

# **Manufacturing Analytics: The Role of Big Data in the Future of Manufacturing**

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# Welcome to the Institute for Manufacturing



# The IfM perspective on manufacturing

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## Big **M**anufacturing

The full cycle from understanding markets and technologies through product and process design to operations, distribution and related services.

# Why manufacturing analytics?

# We live in a world of big data...

*90% of all the data in the world has been created in the last two years alone!*

- Number of Tweets
  - 12 terabytes - per day
- Facebook
  - 200 million pictures uploaded - per day
  - Deals with about 105 terabytes of data – at any given hour

## YouTube

- 500 years of videos are watched – every day
- 700 videos are shared on Twitter – every minute

## Tesco has data on

- 15 million customers – for over 20 years

*The three (or four) V's of big data...*

# Why manufacturing analytics?

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## Big **M**anufacturing

The full cycle from **understanding markets** and **technologies** through **product and process design** to **operations, distribution** and **related services**.

# Understanding markets and distribution

## Information:

- 10,000 retail units in 27 countries.  
\$444 billion sales

## Data Analysis:

- Stocks products based upon expected demand
- Day, weather, time, special events
- Supplier replenishments - never run out, just enough
- Examine buying behavior

## Recent Use:

- Hurricane Irene - strawberry Pop Tarts and beer were big sellers.
- Stocked up on these items before next storm - huge sellers



# Product and process design, technologies and operations

## Information:

- Top five biopharmaceuticals manufacturer

## Data Analysis:

- Identified clusters of related production activities
- Used disparate data to look for correlations between process parameters and yield
- Identified nine particularly influential parameters, including time to inoculate cells

## Recent Use:

- Made targeted process changes to increase vaccine yield by 50%.
- Savings of \$5-10 million per annum for a single substance





# Related services

## Information:

- Using sensors on equipment for real time status reporting
- Also data captured on board and extracted at later date during routine maintenance

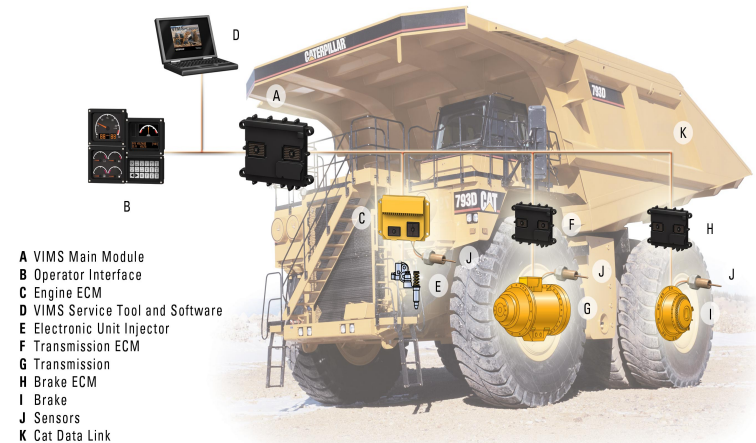
## Data Analysis:

- Data used to track product performance and likely quality issues
- Pre-emptively maintain equipment and assets

## Recent Use:

- Minimise total lifetime operating costs
- Minimise unnecessary spares

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# Manufacturing analytics defined

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Manufacturing analytics is the systematic collection, analysis, interpretation and use of data to support the full manufacturing cycle from understanding markets and technologies through product and process design to operations, distribution and related services.

# Extending the traditional view of analytics

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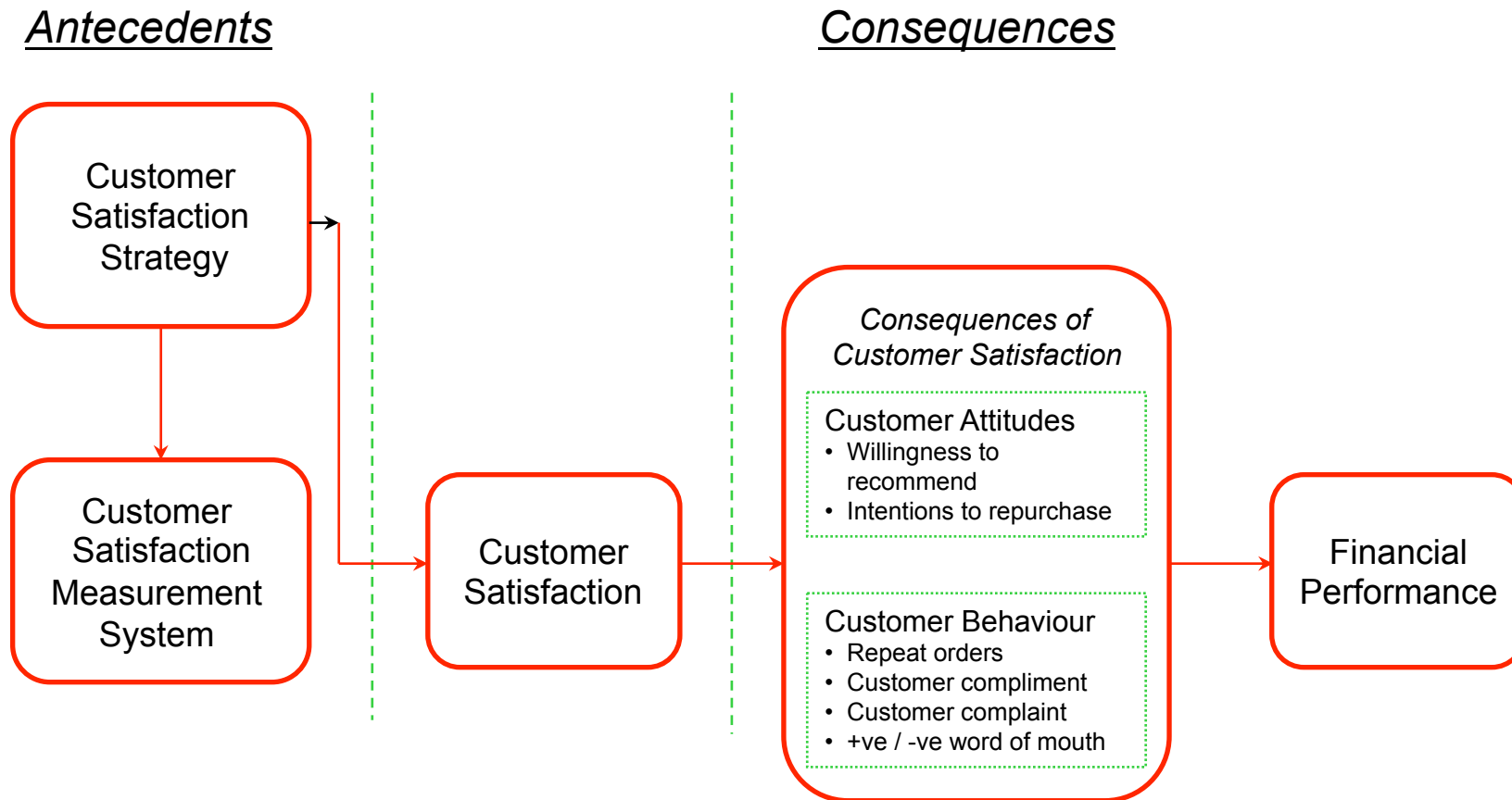


## An additional twist (part 1)...

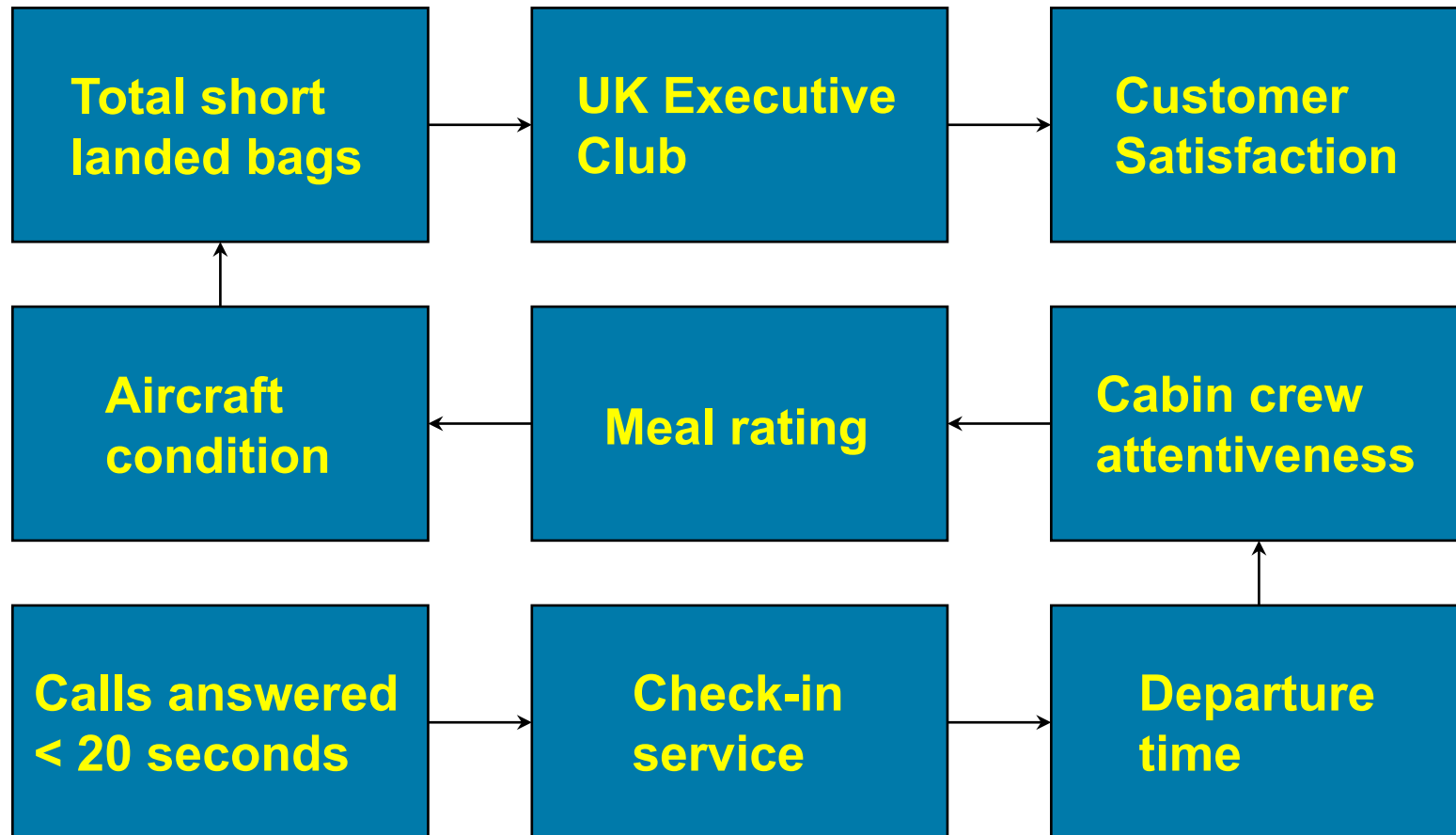
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**Manufacturing analytics should  
be used to challenge your  
theory about how your  
business runs...**

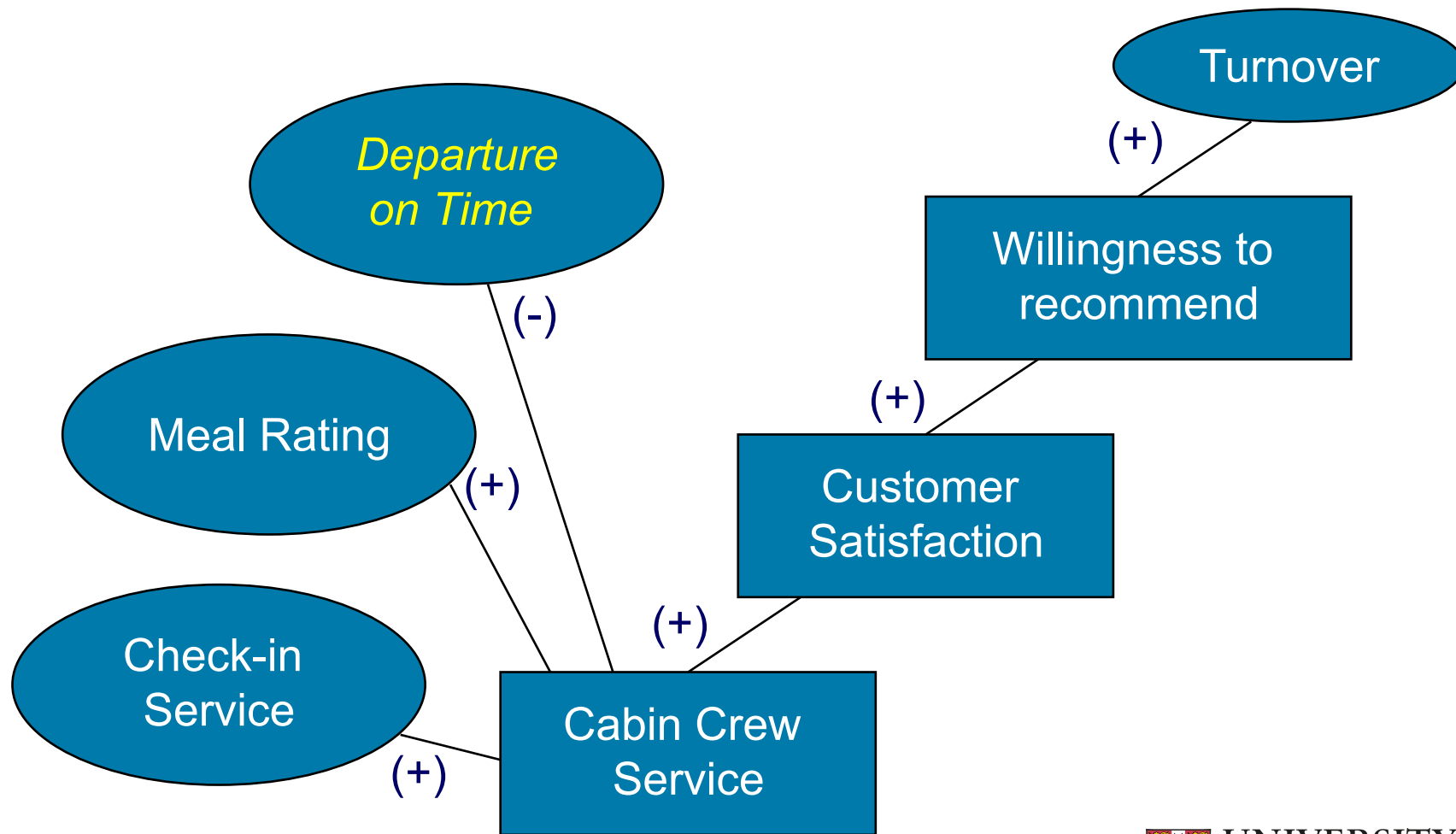
# Challenging assumptions



# An airline's perspective: Process passengers



# What's the story behind the data?



## An additional twist (part 2)...

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**Manufacturing analytics should be used to explore how manufacturers can create value for their clients by opening up opportunities to innovate the business model!**



# Using data analytics to innovate the business model



# Manufacturing analytics revised defined

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Manufacturing analytics is the systematic collection, analysis, interpretation and use of data to support the full manufacturing cycle from understanding markets and technologies through product and process design to operations, distribution and related services. It can be used both to optimise today's system and identify innovations for tomorrow's system.