Robotics and Entrepreneurship

Dr. Paolo Pirjanian
Chief Technology Officer
Overview

- Inspire you to start a company, change the world
- A personal story of building a robotics company
- Starting with overview of successful robots
Takeaways

- Its one thing to have a great idea... its quite a different thing to realize that in the real world

- Typically its people and not technology that get in the way of success

- Real-world problems will pose new technical challenges
Many companies do not cross the relevancy threshold
iRobot
Robots That Make A Difference

Leader in developing practical robots for consumers, researchers, first responders and the military

- Founded in 1990
- 2012 Revenue - $487 million
- Stock trades on the NASDAQ stock market (IRBT)
- Has sold more than 10 million robots
- More than 500 employees
- Sell in over 50 countries
What would the robots do?
iRobot Ava 500 participating in a site tour
Evolution Robotics

- 2001 – 2007 Incubated in Idealab
- 2008 Spin-off from Idealab
- 2008 Raised $13.8M VC financing
- To build consumer robotic products
## Business models

<table>
<thead>
<tr>
<th>Position</th>
<th>Tools provider</th>
<th>Components provider</th>
<th>Product company</th>
</tr>
</thead>
<tbody>
<tr>
<td>Objectives</td>
<td>License software/IP</td>
<td>Sell components</td>
<td>Sell products</td>
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<tr>
<td>Benefits</td>
<td>Lower risk/lower capital</td>
<td>Turn-key solution</td>
<td>Defining killer applications</td>
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<td></td>
<td>Leverage other’s efforts</td>
<td>Easier to integrate</td>
<td>Depend less on partners</td>
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<td></td>
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<td>Capture large piece of the pie</td>
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<tr>
<td>Risks</td>
<td>Support many platforms</td>
<td>Focus on right technologies</td>
<td>Focus on right product</td>
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<tr>
<td></td>
<td>Depend on customers</td>
<td>Focus on right markets</td>
<td>Complex operations</td>
</tr>
<tr>
<td></td>
<td>IP ownership/exclusivity</td>
<td>Focus on right customers</td>
<td>Need for large working</td>
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<tr>
<td></td>
<td>Limited knowledge of customer needs</td>
<td></td>
<td>High risk/reward</td>
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<tr>
<td>Funding required</td>
<td>$1mm - $5mm</td>
<td>$5mm - $10mm</td>
<td>$10mm - $20mm</td>
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<tr>
<td>Examples</td>
<td>Microsoft</td>
<td>Intel</td>
<td>Nokia</td>
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<tr>
<td></td>
<td>ARM</td>
<td>ATMEL</td>
<td>Apple</td>
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The value chain

Partners

Evolution Robotics

Technology

Component

Solution

Product

Manufacturing

Marketing

Sales/Distribution
Where in the value chain?

- Components: 35.0%
- IP Licensing: 15.0%
- Manufacturing: 15.0%
- Product company: 10.0%
- Marketing/Distribution: 3.0%
- Sales channel: 22.0%
Now we have to deliver
3 things matter in consumer products

1. Cost

2. Cost

3. Cost
BOM cost structure of a product

• Example Product: Robot floor cleaner

• Retail price = $199

• Landed cost = $40

• Robotic parts = $20

• Hardware: CPU, sensors, actuators, gears, batteries, charger, chassis, …
No pain no gain!
Product launch at CES 2010
Media is recognizing it
Media accolades

Popular Mechanics

Wired

The Boston Globe

THE MARTHA SHOW

POPULAR SCIENCE

 Today

PM EDITOR'S CHOICE AWARDS

Yahoo! Shopping

Martha

Associated Press

THE HUFFINGTON POST

rachael's daytime talk show

uber gizmo™

CNET

IEEE Spectrum

AOL Living

GIZMODO

ABC NEWS

engadget

FOX Business

PC Magazine

iRobot
More pain
Shipping
Got into retail
JPMorgan Chase Bank, N.A.
Syracuse, NY

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<td>$913,848.70</td>
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PAY THIS AMOUNT

Nine Hundred One Thousand Eight Hundred Forty Eight and 70/100

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147073 1213042796 63014290275049
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Evolution Robotics Mint Automatic Vacuum Cleaner

by Evolution Robotics

4.6 out of 5 stars (94 customer reviews)

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See all 94 customer reviews...
See all 3 discussions...
Sales go through the roof
Sold out
iRobot Acquires Evolution, Creating Cleaning Robot Empire

Robotics manufacture iRobot, which manufactures cleaning robots such as the Roomba, Looj and Scooba, announced today that it has acquired Evolution Robotics, which manufactures the Mint cleaning robot.

iRobot will be using its cash reserves to purchase Evolution Robotics. The total cost of the acquisition is estimated to be $74 million. After the acquisition, Paolo Pirjanian, CEO of Evolution Robotics, will join iRobot as its Chief Technology Officer.
Lessons learned

• Building a successful company is a people’s challenge more than a technology challenge: employees, investors, customers, partners, retailers, etc.
• Enabling tech is < 5% of the solution
• Grounding research in real-world settings can lead to extremely interesting and challenging academic problems
• Hardware manufacturing adds complexity by orders of magnitude: manufacturing, logistics, inventory, financing, retail channels, reverse logistics etc.
• Focus on clear direction and relentless pursuit is key
• If you thought you are working hard, think again
But it’s a heck of fun ride, especially when you succeed!
Thank You

Dr. Paolo Pirjanian
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