

Cultural Challenges of MBSE Adoption



*INCOSE UK MBSE Interest Group
Jon Cashmore - 24/06/2020*

Agenda

A short overview of Ocado

A contextual outline of working in Ocado's Environment

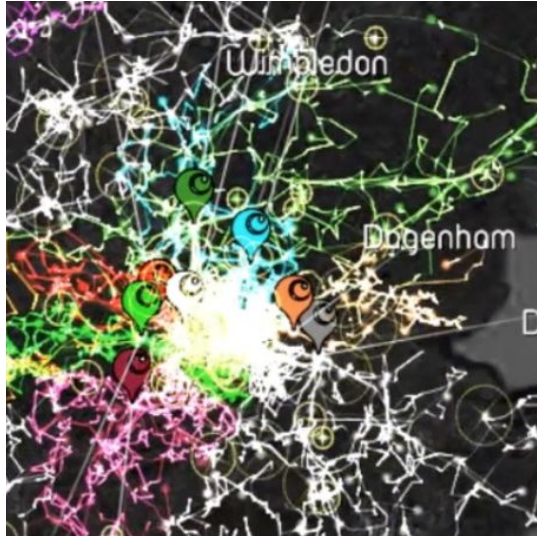
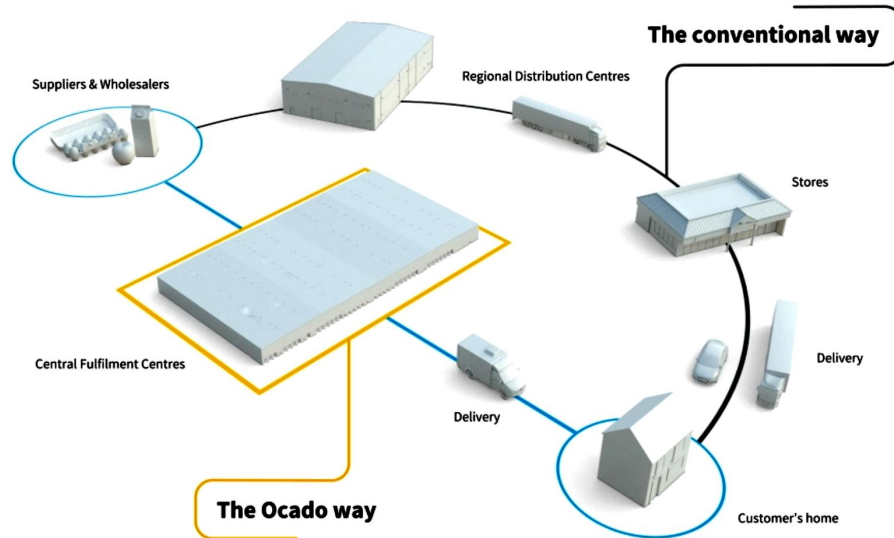
Challenges encountered

Next Steps

Conclusion and Q&A

The Ocado Business Model = Disruptive Technology

The Vision



The Reality

'Ocado: an 18-year overnight success story'



The Ocado Business Model = The Human Element

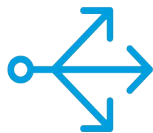
The most advanced eCommerce,
logistics and fulfilment platform
for groceries in the world... depends
on People.



A very exciting place to be...



Ocado Technology is transforming the future of online grocery retail through **serial technology innovation**



600,000+ last-mile routing adjustments made per second*



Seven development centres in the UK and Europe



200 patents granted and counting...



International partners in **eight** countries globally



20 million demand forecasts made each day*

A PESTLE View of Ocado Product Development

Political: Start up mentality, Attention to Detail, Consensus-based.

Economic: Grocery is low margin and a very competitive industry.

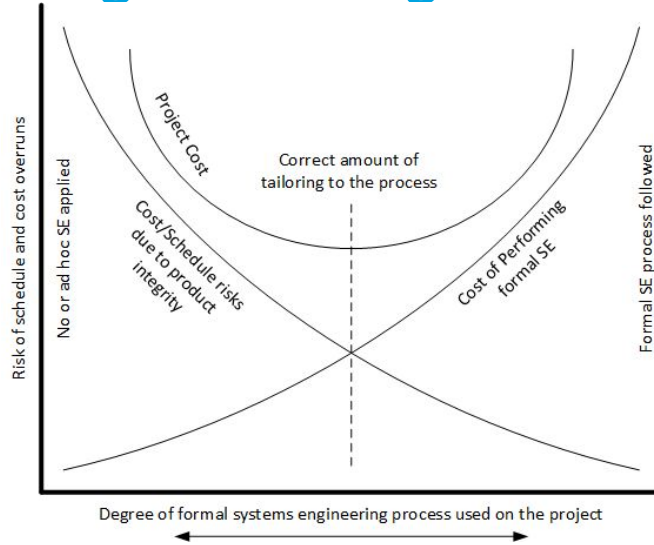
Social: Team-of-Teams arrangements, People very busy, Innovative workforce.

Technology: Software driven, transitioning to mass manufacture, the OSP is a highly coupled system.

Legal: Low Regulatory thresholds, initially CE marking - but now global.

Environmental: Warehouse environment.

Challenges - Making the Business Case



The G Suite® is my 'ePAPs' solution

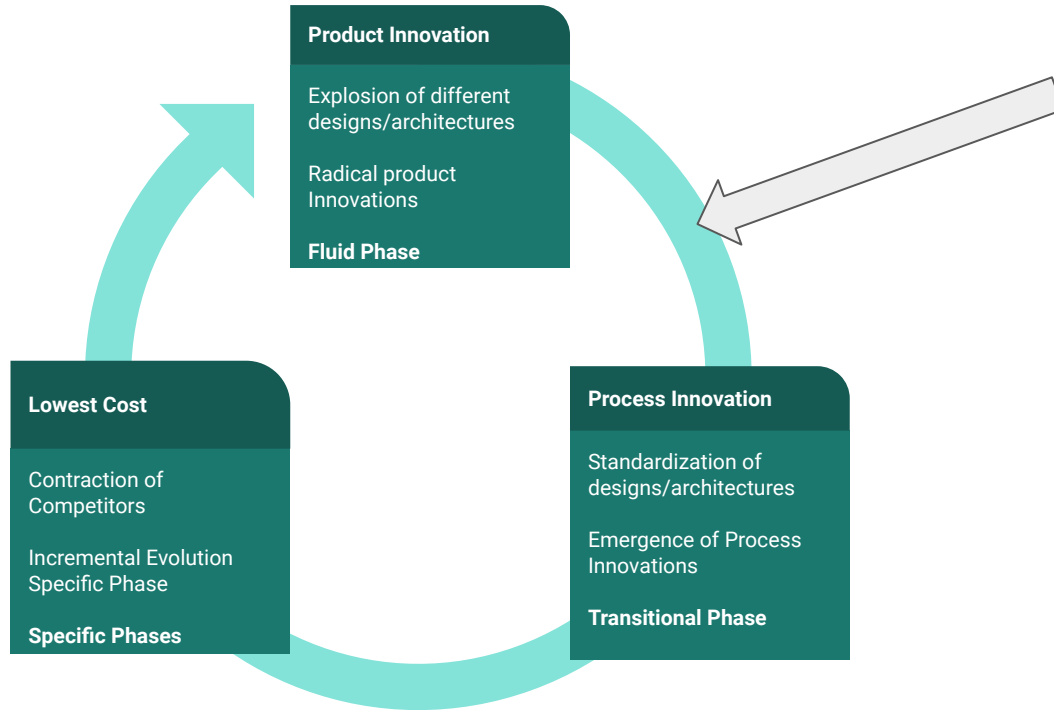


High barrier of entry for MBSE (and SE).

MBSE takes: time, resource and effort - difficult to do whilst doing your day job. Additionally, difficult to sustain as well!

Sparx EA® is the MVP MBSE choice, 'Rock Souped' the training

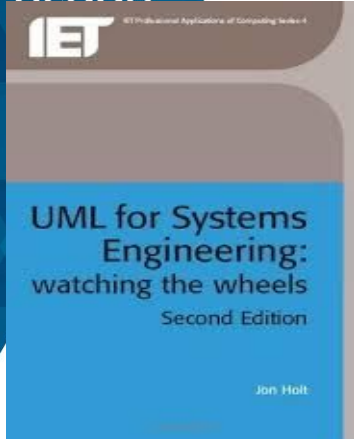
Challenges - Ocado's Business Lifecycle



**Ocado is
now here**



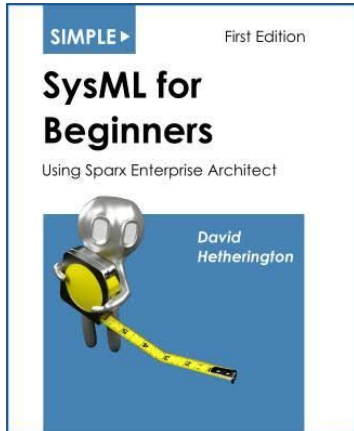
Challenges - Making converts without being evangelical



First Introduced to 'MBSE' in 2009 on my MSc but used Visio templates (sorry Simon) - **intellectually sold**

Came across Howells and Bleakley (2012) and Howells et al. (2015) presentation - **economically sold.**

Gained access to MagicDraw® in 2017 *but was a fool with a tool* - **professionally sold.**



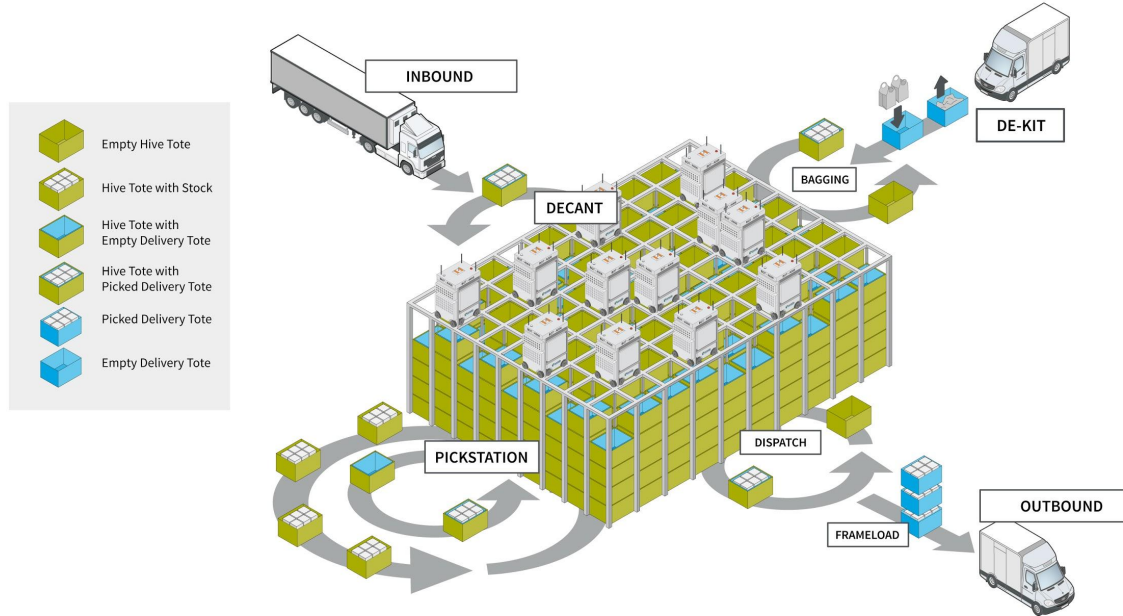
Need to learn the language, learn the process, learn to use the tool (and repeat).

Be incremental, show small benefits often. Seeding ideas through company communications channels (Fuse®, Slack® and a delayed visit to Changan R&D UK).

Fundamental, you need to motivated, to drive your efforts forwards



Challenges - Multiple Whys (Benefits)

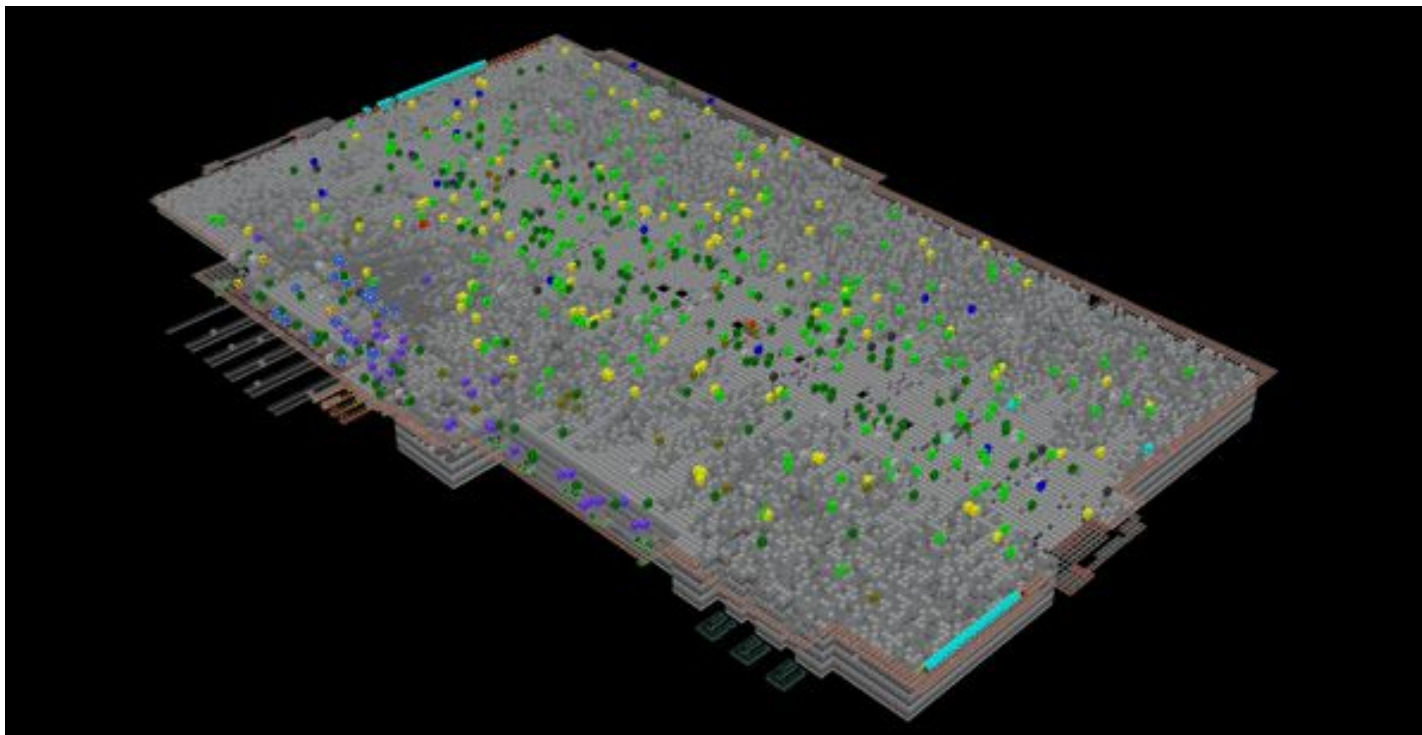


Grid needs Lean Six Sigma = Efficiency.

Peripherals needs Product Line Engineering = Re-use

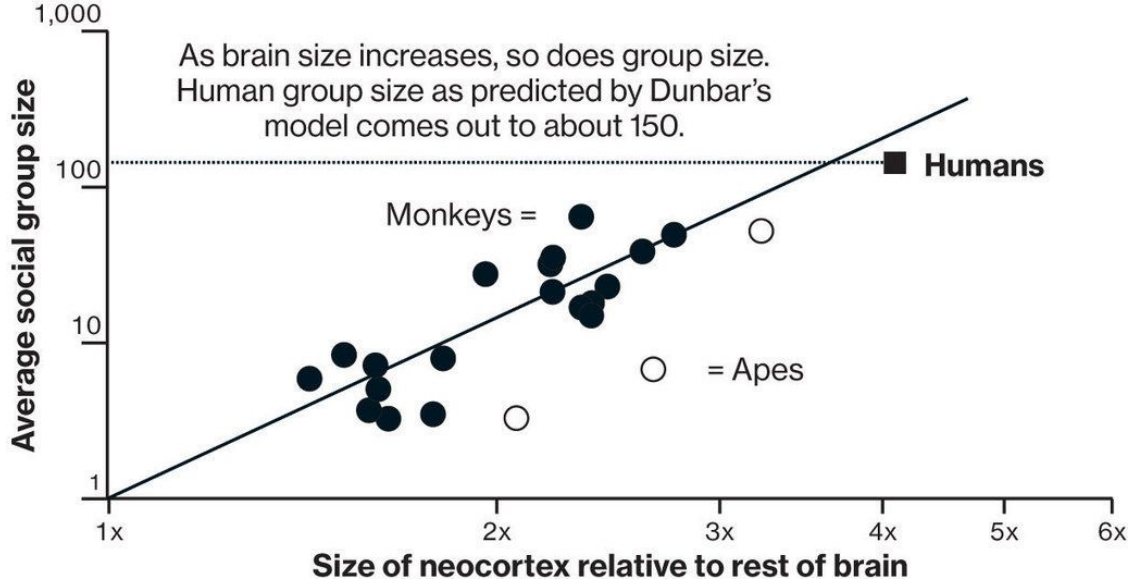
Bots etc. need Complexity Management = Automation.

Challenges - We have Digital Twins already!



Challenges - Conway's Law and Dunbar's Number

The Social Cortex



<https://www.brightlemon.com/blogs/how-many-friends-do-you-really-need>

Need to Architect for the Organisation rather than Design Structure Matrix / N^2 Chart.

Challenges - Conflicting Worldviews

Product-led	↔	Project-led
Product-led Organisation	↔	Functional Organisation
Explore	↔	Expand
Expand	↔	Exploit
Explore	↔	Exploit
Proactive	↔	Reactive
Autonomy	↔	Central Control
Software	↔	Hardware
People driven	↔	Process driven
Knowledge in the Tools (e.g. IDEs)	↔	Knowledge in the Documentation (or Models)
Action-oriented	↔	Reflection-oriented

Next Steps...

Successes and lessons learnt along the way

Systems Engineering started adding value by addressing Requirements Management practice.

With the G Suite, a solid set of Requirements have been documented.

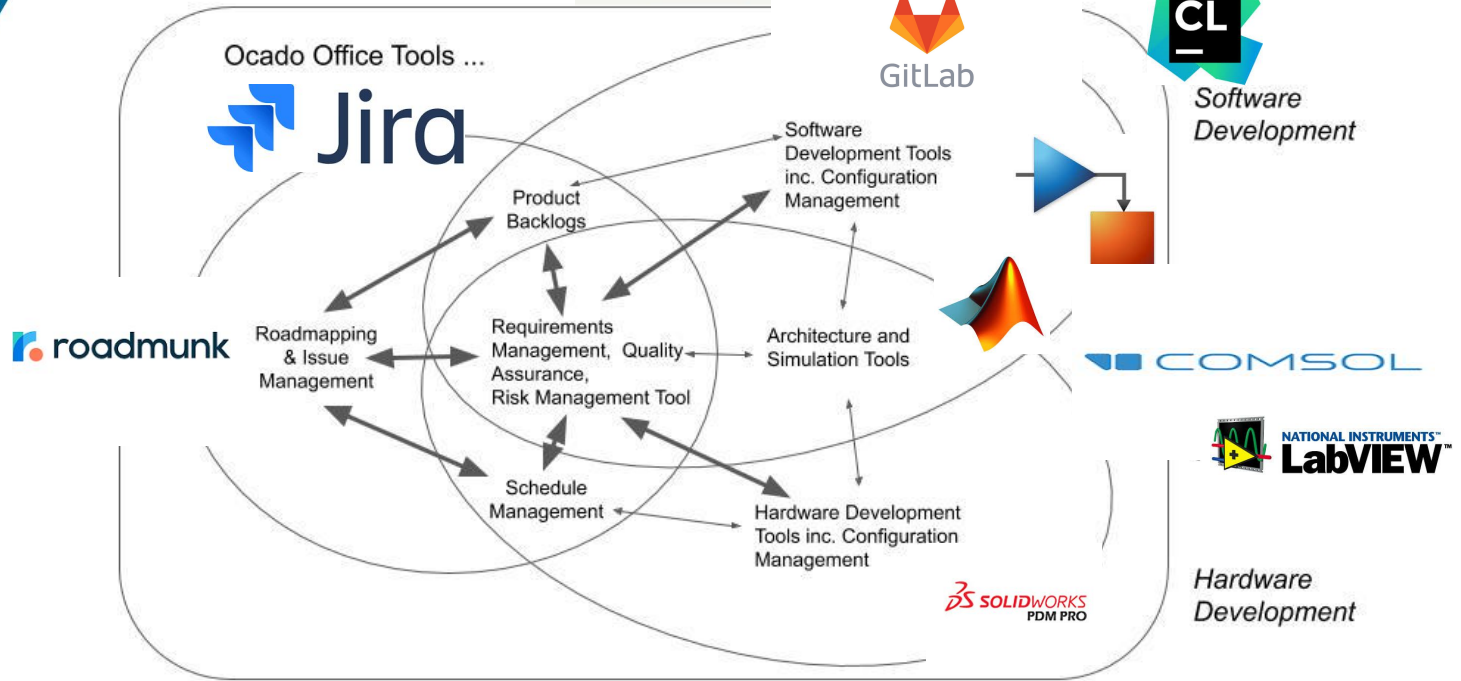
Need G Suite-like collaborative capabilities in our tooling choices to operate within Ocado.

Each area has different technological challenges and therefore has different Architectural Definition needs - don't fight it!

Future Tool Chain Architecture

TIA Portal V14

Basic Tooling Architecture



Altium
Designer

SOLIDWORKS

Develop the Requirements Management Capability

Use MBSE to develop our Requirements Management capability.

High End Requirements Management tools allow you to easily create your Requirements, Test Case and Risk Management ontology elements.

Use ISO 15288:2015 concepts as Rosetta Stone for the Ontology Elements

Continue to practice MBSE where ever possible.

Conclusion & Any Questions?

Adoption of MBSE is work in progress.



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