



2017

## INNOVATION WORKSHOP

*- Learn how to bring your Idea to your Patients -*

This year's Innovation Workshop is created in collaboration with ETH Zurich Product Development Experts. The course is focused on group work activities. Registration is open to all professionals that want to expand their Heart Team skills in innovation.

- **LEARN...** About the Innovation Cycle and how to build a Start-up Business
- **MEET...** The experts, collaborate together with them in group activities, build your network
- **EXPERIENCE...** How to tackle Cardiovascular Innovation from new Perspectives. Identify the User Needs
- **PLAY...** Your Role as potential Entrepreneur. Compete against your peers within our Start-up race

Use this unique opportunity to make new connections and expand your professional network. Flashlight presentations will keep the long story short and provide concise but solid background information. Get inspired by the stories from successful Medical Start-ups. Expect to be challenged.

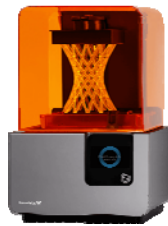
## Technological progress in stereo lithography From invention to innovation since the first patent in 1986

Printer until 2013  
100'000 – 500'000 \$



Source: 3D Systems

Printer 2014  
2'000 – 5'000 \$



Source: Formlabs

## What's the difference between these two product, from an Innovation perspective?

Launched  
in 2000



Launched in 2016

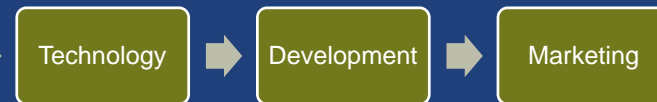
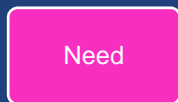


## The difference between technology push and market pull

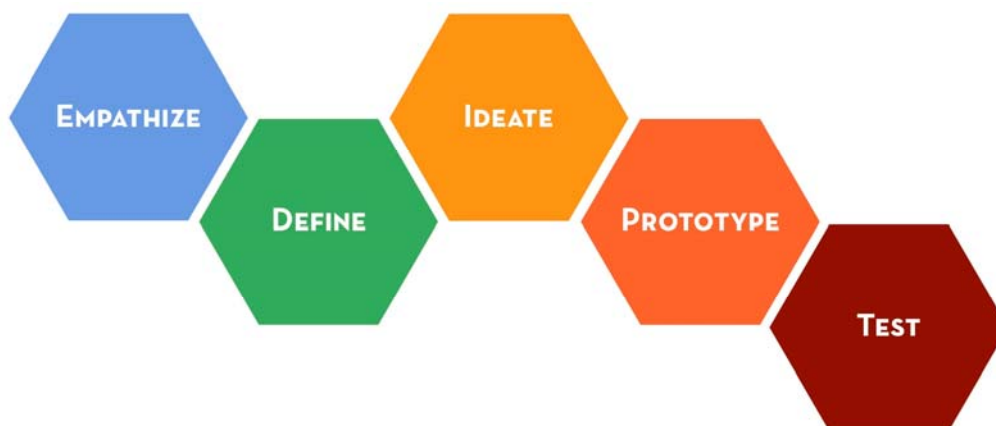
### Technology push



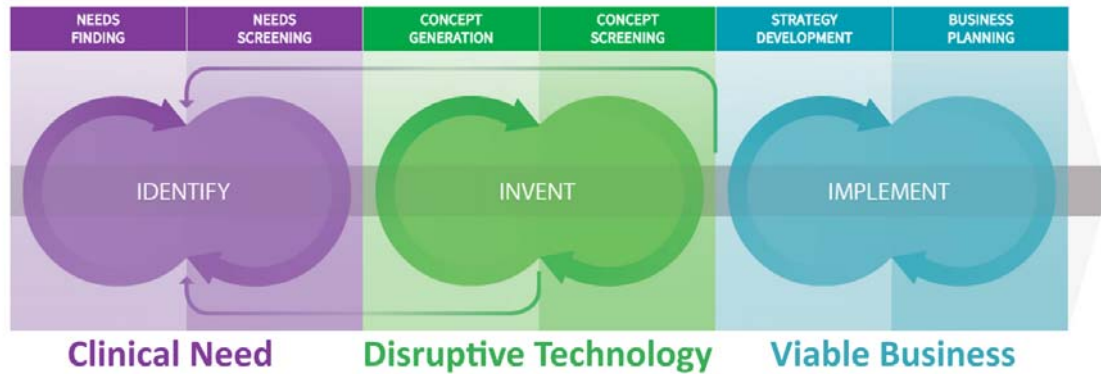
### Market pull



## Need based Innovation Cycles: The most prominent one is Design Thinking

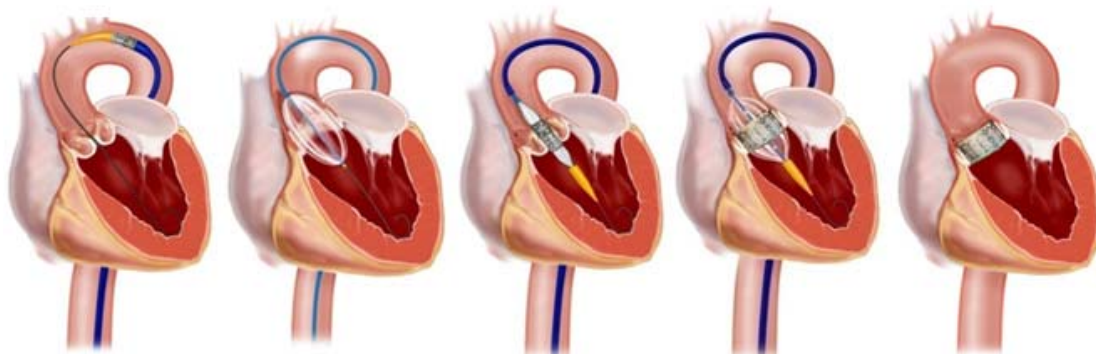


## Innovation Cycle



<http://www.ssbiodesign.org/resources/ck/images/Biodesign.png>

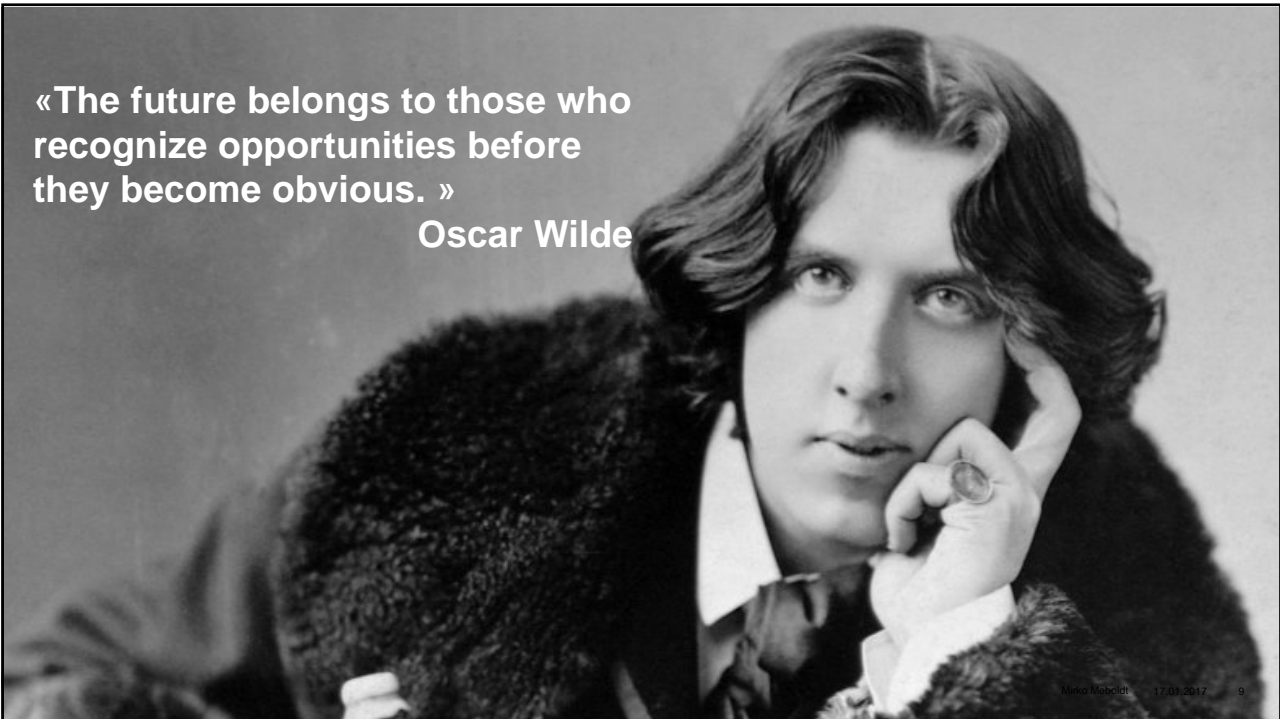
## Tavi - transcatheter aortic valve implantation





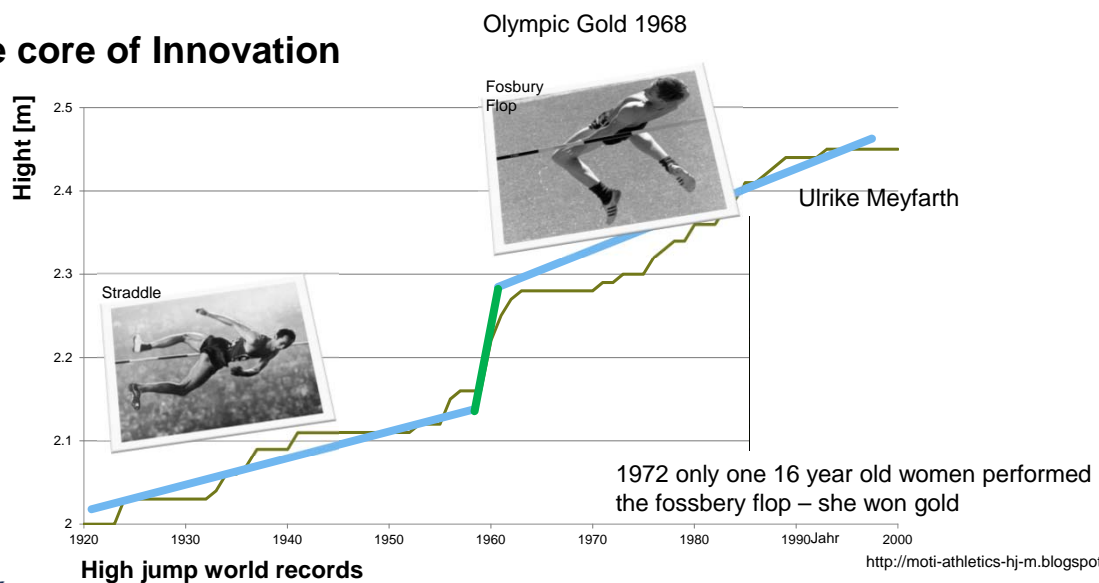
«The future belongs to those who recognize opportunities before they become obvious.»

Oscar Wilde



ETH zürich


## The core of Innovation



pd|z

<http://moti-athletics-hj-m.blogspot.ch/>

| 20.10.2016 | 10



UniversityHospital Zurich

## Workshop Overview

Facilitator: M. Meboldt  
Chair: M. Leon, L. Biegelsen

- **6 Steps** to guide the participants along the Innovation Process -

<p><b>1</b></p> <p>Introduction</p> <p>The Innovation Cycle</p>	<p><b>2</b></p> <p>Group Activity</p> <ul style="list-style-type: none"> <li>- Technology Push</li> <li>- Market Pull</li> </ul>	<p><b>3</b></p> <p>Prototyping</p> <p>Sketch and Build</p>
<p><b>4</b></p> <p>Finance</p> <p>Pitch preparation</p>	<p><b>5</b></p> <p>Development</p> <p><i>From preclinical to clinical</i></p>	<p><b>6</b></p> <p>Groups Pitch presentation</p> <p>Voting</p>



# INNOVATION FLASHLIGHT

Invention vs. Innovation: the cycle of sustainable cardiovascular innovation

Marty Leon

## Invention vs. Innovation

- An invention is a new (or novel) concept or device that is derived from an individual's ideas or from scientific research.
- Invention implies "creativity" and can be either iterative (most commonly) or completely original (rarely).
- As an example, the invention of balloon PTCA (Gruentzig's brainchild) was original and transformational, setting the stage for all future catheter-based therapies!
- Innovation is the commercialization of the invention itself; the process of developing an invention which may address a clinical need and creating "value" (clinical and financial)

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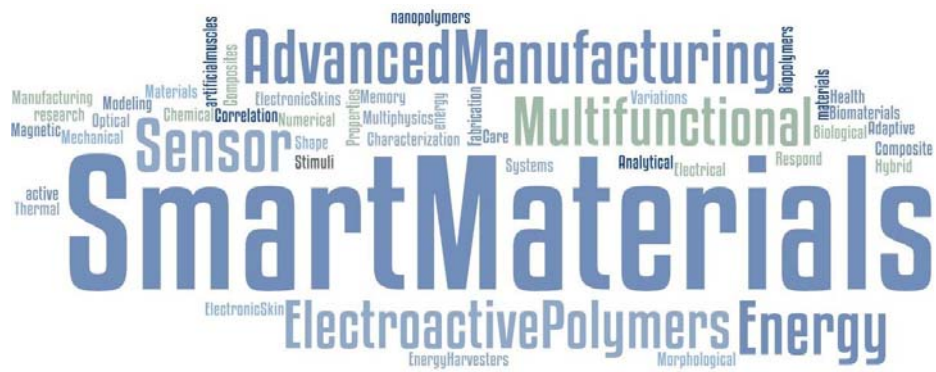
## Invention vs. Innovation

- Innovation is a process requiring multiple individuals with different skill sets (multi-disciplinary) spanning the cycle from device refinement (engineering), to pre-clinical testing (often large animals), to human clinical translation (first-human-use and feasibility studies), to definitive clinical trial validation (evidence-based medicine), to regulatory approval (e.g. CE or FDA), to physician training (generalizability), and finally, to market development.
- Successful and sustainable innovation in CV disease requires that an invention is transformed (by the aforementioned process) into a meaningful clinical therapy.

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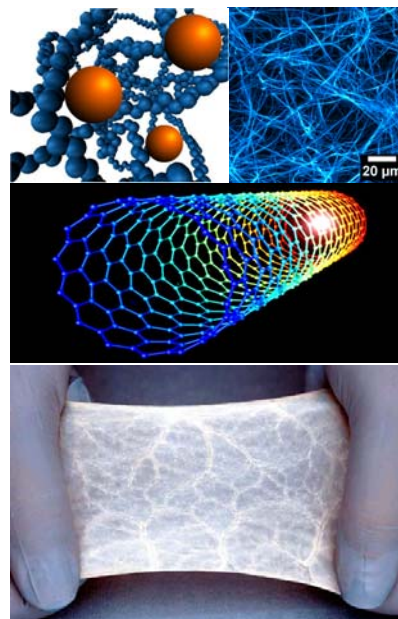


## TECHNOLOGY PUSH

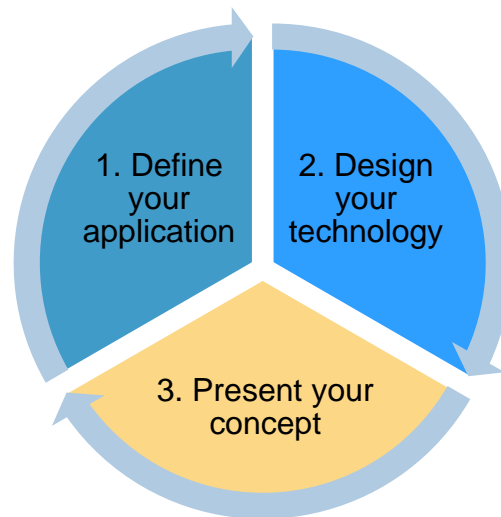


### UNIQUE FEATURES

- ✓ Flexible & shapable
- ✓ Crimpable
- ✓ Anti-thrombotic
- ✓ Anti- immunogenic
- ✓ Anti-calcific
- ✓ Regenerative
- ✓ Ability to grow



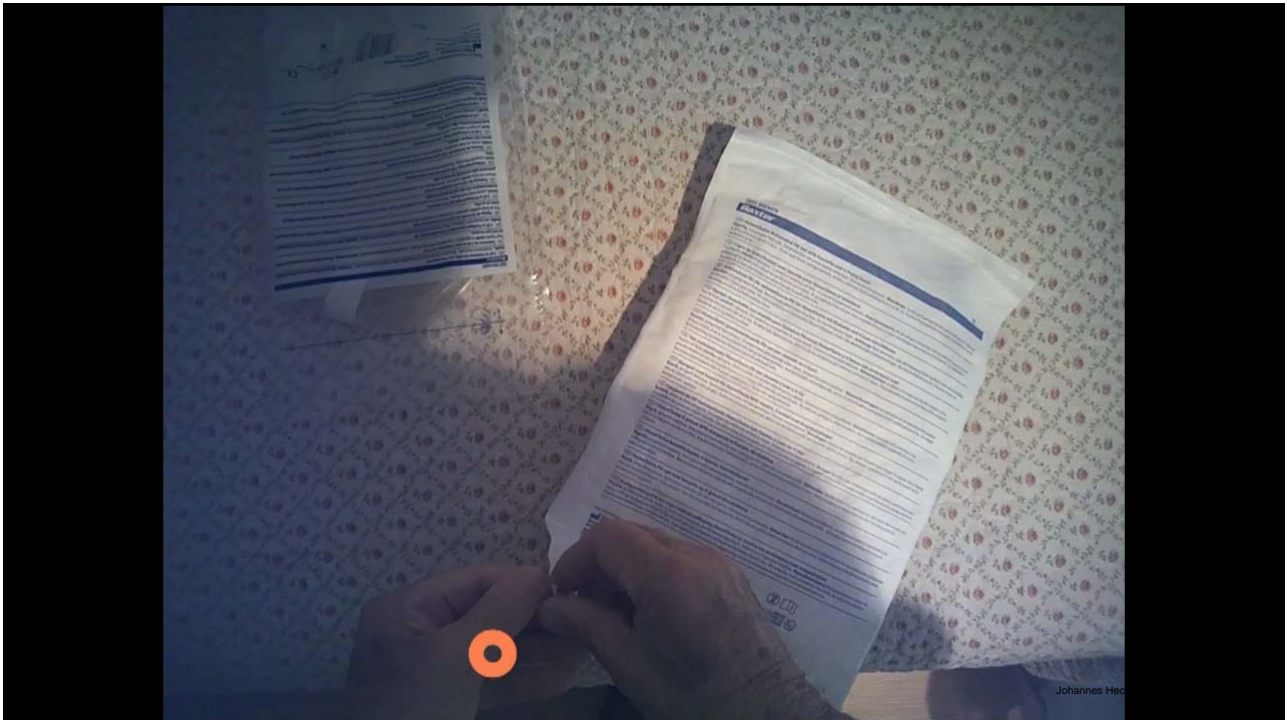
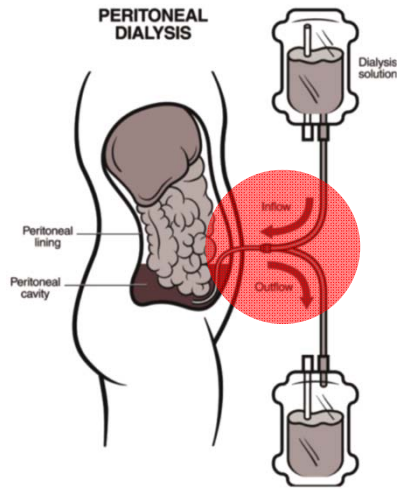
## Group Activity: The Challenge...



## Additional questions to consider for Technology Push

1. Which clinical indication your concept should cover?
2. How to design your prototype to fulfill the clinical needs?
3. What makes your application disruptive in comparison to previous approaches?
4. What are strengths and potential weaknesses?
5. How to pitch your idea efficiently to the users?

# Case Study: Innovating the Peritoneal Dialysis





**Demographics**  
**Helga**  
 Female  
 68 years old  
 living alone

**Character traits**

- Excited, but also scared of technology, overwhelmed very quickly
- Hard of hearing, impatient, but mentally fit

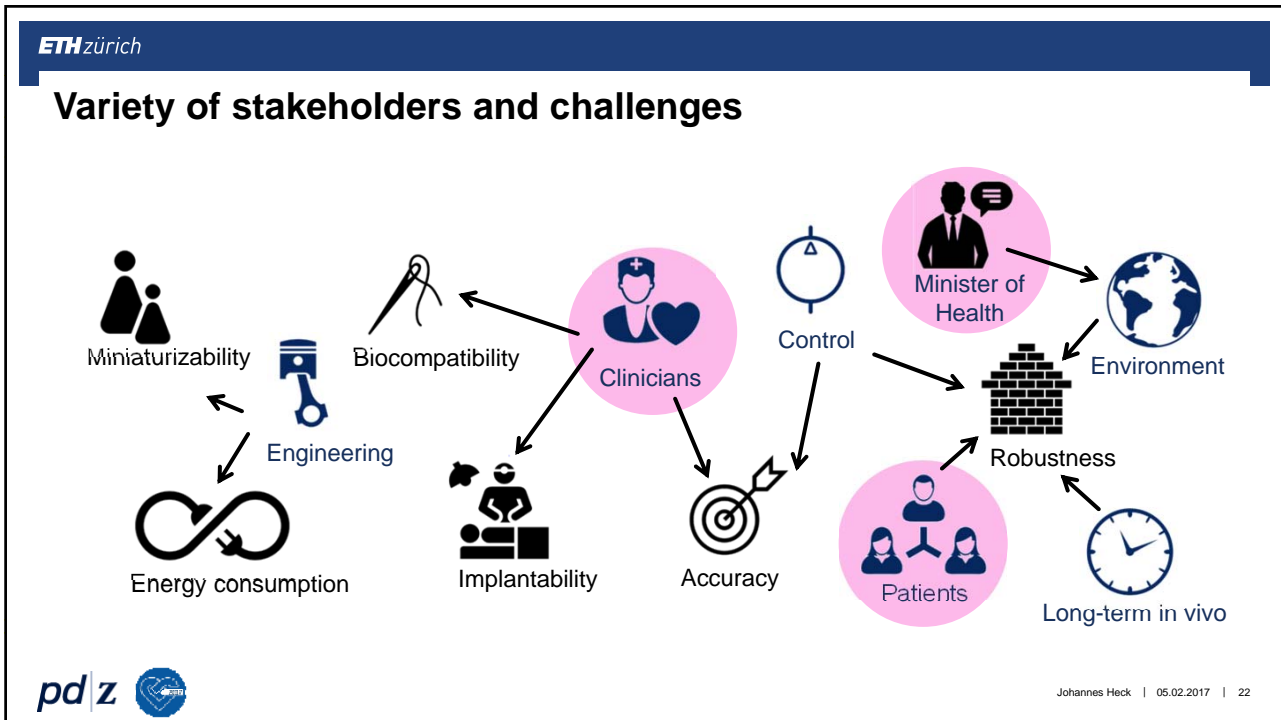
**A typical day**

- Hale - can go well, climb stairs, but gout and cataracts at an early stage hinder her when lifting and working (accuracy diminishes).
- New things are unfamiliar and scary, no problems with routines so later risk for negligence.

**Needs & pain points**

- Renal failure (not total) with type II diabetes
- Dialysis is no surprise, because of diabetes past.

Johannes Heck | 05.02.2017 | 21



**ETH zürich**

## Group Activity: Create a Persona... ..gain empathy

**Persona**

**Demographics**  
Who is the user?

- Name, age, status, financials, living place, ...

**Character traits**  
What is his/her personality?

- Hidden beliefs, convictions
- Early experiences

**Situation**

**A typical day**  
What is the user doing?

- Occupation
- Habits

**Needs & pain points**  
What would the user change?

- Work arounds
- What would I change, if I were the user?

Minister of Health

Clinicians

Patients

pd/z
Johannes Heck | 05.02.2017 | 23

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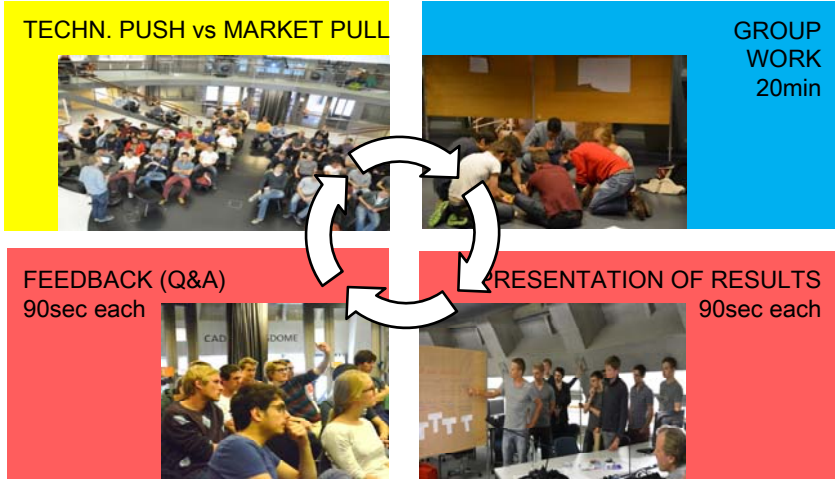
## Group Activity: Technology push

**Guiding Questions:**

- Which clinical indication your concept should cover?
- How to design your prototype to fulfill the clinical needs?
- What makes your application disruptive in comparison to previous approaches?
- What are strengths and potential weaknesses?
- How to pitch your idea efficiently to the users?

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Johannes Heck | 05.02.2017 | 24

### Our next group activity



TRIVENTURES  
Better Health Made Possible

## What Are We Thinking? Inside A VC's Mind...

- **Who are you going on the journey with? Better Be The Right People.**

*"People say doing a startup is like a marathon. It's actually like a road trip at night with no headlights. You think you are going to Toledo but you're actually going to Miami and you might not have enough gas so you might need to buy gas from someone who might take you out if you aren't driving well." - Ben Silbermann, Pinterest*

- **It's gotta be worthwhile.**

*"You are better off being the Beatles than the Monkeys when you are a startup." – Ben Horwitz, a16z*

- **Follow the need.**

*"Forget what they told you. If you want the truth, follow the money." – Roxanne Bland, Author*

- **Understand the stepping stones.**

*"The longer it takes to develop, the less likely it is to launch." – Jason Fried, 37signals*

- **Surround yourself with smarter... and smarter people.**

*"If you're the smartest one in the room, you're in the wrong room." - Anonymous*

- **There has to be a strategic fit.**

*"Who are the buyers? How many are there? What will trigger an acquisition?" – Questions we ask ourselves everyday*

- **Learn from mistakes and don't be discouraged.**

*"The very 1<sup>st</sup> company I started failed with a great bang. The 2<sup>nd</sup> one failed a little bit less, but still failed. The 3<sup>rd</sup> one, you know, proper failed, but it was kind of okay. I recovered quickly. #4 almost didn't fail. It still didn't really feel great, but it did okay. #5 was PayPal." – Max Levchin, PayPal*

TRIVENTURES 



TRIVENTURES

Better Health Made Possible

*Thank You*



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## Swiss Healthcare Startups

- Medical Doctor vs. Entrepreneur
- Startup vs. Gold standard
- Association Swiss Healthcare Startups

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# Prototyping Business Mo



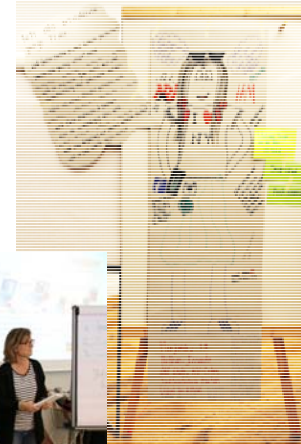
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Mirko Meboldt



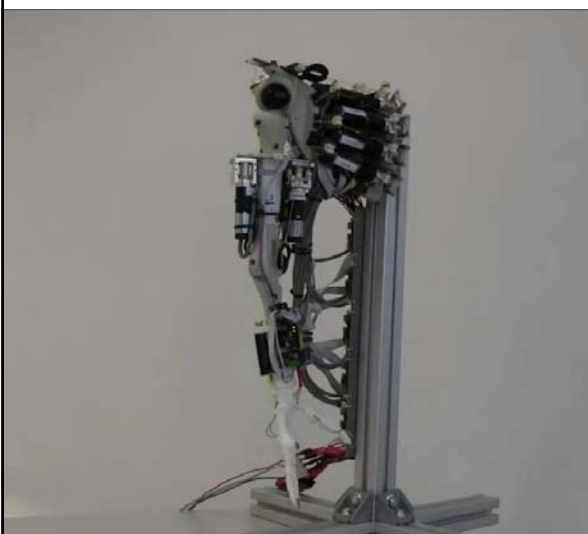
## Acting out of User-Product Interactions



Mirko Meboldt

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## Simple prototypes for complex systems





Mirko Meboldt

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# Source of funding for a startup

Jasmin Lennartz

Equity Crowdfunding, Crowdlending

Founders, Angels, FFF, Accelerators

Public funding, (could include VC)

Sales

VC, Strategic alliances, M&A, etc.

Research and Development

Ideation / Basic research

Proto-typing

Preclinical

Clinical

Regulatory

Product Launch

Post-market monitoring

Market Access-preparation

Market Launch

Fast growth

Market Maturity, slow growth

Market saturation

Decline

Seed capital

Early stage

Grow stage

Later stage

Time

Market approval

Patent expiration

Funding Source	How much?	Pro	Contra
FFF	\$5'000 - \$100'000	Easy to get, better terms, Trust	Relationship in danger, small amounts of capital
Accelerators	\$5'000 - \$50'000	Increase funding chances, PR, Training	Selective, distracting, sometimes equity or \$
Crowdfunding	\$5'000 - \$100'000	Advertising, Built customer base	Time intensive, disclosure, fear visible failure
Angel Investors	\$150'000 - \$500'000	Invest often in field of expertise, «Smart money», connections	Difficult to find, Chemistry?
Venture Capital	\$1 mio - \$300 mio	Big amount of capital, «Smart money», allows to scale quickly	VC receives substantial veto and control rights over the managerial decisions, pressure

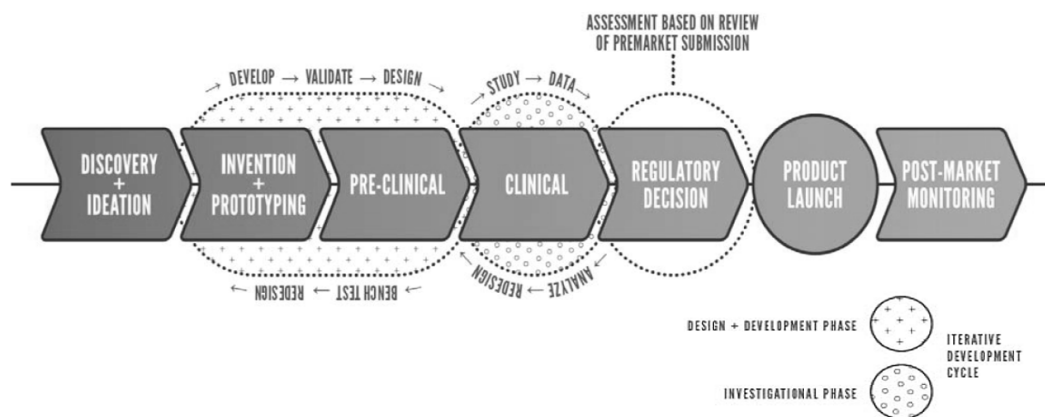


Thank you



Back up –

*The medical device development pathway from discovery and ideation to product launch and post market monitoring*



Source: Retrieved from Medical Device Innovation Initiative White Paper - CDRH INNOVATION INITIATIVE  
<http://www.fda.gov/downloads/AboutFDA/CentersOffices/OfficeofMedicalProductsandTobacco/CDRH/CDRHInnovation/UCM242528.pdf>

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## Backup- Key features of equity crowdfunding and neighboring forms of funding retrieved from (Lukkarinen et al., 2016)

Features	Rewards-based crowdfunding	Equity crowdfunding	Business angels	Venture capital
Typical funder background	Various, many have no investment experience	Various, many have no investment experience	Former entrepreneurs	Finance, consulting, industry
Source of funds	Investing own money	Investing own money	Investing own money	Investing other people's money
Funding instruments	Non-financial, e.g., products	Shares	Shares	Shares
Deal flow	Through web platform	Through web platform	Through social and/or angel networks	Through social networks and proactive outreach
Due diligence	Very limited; may be conducted by individual, if at all	Conducted by individual, if at all	Conducted by individuals based on their own experience	Conducted by staff in VC firm with potential assistance from outside firms
Geographic proximity of funders	Investments made online: funders often distant from venture	Investments made online: funders often distant from venture	Most investments local	Invest nationally (or internationally with local partners)
Post-funding role of funders	Most remain passive	Most remain passive	Active (hands-on)	Active (strategic)
Return on investment	Financial return not relevant	Financial return important (but not the only reason for investing)	Financial return important (but not the only reason for investing)	Financial return critical

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## Literature


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- Cumming, D. J., & Johan, S. A. (2009). *Venture Capital and Private Equity Contracting - An international Perspective*. Oxford: Elsevier Inc.
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- Gleasure, R. (2015). *Resistance to crowdfunding among entrepreneurs: An impression management perspective*. *The Journal of Strategic Information Systems*, 24(4), 219-233. doi:<http://dx.doi.org/10.1016/j.jsis.2015.09.001>
- Gross, A. (2017): Expert opinion on startup stages of medical device development
- Herschel, M., & Falke, S. (2015). Marketing in der Pharmazeutischen Industrie. In H.-P. Knaebel, & M. Wente, *Scientific Marketing in der Medizin* (pp. 21 - 42). Berlin Heidelberg: Springer Gabler.
- Lukkarinen, A., Teich, J. E., Wallenius, H., & Wallenius, J. (2016). Success drivers of online equity crowdfunding campaigns. *Decision Support Systems*, 87, 26-38. doi:10.1016/j.dss.2016.04.006



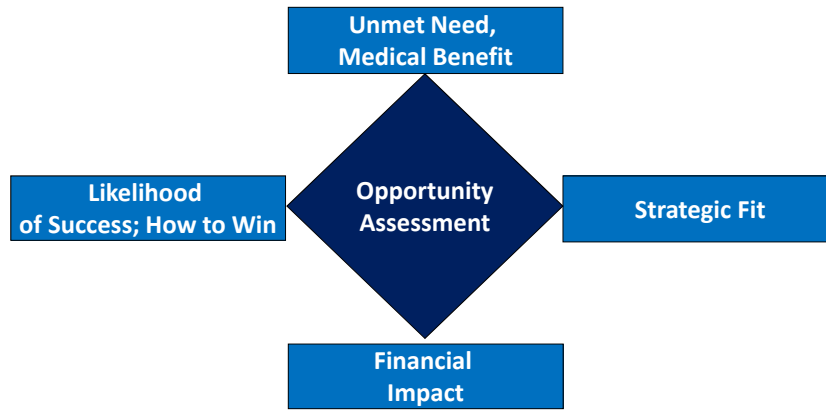
**INNOVATION FLASHLIGHT** UniversityHospital Zurich

## The Right Time For the Corporate Strategic Investment

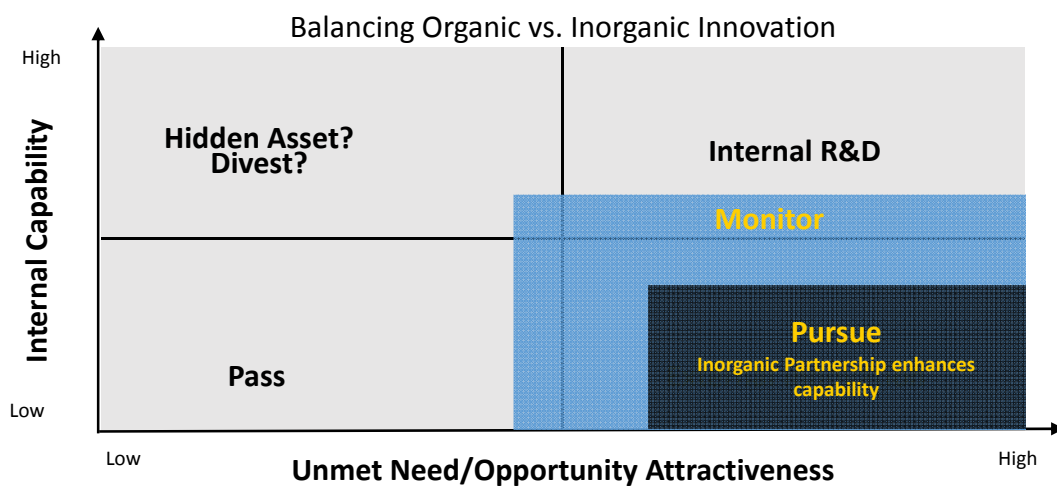
- Opportunity Assessment
- Strategic Approach to Make vs Buy
- Balancing organic vs inorganic innovation
- Engaging in Strategic Investments
- Structures and Timing



# Opportunity Assessment



# Strategic Approach to Make vs. Buy





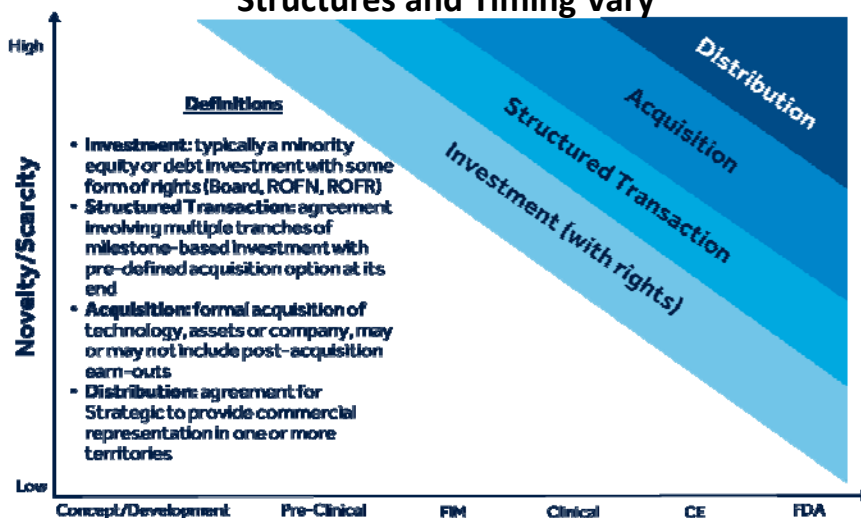
# Engaging in Strategic Investments

- Is it a Novel Concept?**  
 ("I wish I had thought of that")
- How is the IP?**
- What is the market attractiveness?**  
 (Does this address a critical unmet need?)
- What are the risks and are they stacked?**  
 (Technical, Clinical, Market Development)



# Engaging in Strategic Investments

Structures and Timing Vary





The corporate view of  
Technology  
assessment and  
acquisition


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FLASHLIGHT**

X. Bertrand

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<b>What you think we care about, ... but we don't that much!</b>	<b>What we do care about, ... so don't forget!</b>
<ul style="list-style-type: none"> <li>• Your optimistic assessment of the addressable market</li> <li>• Your SAB/MAB is respectable but has bias</li> <li>• You should talk to Dr X., he loves our technology!</li> <li>• We don't need the Résumé of the team, we want to see and interact with the team</li> </ul>	<ul style="list-style-type: none"> <li>• Understand your device, what is it, how does it work concretely</li> <li>• Give us real data, as close as possible to real use, not special models</li> <li>• Build credibility, we know things are not perfect, share your concerns and challenges</li> <li>• Figure out what is your next biggest risk and attack that! Fast fail &amp; de-risk!</li> </ul>

WE DON'T WANT YOUR RECIPE, WE WANT TO TASTE YOUR COOKIES, AND MEET THE COOKS

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## The corporate view of Technology assessment and acquisition

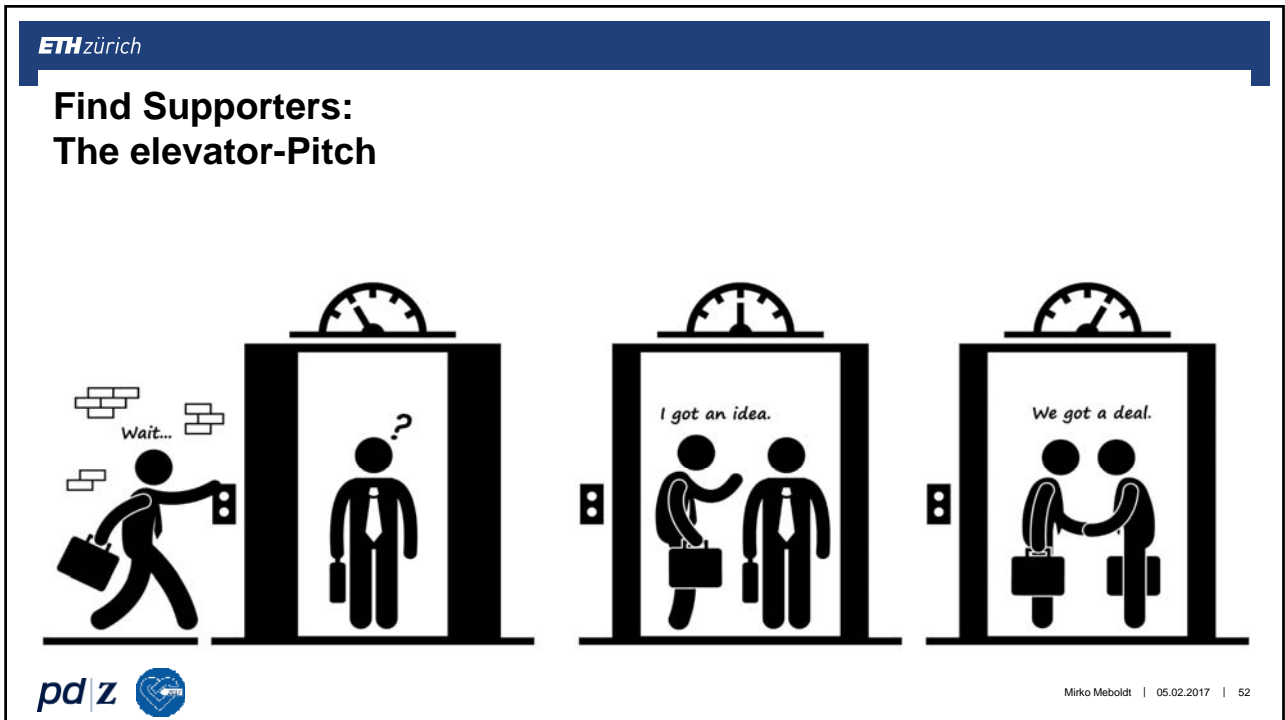
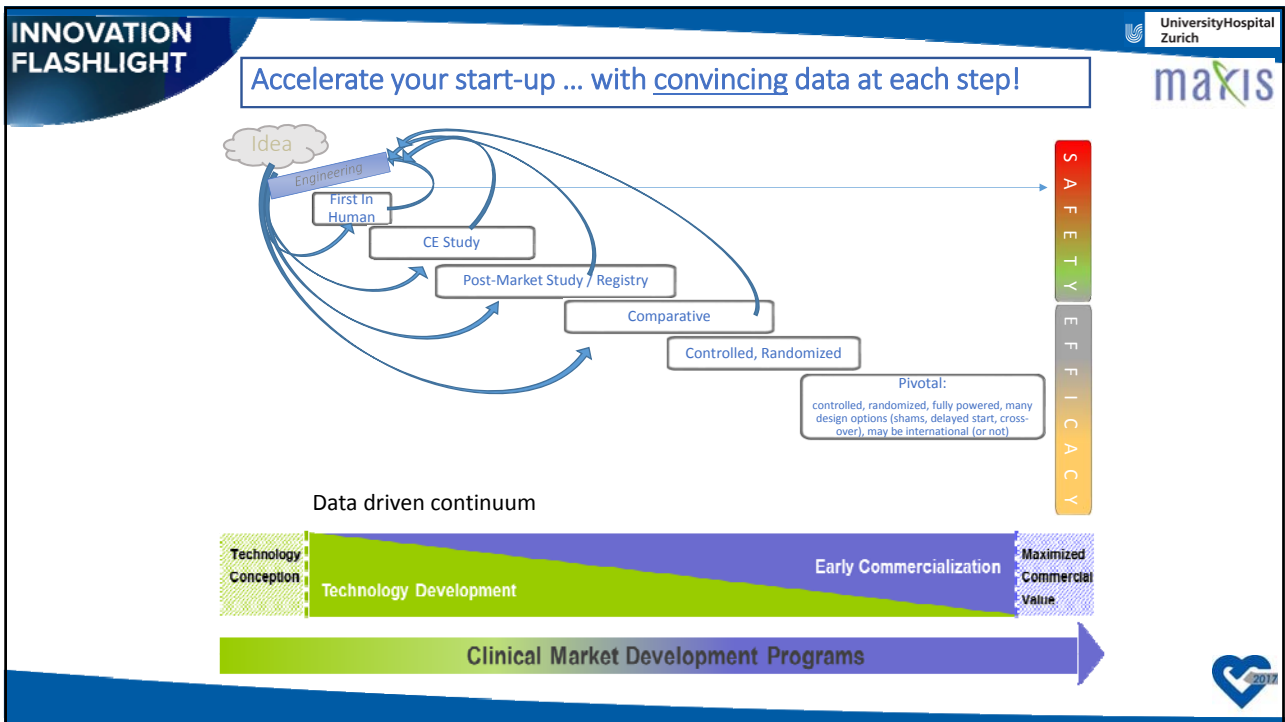
- The most important element as you prepare to pitch your project is to build CONFIDENCE from the first meeting
- There are a few “Must Have” that we need to see like manufacturing costs, expected Selling Price, IP elements, etc.
- We need to understand your product, its mechanism of action, how it works and how it does not. Be concrete, and specific
- We review many projects, tell us what is different with this one
- Help us understand how we can limit our risks



Accelerate your  
start-up

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FLASHLIGHT**

K. Marshall  
MAXIS Medical






**3. What next** **What**  
An invitation, opening a conversation

**2. Value proposition**  
User need & solution **How**  
**Why**

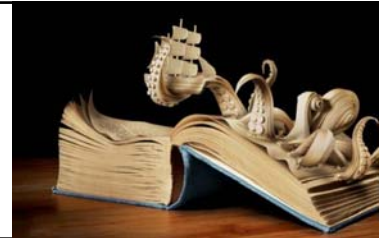
**1. Get attention**  
Unexpected, new perspective

## Four things to remember for a pitch!

**Golden thread**



**Make it tangible**



**Do not bother**



**Train hard**



## Patenting your idea: From an invention to a patent

### What is an invention?

- A solution with a defined relation between technical features and a effect
- Which is reproducible

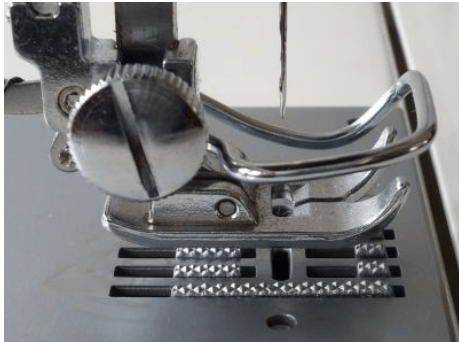
### What is a Patent?

1. **Economical:** Capable of industrial application
2. **New:** Novelty to the world
3. **Inventive step:** Significantly different from that which is already known the  
(Subjective evaluation)



**Most important is the major claim:  
Imaging you would be the Inventor of the first sewing machine?**

What would be your patent Claim, which would block every competitor?



# INNOVATION FLASHLIGHT

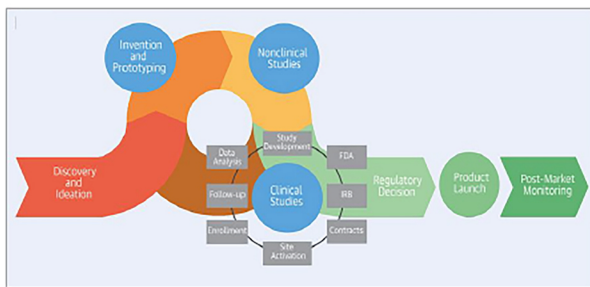
Validate and Verify  
your Idea: R&D and  
Preclinical Steps

A. Guidotti

## Validate and Verify your Idea *Nonclinical Studies*

### Bench Testing Your Device

- Optimize product design
- Simulate various clinical anatomies
- Ongoing verification
- Freeze design before pre-clinical studies are initiated



Holmes DR et al JACC 2016;68(17):1908-15

### Animal Model Testing

- To validate efficacy of a device within an appropriate animal model.
- To validate device in real anatomy and physiology
- To obtain outcomes and safety data needed
- for CE mark - 510(k) submissions or for developing human clinical trials
- To obtain bio-compatibility data
- To gain confidence in the technology itself
- Transcatheter cardiac valve: ISO 5840-3 (2013)
- Valve Repair Devices: ISO 5910 (2017)

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# INNOVATION FLASHLIGHT

## Regulatory steps for a CV device in Europe and in US


M. Tocchi, MD, PhD

**INNOVATION FLASHLIGHT** UniversityHospital Zurich

## Evolving Standards for Valve Products

- ISO/TC 150/SC 2 “Cardiovascular implants and extracorporeal systems”  
Working Group 1 “Cardiac Valves”

American National Standard



ANSI/AAMI/ISO 5840-3:2013  
Cardiovascular implants —  
Cardiac valve prostheses —  
Part 3: Heart valve substitutes  
implanted by transcatheter  
techniques.


AAMI

➔

Under Revision

New

Cardiac valve repair devices





**INNOVATION  
FLASHLIGHT**

# From Idea to Change-in-Practice: Which data you need to change guidelines

Gregg W. Stone MD  
Columbia University  
Cardiovascular Research Foundation

## From TVT Idea to Change-in-Practice: Which data you need to change guidelines

- **Outcome measures**

- Hard endpoints (death, hospitalization for HF) + safety (COAPT)
- QoL (improvement in 6MWD, KCCQ, etc.) (+ hard endpoints)

- **Level of evidence**

- **Europe**

- Registries (class IIb)
- Small randomized trial(s) (class I - IIa)
- Large randomized trial(s) (class I)

- **USA**

- Registries (class IIb)
- + Small randomized trial(s) (class IIa)
- Large randomized trial(s) (class I)



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From Idea to Change-  
in-Practice: which data  
you need to change  
guidelines

A. Vahanian

**Mitral disease is much more complex than aortic disease...****Thus we need:**

- Evidence from RCT in a well-defined patient population, using clinically relevant end-points, and sufficient duration of F.U.
- Evidence from high quality registries: representative, complete, continuous, independent

**Do not forget:**

- The Guidelines Committee interpret the data...
- Guidelines are only Guidelines...
- The regulators have their say!
- Increased awareness of the disease/data/Guidelines by physicians is key

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## Innovation Flashlight: This is the Right Startup to Invest in

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**Larry Biegelsen**

Senior Analyst, Medical Supplies and Devices

Mitral Valve Meeting 2017

February 5, 2017

All estimates/forecasts are as of 1/19/2017, unless otherwise stated.  
Please see page 2 for rating definitions, important disclosures and required analyst certifications.

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Together we'll go far



## The “MAKE MONEY” Strategy\*



- **M**anagement has a strong track record
- **A**ddresses an unmet clinical need
- **K**linical and reimbursement risk are acceptable
- **E**ntry barriers are high
  
- **M**oat – the competitive advantage is sustainable
- **O**pinion leader support is strong
- **N**umerous potential acquirers exist
- **E**xit strategy / Path to profitability
- **Y**UGE market opportunity!

\*In our view, these components are staples of successful medical device investments

1

## Required Disclosures

### Additional Information Available Upon Request

I certify that:

1) All views expressed in this research report accurately reflect my personal views about any and all of the subject securities or issuers discussed; and  
 2) No part of my compensation was, is, or will be, directly or indirectly, related to the specific recommendations or views expressed by me in this research report.  
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### STOCK RATING

**1=Outperform:** The stock appears attractively valued, and we believe the stock's total return will exceed that of the market over the next 12 months.

**BUY**

**2=Market Perform:** The stock appears appropriately valued, and we believe the stock's total return will be in line with the market over the next 12 months. **HOLD**

**3=Underperform:** The stock appears overvalued, and we believe the stock's total return will be below the market over the next 12 months. **SELL**

### SECTOR RATING

**O=Overweight:** Industry expected to outperform the relevant broad market benchmark over the next 12 months.

**M=Market Weight:** Industry expected to perform in-line with the relevant broad market benchmark over the next 12 months.

**U=Underweight:** Industry expected to underperform the relevant broad market benchmark over the next 12 months.

### VOLATILITY RATING

**V** = A stock is defined as volatile if the stock price has fluctuated by +/- 20% or greater in at least 8 of the past 24 months or if the analyst expects significant volatility. All IPO stocks are automatically rated volatile within the first 24 months of trading.

As of: January 19, 2017

41% of companies covered by Wells Fargo Securities, LLC Equity Research are rated Outperform.

56% of companies covered by Wells Fargo Securities, LLC Equity Research are rated Market Perform.

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Wells Fargo Securities, LLC has provided investment banking services for 39% of its Equity Research Outperform-rated companies.

Wells Fargo Securities, LLC has provided investment banking services for 28% of its Equity Research Market Perform-rated companies.

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