Adapting Operations Management Teaching to a Changing World

Nigel Slack & Alistair Brandon-Jones

- Is the operations environment getting more turbulent?
- What is changing / has already changed / likely to change?
- What will be the impact on operations management?
- How will / should it affect our teaching?
  - Which changes to incorporate?
  - How to incorporate them?
Fog of war
The World Uncertainty Index is climbing again as the invasion of Ukraine clouds the economic outlook.

Overall uncertainty
(Index, GDP weighted average)

Uncertainty related to the war in Ukraine as a share of overall uncertainty

Note: The left chart is computed by counting the percent of the word “uncertain” (or its variant) in the Economist Intelligence Unit country reports. The index is rescaled by multiplying by 1,000,000. A higher number means higher uncertainty and vice versa. The right chart is computed by counting the percent of the word “uncertain” (or its variant) that appear near a word related to the war in Ukraine in the Economist Intelligence Unit country reports and is calculated as a percentage of overall uncertainty.
The VUCA (volatility, uncertainty, complexity, ambiguity) framework

- **Volatility**: Low (time) to High
- **Uncertainty**: Low to High (time)
- **Complexity**: Low (time) to High
- **Ambiguity**: Low to High

**Reduce effect by**

- **Vision**: Redundant / surplus resources, Preparedness
- **Understanding**: Collecting / modelling and Sharing information
- **Clarity**: Develop expertise / understanding of relationships
- **Agility**: Learning through experiment and simulation
Before we consider current and future changes ... 

does our teaching reflect what has already happened?

...what examples do we use to illustrate OM?
Scope - from core manufacturing ... to all types of operation, process, and supply network
Sometimes we are late in including issues. For example the importance of data in OM decision-making
Sometimes we are ‘about right’. For example, introducing cases that speak to significant changes in strategic direction or operational realities

IKEA looks to the future

https://www.youtube.com/watch?v=DXfwLFyxtls
IKEA looks to the future

- Expansion slowing, new generation not as enamoured, negatives getting more important – “it is clear that one era is ending and another beginning.”

- The response ->
IKEA case questions

• Consider smaller town-centre stores and discuss ->
  • What do you see as the customer value proposition?
  • What are the challenges of delivery this new service?
Sometimes use the same idea (EOQ), but with a different emphasis.

Shortage costs getting more expensive?
And sometimes we’re maybe too early!
Things change, OK?

There is a vast industry involved in designing, making and distributing trainers (sneakers). It is an industry where supply chains are complex, and involve an extensive network of specialized operations, each focusing on the individual components that make up the shoes. A single part could have crossed back and forwards between several different countries before being assembled into the finished product, usually by hand. Most of the making is done in Asia, where the vast majority of production takes place. The shoes are then transported to the retail shops where they are sold. This process can take a long time, from the initial conception of a new trainer to its eventual arrival in the shops.

There have been problems with the traditional model of fashion cycling, particularly for fashionable trainers with a short ‘fashion life’. From the initial design for a new trainer through prototype creating and testing, to placing orders on suppliers, setting up the production process, ramping up production, and finally sending the trainers to the shops, can take as long as 18 months. Even orders to replenish stocks can take two to three months. But fashion cycles for trainers are getting shorter, with some designs lasting only one to three years.

Faced with this tension between slow lead-times on one hand and short fashion cycles on the other, Adidas developed its ‘Speedfactory’ operation, the first of which was located in Ansbach, Germany, halfway between Munich and Frankfurt (the second one is near Atlanta in the US). The Speedfactory is totally automated, and designed to be able to accommodate new technologies.

Adidas shuts its ‘near market’ factories?

18 months) between conceiving a new trainer and it arriving in the shops. And it is this last point that was the most problematic, particularly for fashionable trainers with a short ‘fashion life’. Even orders to replenish stocks can take two to three months. But fashion cycles for trainers are getting shorter, with some designs lasting only one to three years. Faced with this, Adidas developed its ‘Speedfactory’ operation, the first one of which was located in Germany and the second one in the United States. The Speedfactory was totally automated, and designed to be able to accommodate new technologies, such as 3D printing enabled by motion capture technology. And because almost all the stages of manufacturing were done on the same site, the intention was to make Adidas faster and more flexible, especially in producing small batches of fashionable products. It was hoped that the Speedfactories could produce shoes in days and replenish stocks in hours.
Textbook writing schedule and usage

Governs the risks generated over content decisions

- Start writing
- Manuscript
- Published
- Adopted
- Average age of text
- Second-hand market
- Used as current edition
- Year 1
- Year 2
- Year 3
- Year 4
- Year 5
- Etc.
Question ....

Do the examples you use cover a reasonable range of types of operation?
Examples in Slack et al ‘Operations Management’ 10\textsuperscript{th} Ed.

<table>
<thead>
<tr>
<th>Dimension</th>
<th>Description</th>
<th>Percentage/Category</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of Service</td>
<td>20% manufacturing</td>
<td></td>
</tr>
<tr>
<td>Unit of Analysis</td>
<td>Most in supply chaps</td>
<td></td>
</tr>
<tr>
<td>Producer-Recipient</td>
<td>B2C (50%), B2B (44%)</td>
<td></td>
</tr>
<tr>
<td>For-profit, Non-profit</td>
<td>≈7% non-profit</td>
<td></td>
</tr>
<tr>
<td>Strategic Focus</td>
<td>33% some strategic coverage</td>
<td></td>
</tr>
<tr>
<td>Volume-Variety</td>
<td>20% low volume-high variety</td>
<td></td>
</tr>
</tbody>
</table>
Examples in Slack et al ‘Operations Management’ 10th Ed.

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<tr>
<th>Dimension</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>The ‘revenue flows’ dimension</td>
<td>&lt;2% platform-based operations</td>
</tr>
<tr>
<td>The ‘order penetration’ dimension</td>
<td>≈45% create-to-order</td>
</tr>
<tr>
<td>The ‘functional scope’ dimension</td>
<td>&lt;2% non-operations function</td>
</tr>
<tr>
<td>Steady state-transient dimension</td>
<td>&lt;5% deal with transient conditions.</td>
</tr>
<tr>
<td>The ‘operations activities’ dimension</td>
<td>≈ Equal split</td>
</tr>
</tbody>
</table>
Question ....

What is changing in the operations world, and what impact will it have?
What will have an impact on OM teaching?

<table>
<thead>
<tr>
<th>Cause</th>
<th>Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attitudes to sustainability</td>
<td>Climate change</td>
</tr>
<tr>
<td>Hybrid working</td>
<td>Political conflict</td>
</tr>
<tr>
<td>Commodity prices</td>
<td>New / developing technologies</td>
</tr>
<tr>
<td>Regulation</td>
<td>Customer expectations</td>
</tr>
<tr>
<td>Labour / skill shortages</td>
<td>Supply security</td>
</tr>
</tbody>
</table>
How will the relative importance of operations objectives change?

All will remain important, and...

Different objectives will have different degrees of importance for different operations.

.... But generally, .....
Question ....

How do we judge which developments to include in our teaching?
Judging how much of the change to incorporate into teaching

How Frequent is it likely to be?

- One-off
- Repeated

How enduring are its effects likely to be?

- Transient
- Permanent

How many types of operation will it affect?

- Few
- All

How many OM topics is it likely to affect?

- Little
- Total

How much consensus is there on the consequences of the change?

- AI?
- Covid?
Judging how much of the change to incorporate into teaching

The Internet of things (IoT) More to the left, or right?

How Frequent is it likely to be?
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How enduring are its effects likely to be?
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- All

How much consensus on the consequences of the change is there?
- Little
- Total
And the impact on teaching? ....

Question ....

As things change faster, or become less predictable, should we move to teaching ‘principles’ rather than ‘specifics’?

For example, Process technology ....
For example - process technology - Five ‘primary capabilities’
New Mac Desktop?
Might be upgraded next year ...... but I want one NOW

Buy now or wait?

What factors should I consider?

It’s the bionic duckweed problem
Assessing the impact of a processing technology on operations performance

What can it do?
- How securely can it do it?
- How connectedly can it do it?
- How safely can it do it?
- Where can it be done?
- How sustainably can it do it?
- How cheaply can it do it?
- How well can it do it? (quality)
- How fast can it do it? (speed)
- How reliably can it do it? (dependability)
- How flexibly (response) can it do it?

What range of things can it do
And the impact on teaching? ....

To what extent should we be integrating new ideas into the curriculum?
Devote a session to a new topic, or spread it through the module (or book)
Thanks for viewing

Any more questions ....

Email me at..

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