BEFORE DRAGON
DRAGON’S VISION

We are going to make something as insanely complex as manufacturing consumer electronics feel easy.
WHO WE’VE HELPED
## What Is The Hardware Revolution?

**Barriers to entry have come down... anyone can develop a product**

<table>
<thead>
<tr>
<th>Rapid prototyping, 3D printing, Arduino</th>
<th>Diverse teams that can be dynamically built (Linked in)</th>
<th>CAD tools available on the cloud (Sketchup/Grabcad)</th>
<th>Online marketing and market validation (Youtube, Videos)</th>
<th>Access to capital (Kickstarter)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cloud based operational software (Google docs, Dragon Standard BOM)</td>
<td>Manufacturing expertise productized (Protomold)</td>
<td>CM’s taking on small start ups, small flexible cells</td>
<td>Bypass distributors and retail (Web-based)</td>
<td></td>
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</table>
Why is the HW revolution relevant to all companies?
The hardware revolution is a collection of disruptive technologies that enable small companies to behave like big ones.

*Thousands of hardware products will launch this year*  
*Thousands of appropriately sized and capable factories worldwide*
### System architecture

**System**

Combined elements that define how your service is experienced by your customer

- Technologies, Hardware, packaging, software, app, communications, 3rd party apps, 3rd party SDKs, customer, community of consumers, etc.

**Architecture**

Mindful design and selection of elements and active management of interface definitions

- Organizational and strategic partners layer over the architecture (may not be 1-1)

Defined by the ELEMENT and INTERFACES

**Vision requires successful integration of the whole system.**

**Complex interactions and complex partnership**

**A single change can have significant ripple effects on the rest of the product**
• What is the overall vision for and what it delivers as a brand? How are the brand ambassadors communicating? How do the products relate? What unique proposition are you providing? How stable is the vision?

Technology Road Map

• What are the products, their features, and delivery dates? Is there a common architecture, or one planned for the future? What chipsets/platform will be common across all products? Are changes to roadmaps done without consultation? Is it written down? Is there a governance to manage the roadmap?

Partnership strategy

• Who will help to execute the roadmap? How and when do they phase in and out? How are the right partners selected?

System architecture

• How are the various parts of the whole customer experience divided up? Who is responsible for what aspects of the product? What are the interfaces and interactions? How are tradeoffs made? How is the PRD managed and changed?

Development execution

• What processes are used to drive programs to success? How are tradeoffs and decisions made? How are the partners coordinated? Right skills on the team?

Production execution

• How do we achieve consistent quality, time and cost performance from our CMs? What are the right terms? How is manufacturing managed?

Alignment across all levels

• Excellent
• Good
• Fair
• Needs significant improvement
• Critical
Smorgasbord of opportunities: Can’t fill up the plate too full.

This is an exciting product category with lots of opportunities and partners that want to work with.

Tempting to just outsource to add capacity.

If you try to do them all, you will fail at all.

Limiting factor is internal capacity and ability to create a portfolio approach.

Multiple products using the same bandwidth limits the schedule.

Adding a project will extend or compromise all other products.
Why do you need a technology roadmap

• Scale work scope to a feasible
• Improve chance of meeting targets at the right cost and quality
• Create consensus on directions
• Allocate resources to advanced technology map
• Ensure you are all on the same page
• Take advantage of technology trends
• Meet emerging trends
• Ensure you have enough resources
• Set the tempo for product releases
• Align strategic partnerships
Why do it if is going to change?

• 401K analogy
• Create a baseline plan and then review the changes
• All going in the same direction and being consistent in changing direction
• It isn’t the outcome, it is the process of discussing it
Technology Roadmap

A technology roadmap is a plan that matches short-term and long-term goals with specific technology solutions and resources

- Reach consensus and agreements
- Forecasting resource needs
- Forecast advanced development
- Has a governance process to manage changes

### Roadmap example

![Roadmap Example Image]

### Roadmap elements

**Elements**
- Technology
- Feature set
- Schedule
- Resources
- Capacity
- Product launch
- Platform elements

**Process**
- Governance
- Ownership
- Communication
- Change mgt.
Why isn’t there a single format

• Each company has a different “constraint”
• Different X-Y axes
• Different types of technologies.
Example 1
Example 4
How frequently do you release new products

Based on product cycles

18-24 months

1 year refresh (see the apple example)
## What variables are on technology roadmaps

### Resources

<table>
<thead>
<tr>
<th>People</th>
<th>Factory capacity</th>
<th>$, NRE</th>
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### Product introduction tempo

<table>
<thead>
<tr>
<th>Versions/refresh</th>
<th>Major product intro</th>
<th>Platform based introductions</th>
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### Technology

<table>
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<tr>
<th>Trends (LCD, size, power)</th>
<th>Emergent technologies (chips)</th>
<th>New tech development</th>
<th>Platform technology</th>
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</table>

### Customer

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<tr>
<th>Trends in needs (cpu, size)</th>
<th>What they need to learn to use the product (i.e., mouse)</th>
<th>Market growth, demographics,</th>
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</table>
Governance process

Who owns it?
Who changes it?
How do you check execution against the plan.
Resources

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Dragoninnovation.com

Dragon Standard BOM
dragoninnovation.com/dragon-standard-bom

Videos on DFM
blog.dragoninnovation.com/category/design-for-manufacturing-course/

Blog
blog.dragoninnovation.com

Slides
www.slideshare.net/dragoninnovation
Questions?