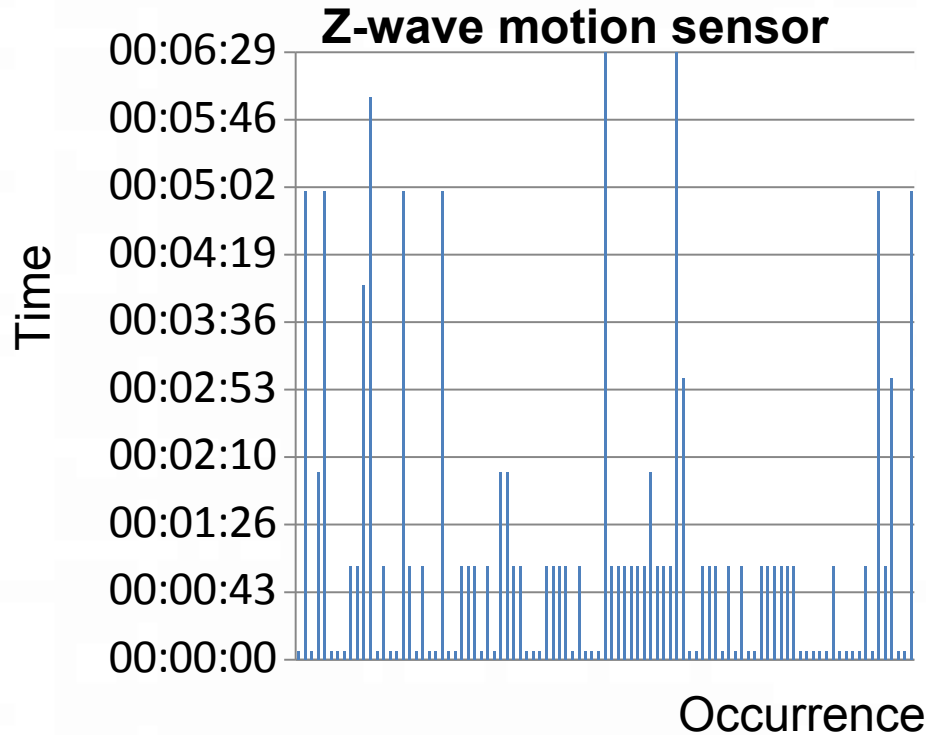
Also gives count data of Interaction with shower

# Example of consumption data capture: shower water use



**Also gives count data of Interaction with shower  
Shower duration and volume of water was much  
longer than individual thought!**

# Example of experience data capture: Towel

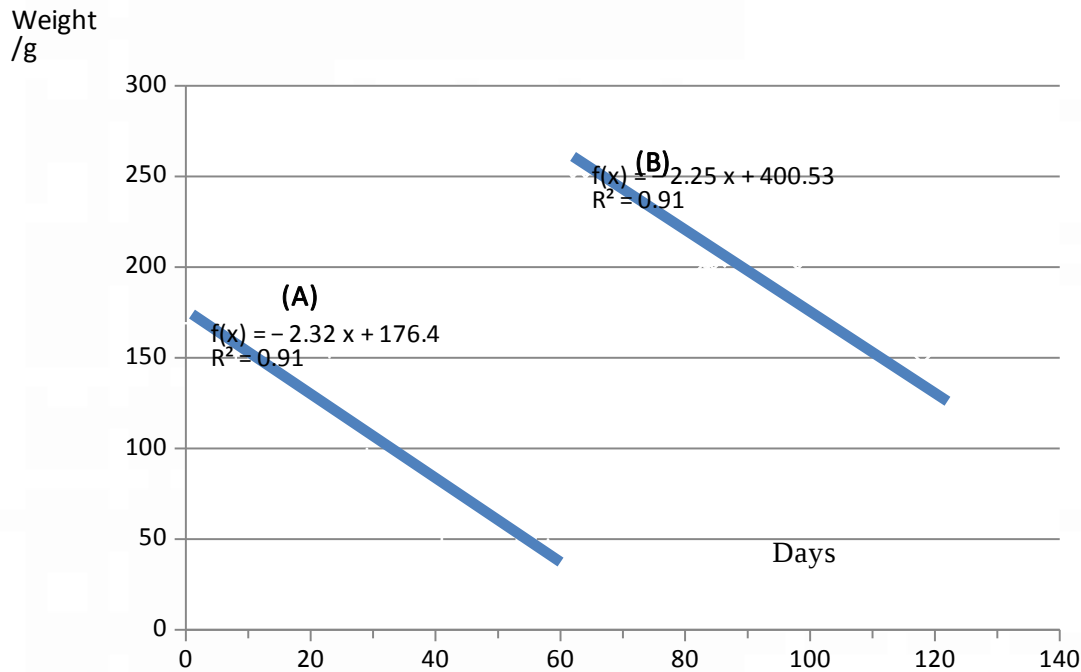


**It appeared that the towel was used more often than the 'owner' expected  
Others were using their towel to dry their hands!**



# Example of depletion data capture: shampoo

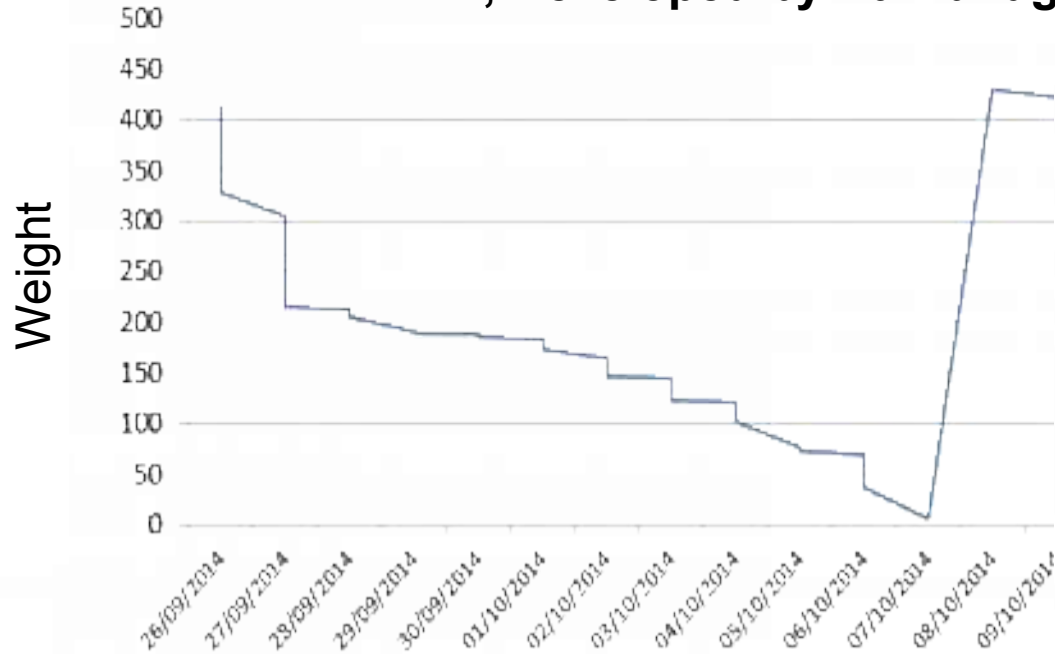
AMBB; Developed by Cambridge



Shampoo consumption rate was relatively linear

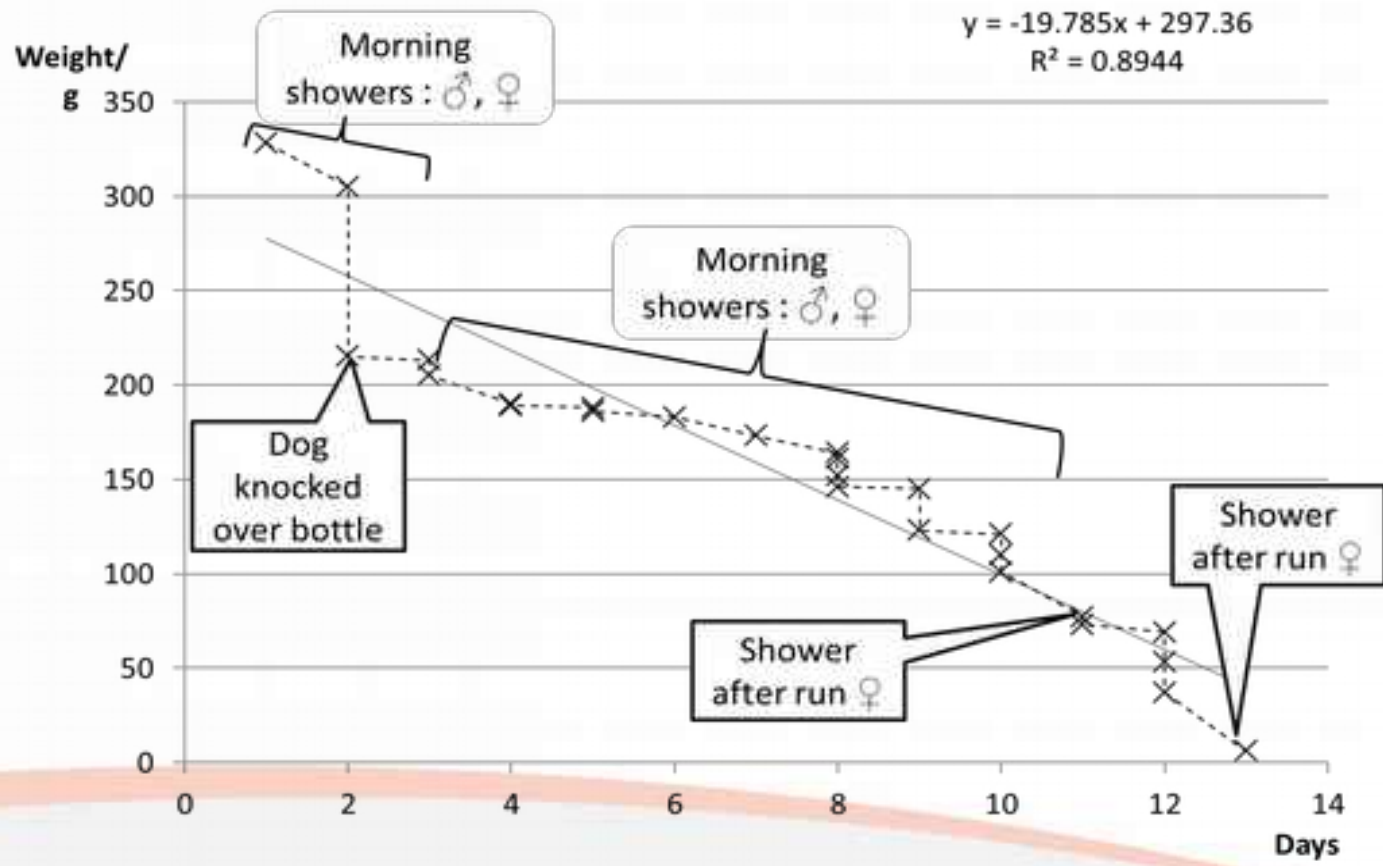
# Example depletion data capture: Shower gel

AMBB; Developed by Cambridge



Shower gel consumption rate was erratic

# Linking data we can start to see the effects of context on shower gel use



Running increases both shower time, and shower gel consumption by 100%

# Findings

- Explorative case shows IoT implementation and operationalisation in the home
  - Tracks consumption
  - Shows use and resource combination
- Provides a categorisation of consumption types
  - Helps in constructing measurement and sensor selection
- Numerous implications for supply
  - Consumers perceptions of use differs to actual
    - Time in shower is longer
    - Use of towel is more 'shared' than thought
  - => Survey data would be misleading
  - Some activities are moderators for others
    - Running leads to longer shower length and double the consumption of shower gel

## Session draws upon the open access paper:

Parry, G., Brax, S.A., Maull, R., Ng., I. (2016)  
“Visibility of consumer context: improving reverse supply with internet of things data”,  
*Supply Chain Management: An International Journal*, Vol. 21 Iss: 2, pp.228 – 244

# Questions



The 'Good' Professor  
@drgeep



[www.hubofallthings.com](http://www.hubofallthings.com)



YouTube™ Glenn Parry

bettertogether