Prioritizing your resources based on bottlenecks and riskiest assumptions

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Integral.
Software consulting in automotive

- Inclusion
- Transparency
- Bias towards action
- Strong opinions, loosely held
- Learn through experimentation

Software taught through pairing

- Diversity in tech
- Tech in Detroit
- Focus on OOP, TTD, Cloud
- integrate@integral.io
- integratedetroit.org
Lean software in automotive in Detroit!
Disclaimer
I am not an agile practitioner
Disclaimer

This won’t be useful if you have a crystal ball

@ashoksivanand | ashok@integral.io | #AAB18
Disclaimer

This may be useful if you often use a magic 8 ball.
Systems + Theory of Constraints + Bayesian Analytics

Image sources
- http://www.tciaffairs.net/an-electrical-wiring-diagram/
- https://www.allaboutlean.com/drum-buffer-rope/
- https://www.kbmanage.com/concept/bayesian-analysis
Metaphor for the system – Flavoured Water Inc.
Step 1 - Decompose the system
How many bottles can we ship after 10 hours?

- Filler: 840/hr
- Capper: 720/hr
- Labeler: 780/hr
- Shrink Wrapper: 800/hr
- Cartoner: 760/hr

Raw Materials → Customers
Step 2 - Identify the constraint and exploit

- Raw Materials
  - Filler
  - Capper
  - Labeler
  - Shrink Wrapper
  - Cartoner

- Customers

- Water: $840/hr
- Caps: $720/hr
- Labels: $780/hr
- Wrap: $800/hr
- Cartons: $760/hr

$Flavour$
Raw Materials, Customers, Workforce etc.

- Flavour
- Water

- Filler
- Capper
- Labeler
- Shrink Wrapper
- Cartoner

- Caps
- Labels
- Wrap
- Cartons

Costs:
- Water: $840/hr
- Caps: $720/hr
- Labels: $780/hr
- Wrap: $800/hr
- Cartons: $760/hr

Customers:
- Customer 1
- Customer 2
- Customer 3
- Customer 4
- Customer 5
- Customers...

Monthly hours: 200 - 500 hours
Add a warehouse?

Monthly hours: 200 - 500 hours
Estimates by Experts – 90% Confidence Interval
Effective rates vs Maximum rates

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<thead>
<tr>
<th>Flavour</th>
<th>Caps</th>
<th>Labels</th>
<th>Wrap</th>
<th>Cartons</th>
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<td>Water</td>
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<td>760/hr</td>
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<td>720/hr</td>
<td>780/hr</td>
<td>800/hr</td>
<td>760/hr</td>
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Monthly hours: 200 - 500 hours

Customers

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The new Step 2 - Model it out

“all models are wrong but some are useful”

- George Box
Integral Powertool – Spreadsheets make this easy

https://docs.google.com/spreadsheets/d/1A5pAeJq166GWFvTTMWI1jlRjrJvyg21US3Hloxo6kow/edit#gid=1755358533

I promise this will be shared
Recap

Step 1 - Decompose the system

Step 2 - Leverage ‘experts’; estimate and model the system

Step 3 - Identify the biggest constraint and exploit
  - Identify the most uncertain and validate

Step 4 - Apply feedback to your estimates as you learn and measure
Precision vs Accuracy

Low accuracy  
Low precision

Low accuracy  
High precision

High accuracy  
Low precision

High accuracy  
High precision

https://sites.google.com/a/apaches.k12.in.us/mr-evans-science-website/accuracy-vs-precision
Testing isn’t limited to A/B testing
Wizard or Oz, Concierge
Depth interviews
Fundraising
“MVP”

https://www.minervatel.com/call_center
https://www.amazon.com
What would you do if your budget was .01X? 100X?
Books you can read

The goal
- Eliyahu Goldratt

How to measure anything
- Douglas Hubbard
Thank you

Feedback?
Questions?

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