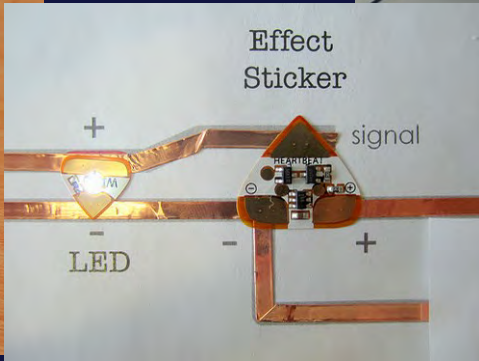
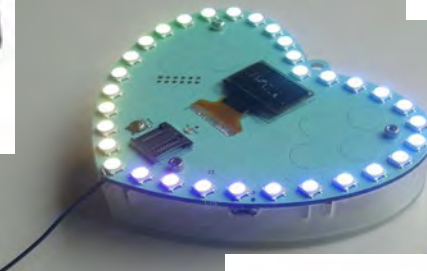


Guerilla Production Tactics

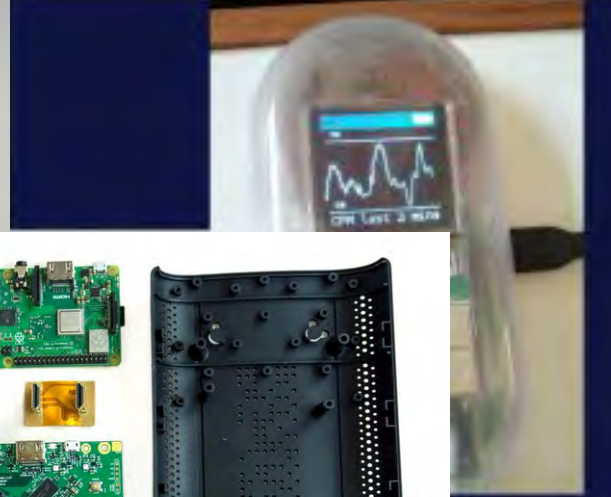
Unconventional Supply Chains
for Unconventional Products
@bunniestudios

I Like to Make Hardware

I Have Many Strange Projects...



Most are "Boutique" Projects...



Produced in Low Volume, Few Customers...



-2000



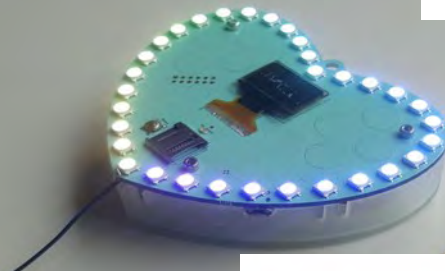
90



-500



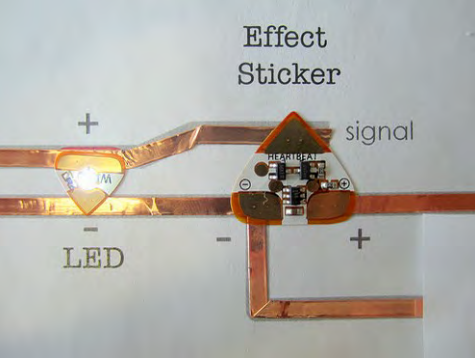
-2000



-300



-300



Boutique Hardware:

**Unique Idea,
Small Market;**

No Investors

How to *Make*?

One Common Approach: "Look Before You Leap"



Problem: It's Scary...



Another Common Approach: "Fail Forward Fast"



Problem: Only Unicorns Can Fly, Normal People Fall



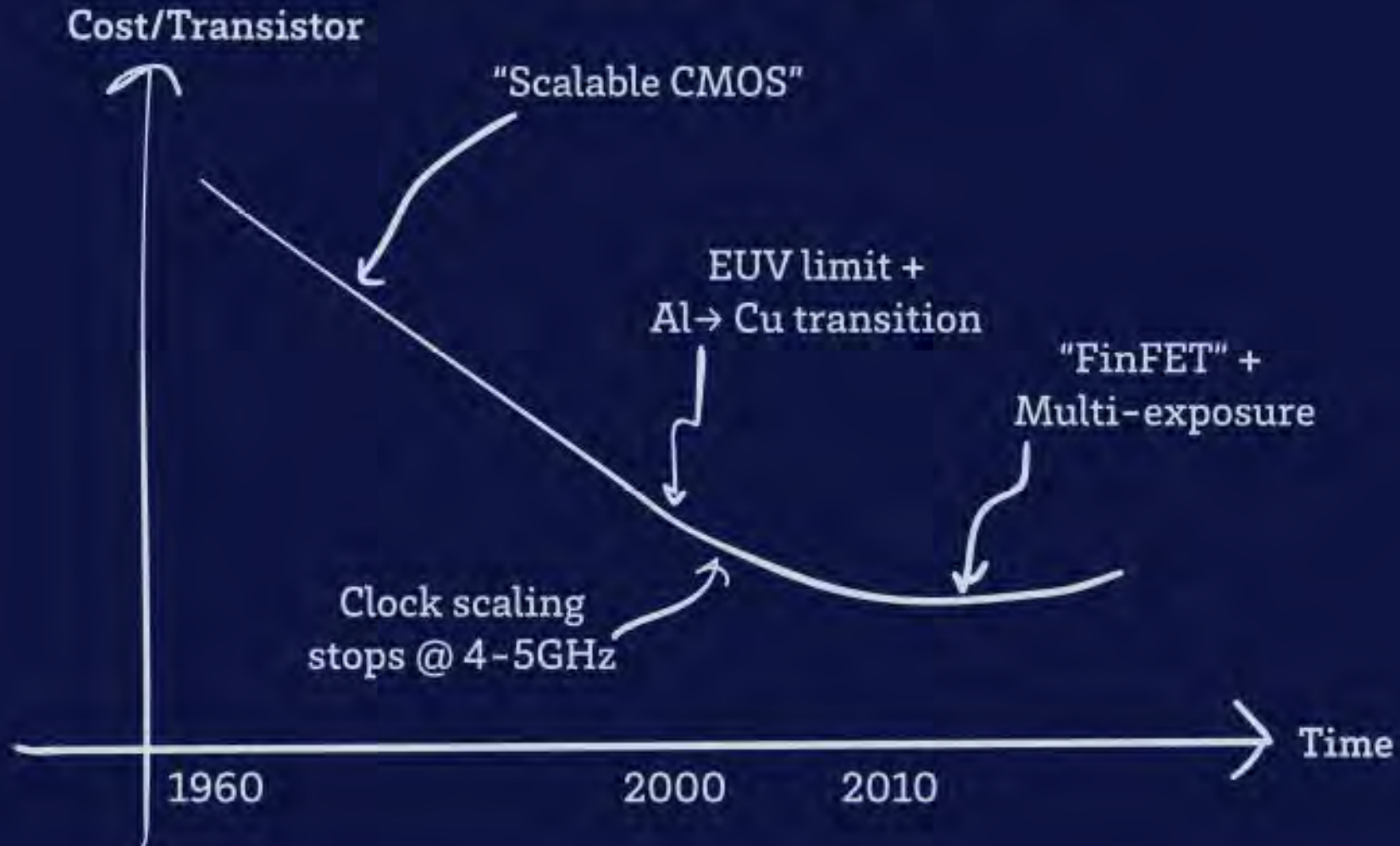
**So How Do I Make?
"Guerilla Production Tactics"**

Three Factors that Enable Guerilla Production Tactics

- 1) The Ending of Moore's Law
- 2) The Normalization of Open Innovation
- 3) Crowdfunding

**Factor #1:
Moore's Law is Dead**

Moore's Law is Dead



**Meaning:
More Investment
Does Not Mean More Performance**

2009 Maker vs Corporation



- Arduino Uno
- 20 MHz, single core

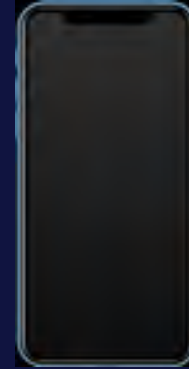


- iPhone 3GS
- 600 MHz, single core

2019 Maker vs Corporation



- Raspberry Pi 3B+
- 1.4 GHz quad-core



- iPhone XR
- 2.49 GHz hexa-core

Old Capability Approaches New Capability

- Chips used in older products now less different from chips in new products



Similar Trend in Manufacturing



**\$1mm investment in top-of-line
Assembly equipment**

**Depreciate 3 yrs, sell as
Scrap for \$100k**

**Use for 10 yrs, sell as scrap
For \$10k**

**Picked up by small factories
(but same capability)**

**High-end capability
for low price**

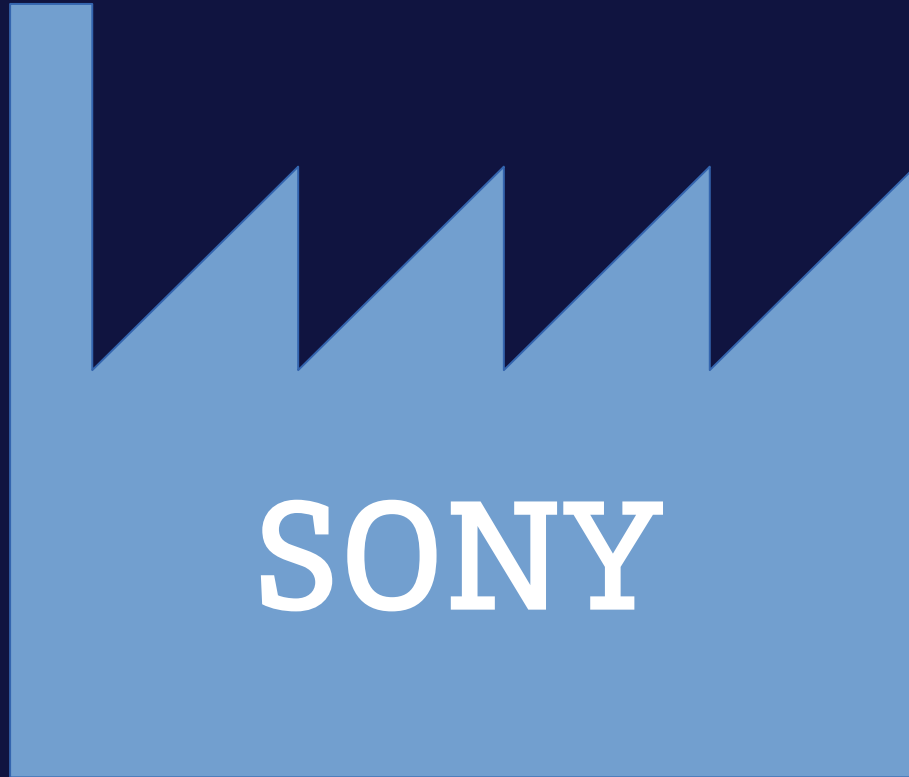
Summary: Impact of Moore no More

- More investment does not mean more performance
- Smaller gap between "old" and "new" parts
- Smaller gap between "old" and "new" factories

- Think like guerilla:
 - Consider smaller/older factories
 - Use existing modules and parts to reduce engineering and risk (less make more buy)
 - Older, cheaper modules can be "good enough"

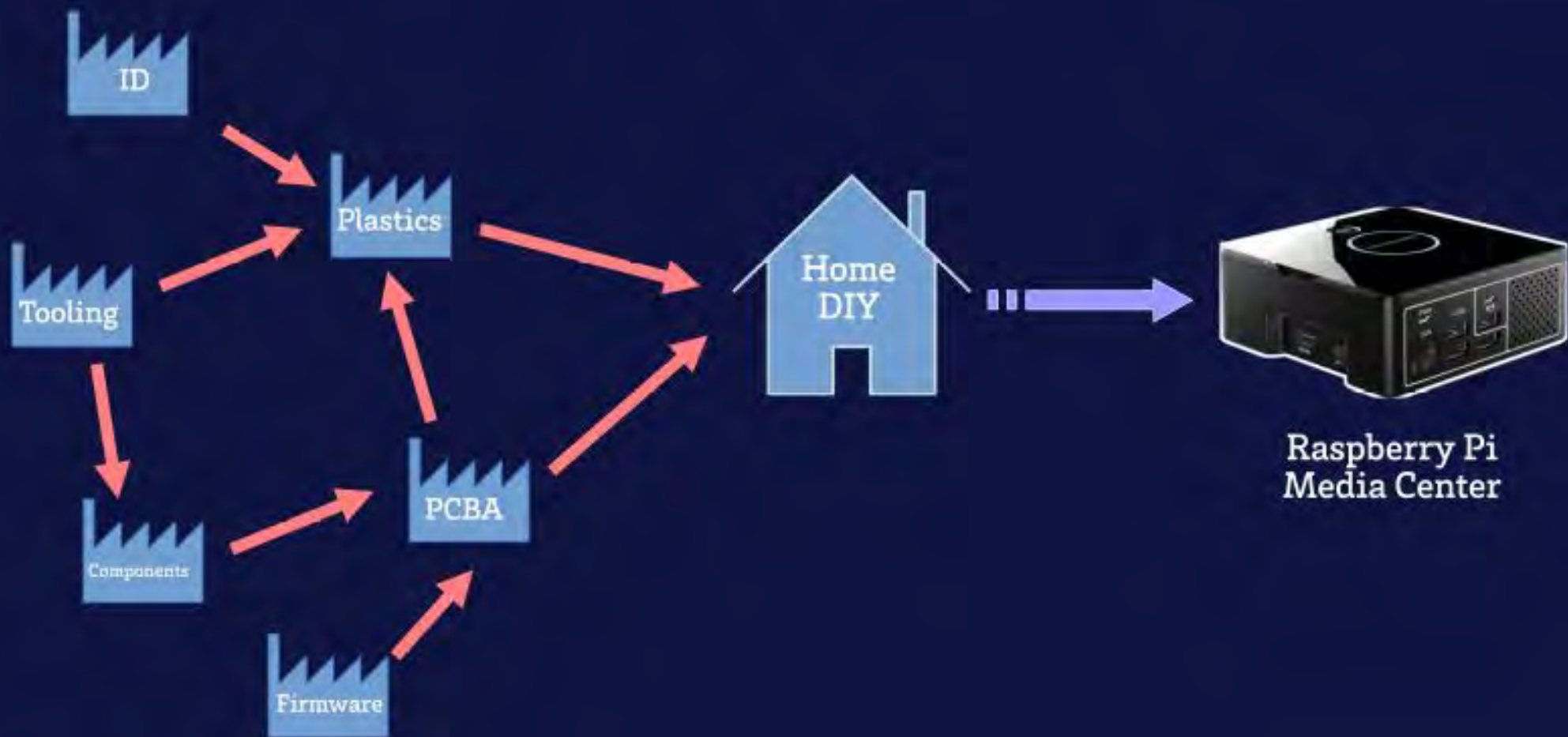
**Factor #2:
Normalization of Open Innovation**

Before Open Innovation

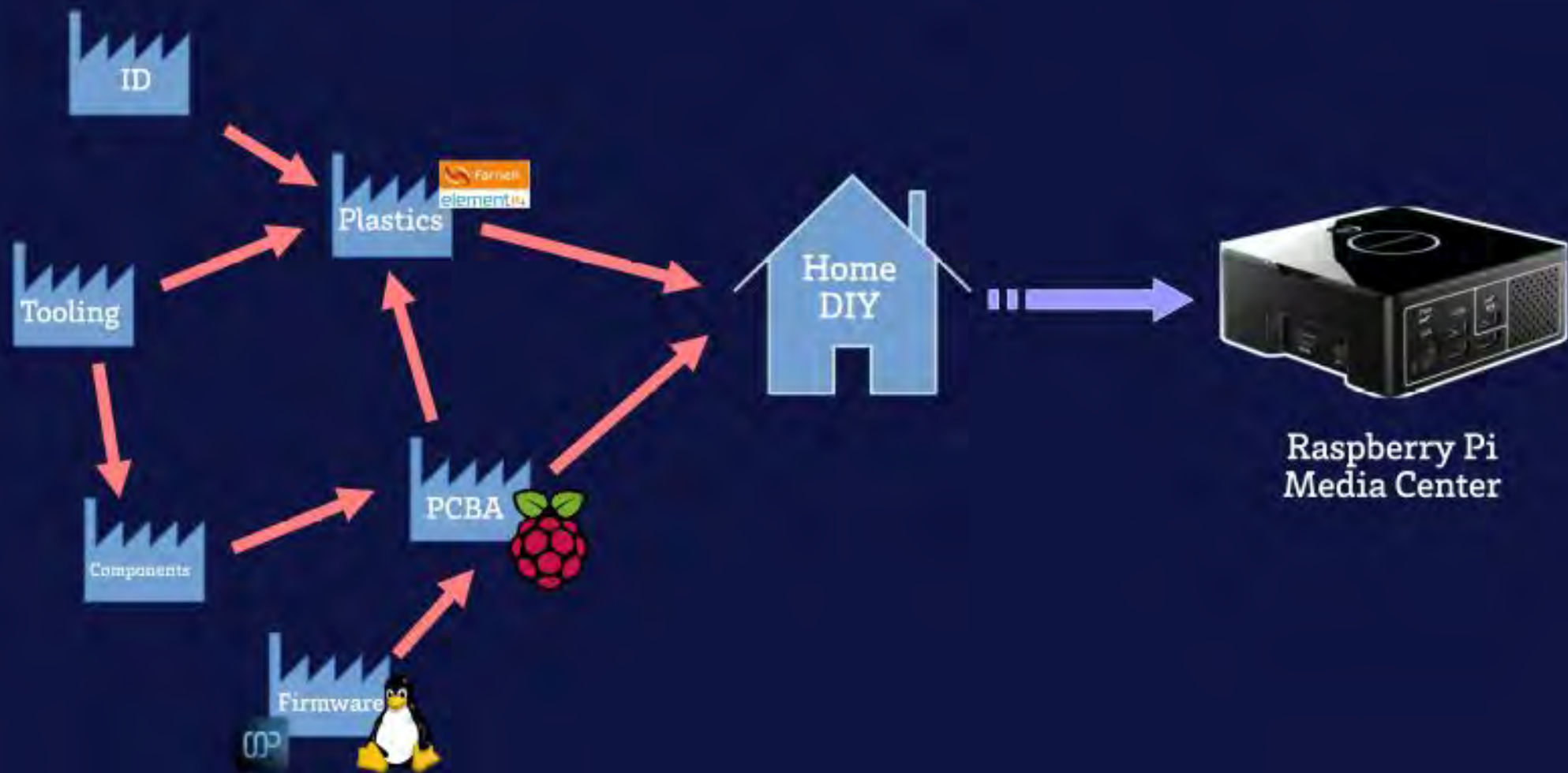


Betamax VCR

After Open Innovation



Innovators Can Focus on One Specialty Yet "Full Stack" Product Emerges from Network



Network Effect Drives Virality

Betamax

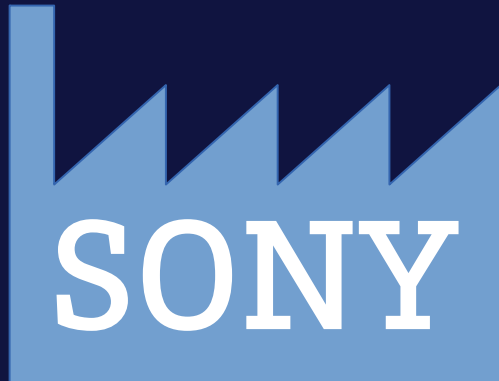


VHS

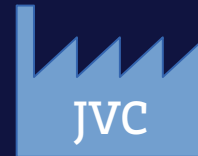


Network Effect Drives Virality

Betamax

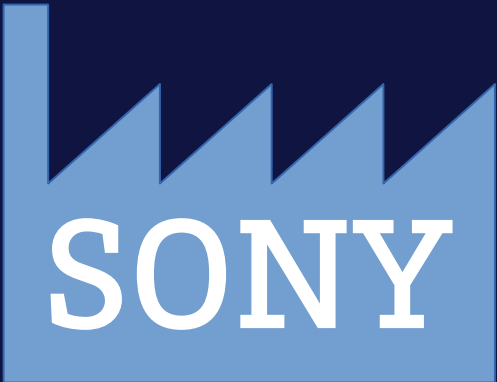


VHS



Network Effect Drives Virality

Betamax



VHS



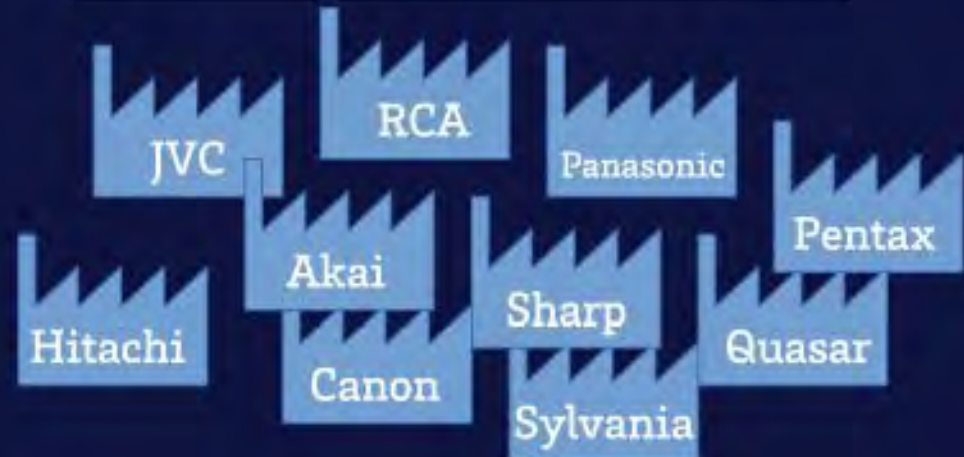
Introduced
4-hour
variant

Network Effect Drives Virality

Betamax



VHS



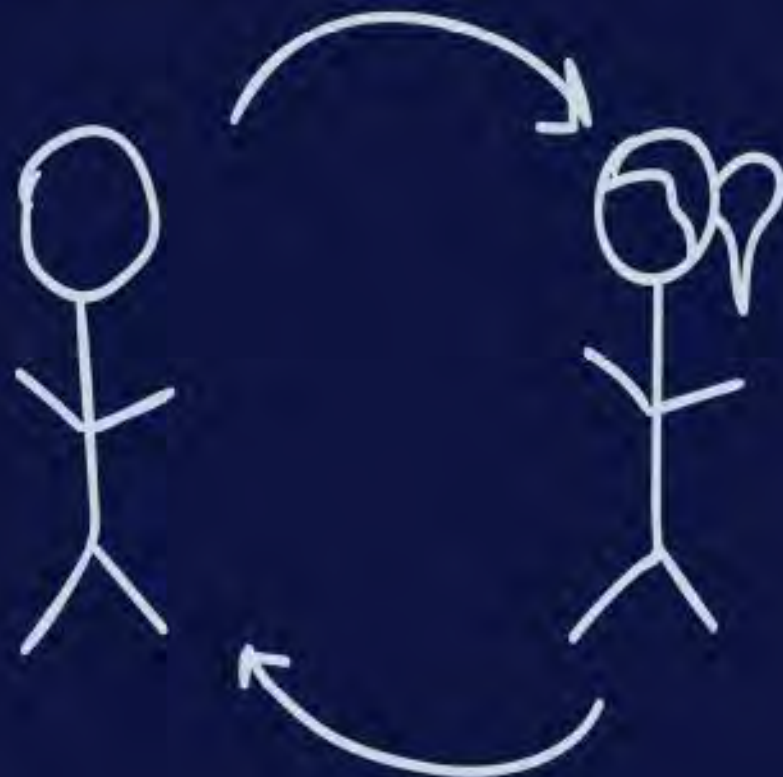
Open Innovation: Don't Be Afraid to Share

- Concern: sharing means your idea will be stolen



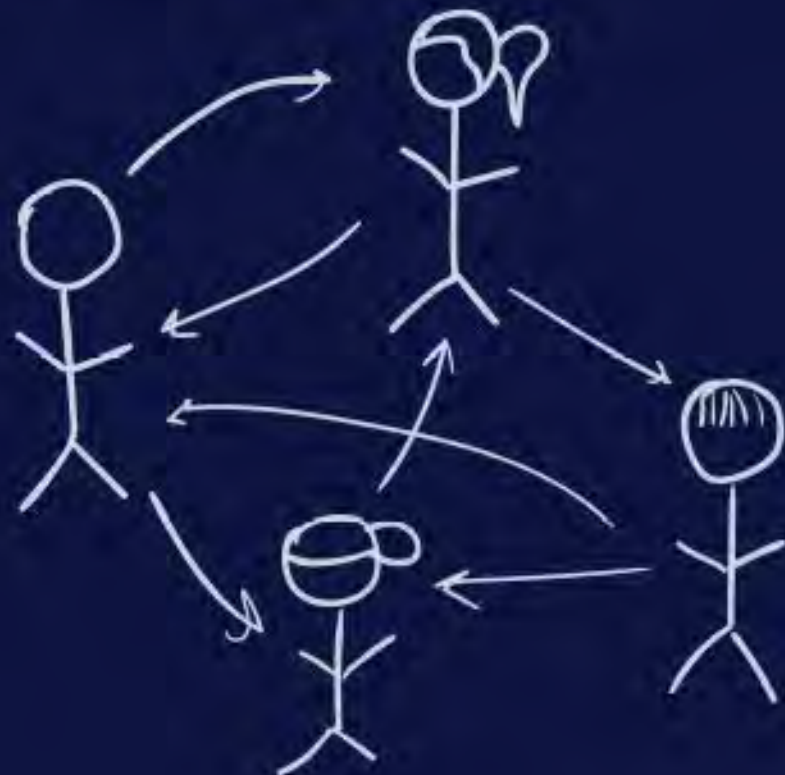
Open Innovation: Don't Be Afraid to Share

- Reality: you can "steal back" any improvements
 - Also known as "collaboration"



Open Innovation: Don't Be Afraid to Share

- Why it works:
 - Sharing unlocks a network of collaborators
 - Legal licenses (GPL, CC-SA) set expectations of reciprocity
 - Cheaters who steal face network pressure to comply



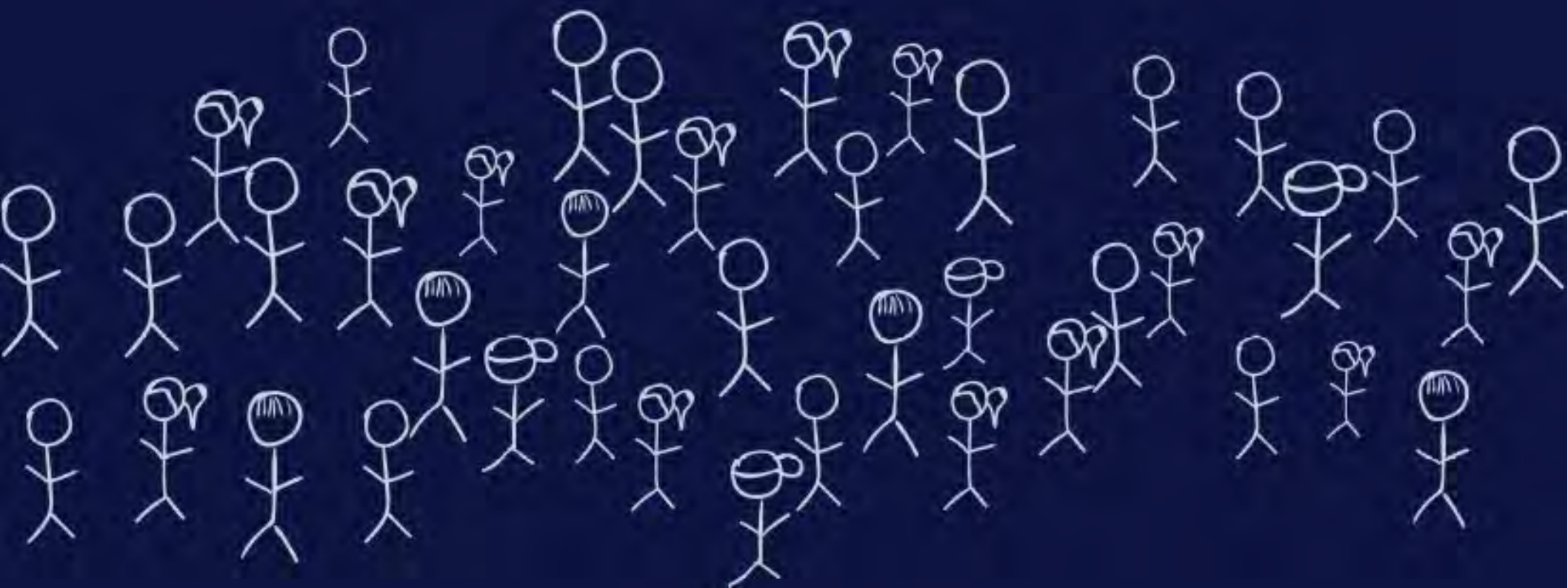
**...But Wouldn't it Be Great if Collaborators
Could Also Finance Each Other?**



Factor #3: Crowdfunding

What is Crowdfunding?

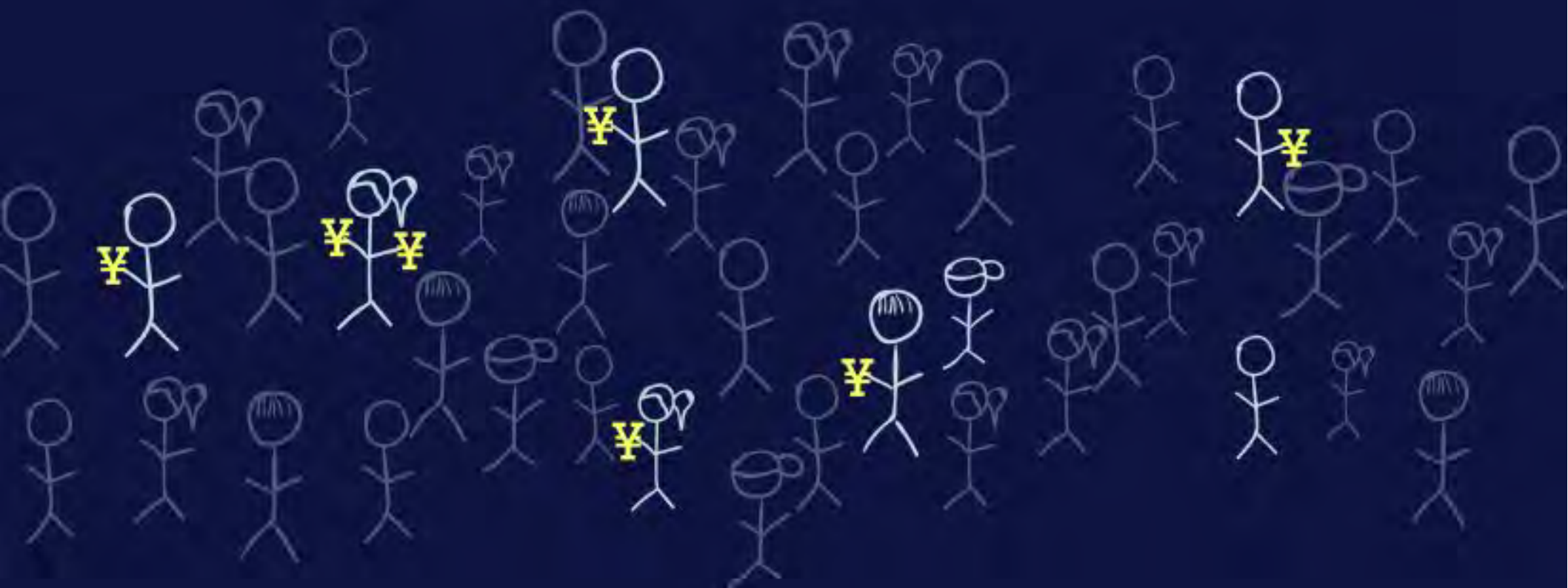
It's Exploring a Network People



Finding the Real Customers



Gathering Support at a Level They Can Afford



Solving Their Problem With Your Product



Sharing in Their Feedback, Ideas & Improvements



Thus Improving, so You Can Grow Your Customer Base



Crowdfunding

- A method to:
 - Validate market
 - Gather early adopters
 - Raise money
 - Improve your product in manageable stages

Crowdfunding vs. Venture Capital (VC)

- **Benefits**
 - Backers care more about your technology than your profitability
 - No debt, no investors – more control
 - Less effort than pitching, managing VC
- **Drawbacks**
 - Smaller amount of money raised
 - Best results when you are humble
 - VC has best results when you exaggerate
 - Brutally open process

Case Study: Novena



It Started Actually as a Router...



Thanks to Lots of Open Source Components



I Could Hack it Into a "Laptop"



Crowdfunded!

CROWD SUPPLY

BROWSE

LAUNCH

ABOUT US

Search



Novena

by Sutajio Kosagi

Computers & Networking
Open Hardware

A new open-hardware computing platform, flexible and powerful, designed for use as a desktop, laptop, or standalone board.



\$783,382 raised
of \$250,000 goal

313% Funded!

Order Below

27
updates

May 18 2014
funded on

732
backers

Last update posted Feb 13, 2018

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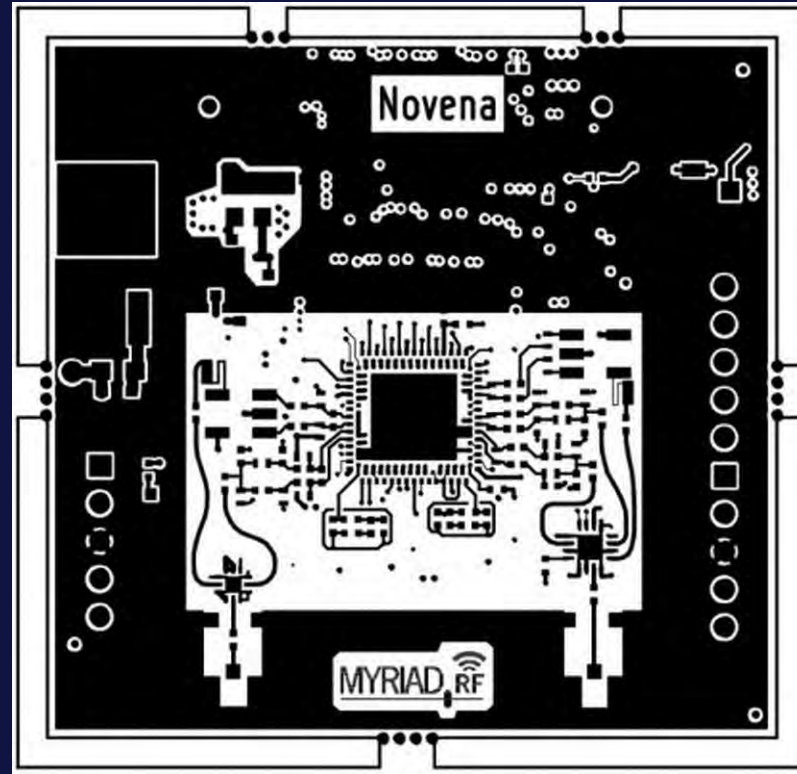
Recent Updates View all 27 updates.

Just the Board

\$550

For crafty people who want to build their case and define their own style, we'll deliver to you the main PCBA, stuffed with 4GiB of RAM, 4GiB

Users Spoke Up About Their Favorite Use Case, An Open-Source SDR...



Production Moved Ahead...



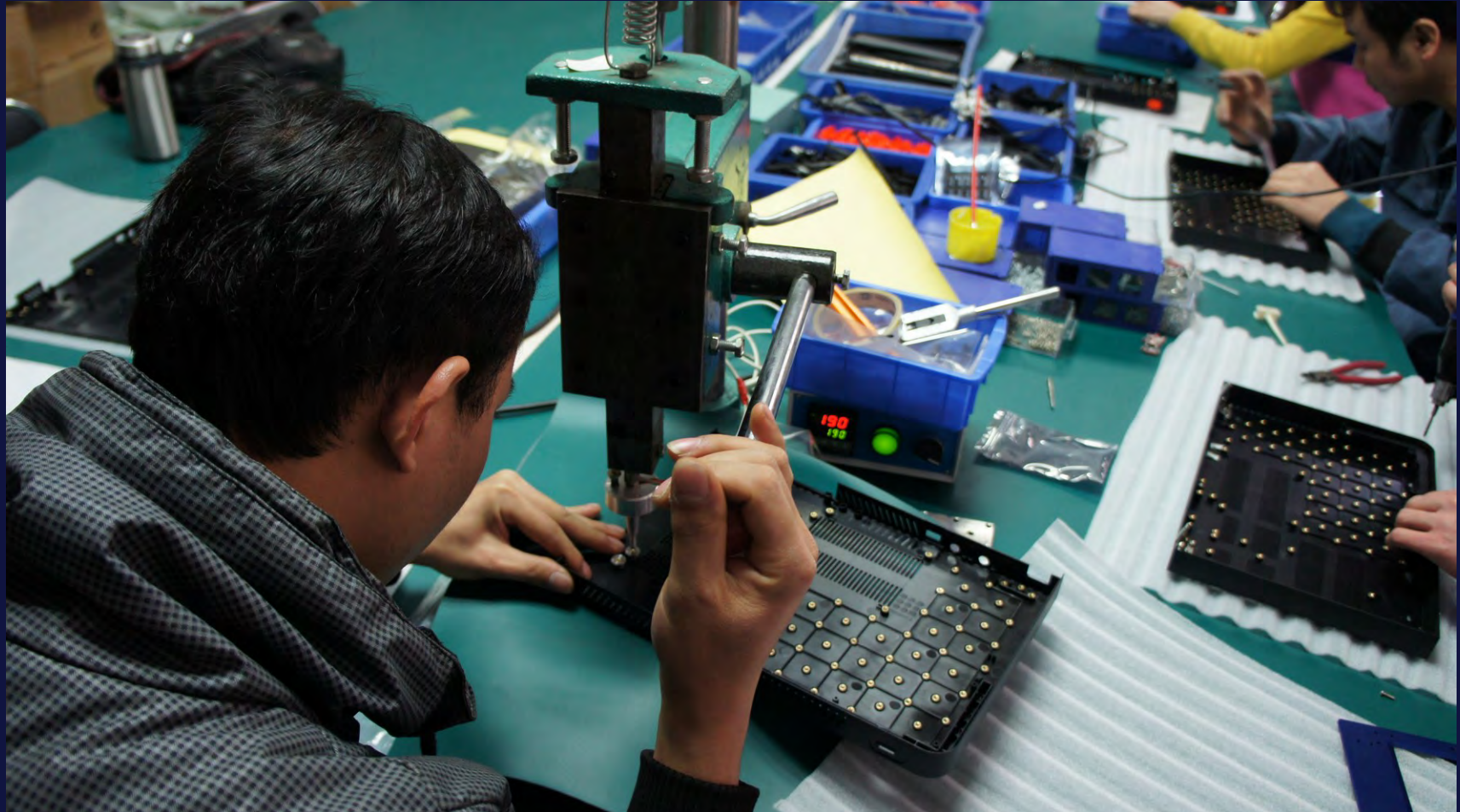
Lots of CNCs



Built Originally by Investment in Smartphones...



And a Small Production Line



Finally, on Customer's Desks!



<http://www.taoexmachina.com/images/novena1.jpg>

My Happy Outcome

- Understood open laptop market much better
- Realized it's not my thing
- Other businesses now doing it...



**So, What Was this?
Look Before You Leap?
Fail Forward Fast?**



My Approach: "Shuffle Forward With Conviction"



How to Take Small Steps with Confidence?

"Guerilla Tactics" Recap

1) End of Moore's Law:

More Investment is not Always Better
Innovation "Trickle Down" to Makers

2) Normalization of Open Innovation:

Sharing ideas enables specialization
Virality drives adoption

3) Crowdfunding:

Low-risk validation of market
Funding directly from customers with aligned interests

Thank You!
@bunniestudios

