

# Innovation

OIDD614 - Session 1

Karl T. Ulrich

## Course Topics

- What is innovation?
- Need pull vs. solution push
- Internal vs. external innovation
- Horizon 1, Horizon 2, and Horizon 3 innovation
- VIDE success model; value =  $f(\text{idea, development, exogenous factors})$
- Opportunity identification
- Individual vs. group performance in idea generation
- Problem definition using "5 Whys"
- Innovation tournament structure
- Tournament performance levers: N, mean, variance, filter ratios
- Design thinking: observational methods, rapid prototyping, iterative refinement
- Concept exploration/development methods
- Whiteboard 101 (plus more optional visual expression tutorials)
- Branding and naming
- Valuing innovation projects
- Crowdfunding and open innovation
- How to pitch
- Culture of innovation
- Lean innovation/MVP, project planning
- (Project-specific content and methods.)





# Where does advantage come from?



1. Regulated monopoly (e.g., CCTV)



2. Scale (e.g., Walmart)



3. Doing something valuable, better, and different.

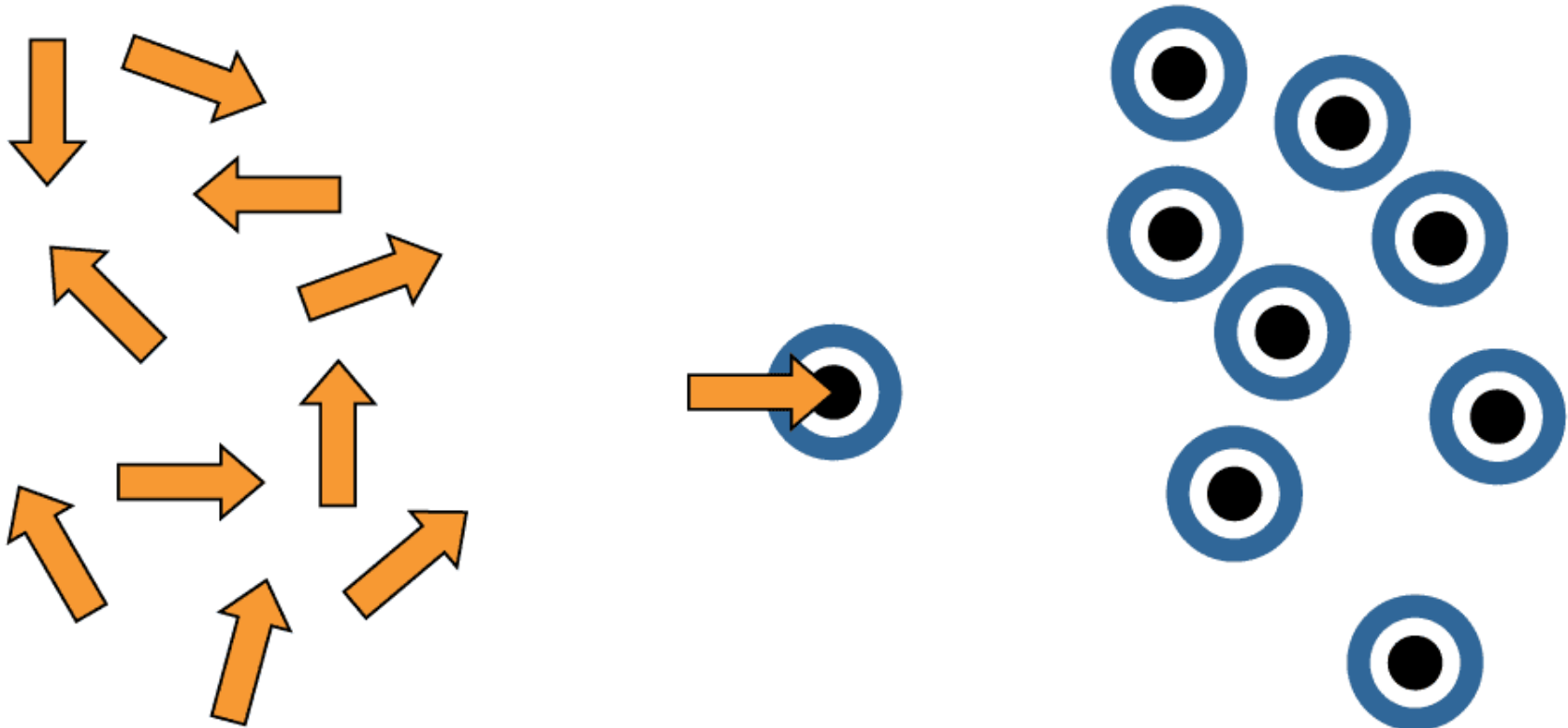


[http://www.hovding.com/how\\_hovding\\_works](http://www.hovding.com/how_hovding_works)



# innovation

**A new match between a solution and a need.**



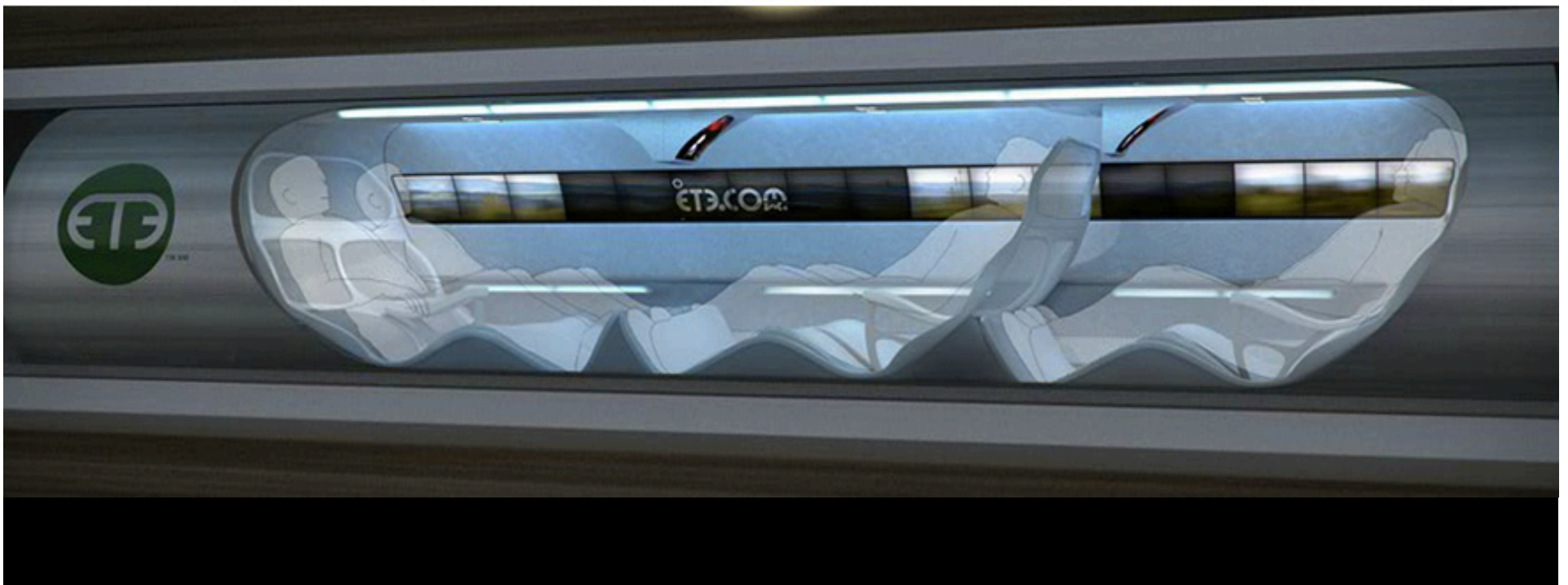
**“Need” is broadly defined**



The "Monster Thickburger" —  
two 1/3-pound slabs of Angus beef,  
four strips of bacon,  
three slices of cheese  
and mayonnaise on a buttered sesame seed bun.

Sells alone for \$5.49, \$7.09 with fries and a soda.







DO NOT ACCEPT THIS CHECK without confirming presence of Artificial Watermark on back. Other security features are listed on back.

LiveWorld, inc.  
170 Knowles Dr  
Ste 211  
Los Gatos, CA 95032

BANK OF AMERICA  
DES MOINES, IA 50317

49 62  
790

CHECK DATE

CHECK NUMBER

02/26/2005

1173

PAYROLL CHECK

PAY... FIVE HUNDRED SIXTY SIX DOLLARS 52 CENTS

\$ \*\*\*\*\*566.52



SPL2 31 500 1173

TO  
THE  
ORDER  
OF:

Sandy Purins

Los Angeles CA 90001

AUTHORIZED SIGNATURE

⑈001173⑈ ⑆073000820⑆1234567⑈

Sandy Purins

Liveworld Inc

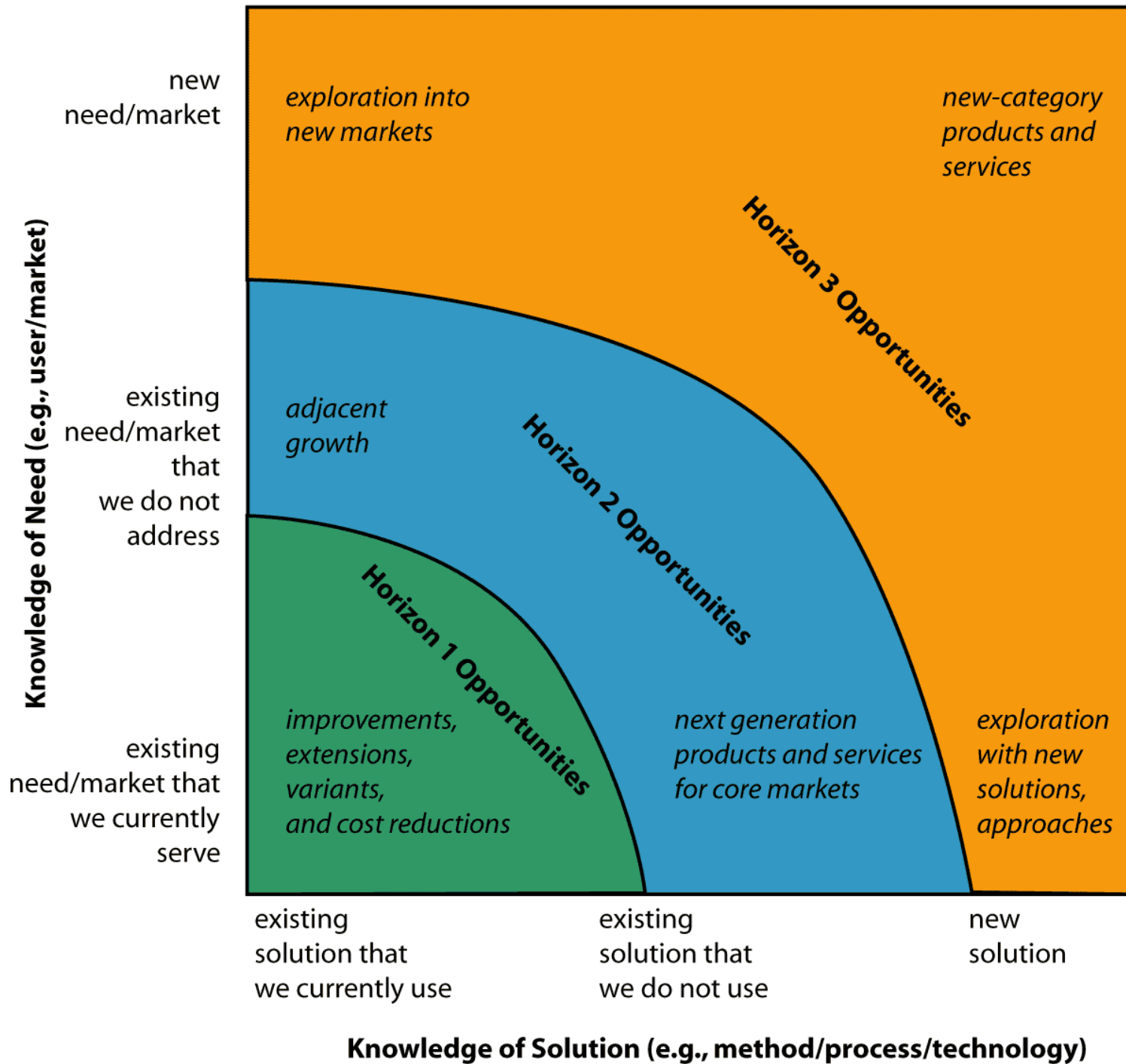
EMPLOYEE 31	DIVISION	SOCIAL SECURITY NO. 000-00-0000	PERIOD END 02/26/2005	CHECK COMMENTS MAX OF 5 LINES CAN CHANGE FOR EACH P/R	PTO 36.34 HOURS
COMPANY SPL2	BRANCH	HIRE DATE 02/26/2005	CHECK DATE 02/26/2005		
CHECK NO. 1173	DEPARTMENT 500	FED. STATUS S2/S2	CHECK DATE 02/26/2005		

EARNINGS

TAXES AND DEDUCTIONS

DESCRIPTION	RATE	HOURS	CURRENT	YEAR TO DATE	LOCATION AND JOB OVERRIDES	DESCRIPTION	CURRENT	YEAR TO DATE
REGULAR	97500	8000	78000	78000		FEDERAL W/H	5770	5770
COMMISSION				50000		OASDI	4836	7936
401K			-7800	-12800		MEDICARE	1131	1856
CO 401K MATCH-M			1404	2304		STATE W/H IA	1811	1811
GROSS EARNINGS		8000	70200	115200		TOTAL DEDUCTIONS	13548	17373
			78000	128000	TRUE GROSS	NET PAY	56652	97827

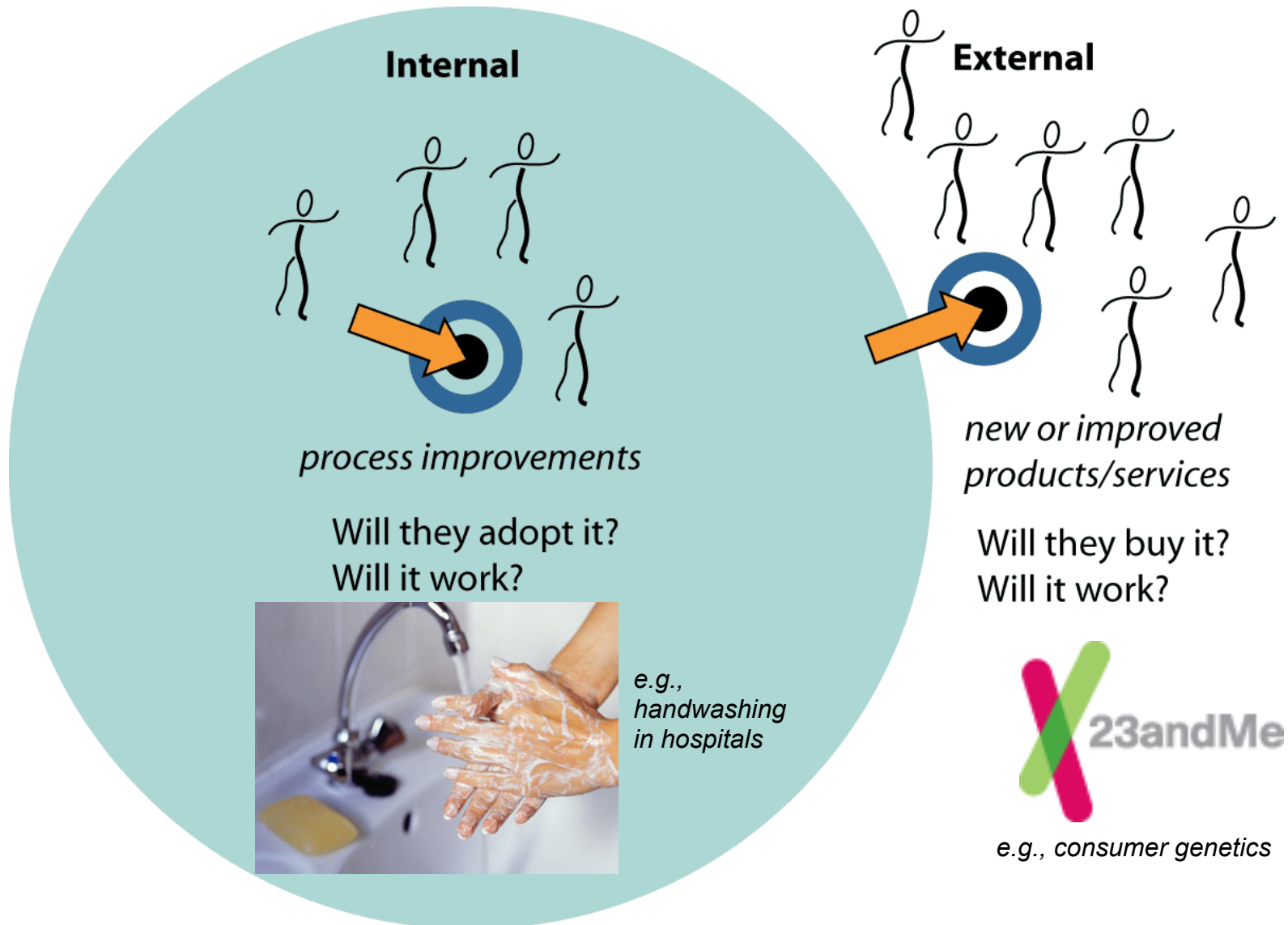








## External and Internal Innovations Face Similar Uncertainties





## Value Creation in Innovation

1. Is the need real?



2. Does the solution meet the need?



3. Is the “customer” willing to pay more for the solution than it costs to deliver it?



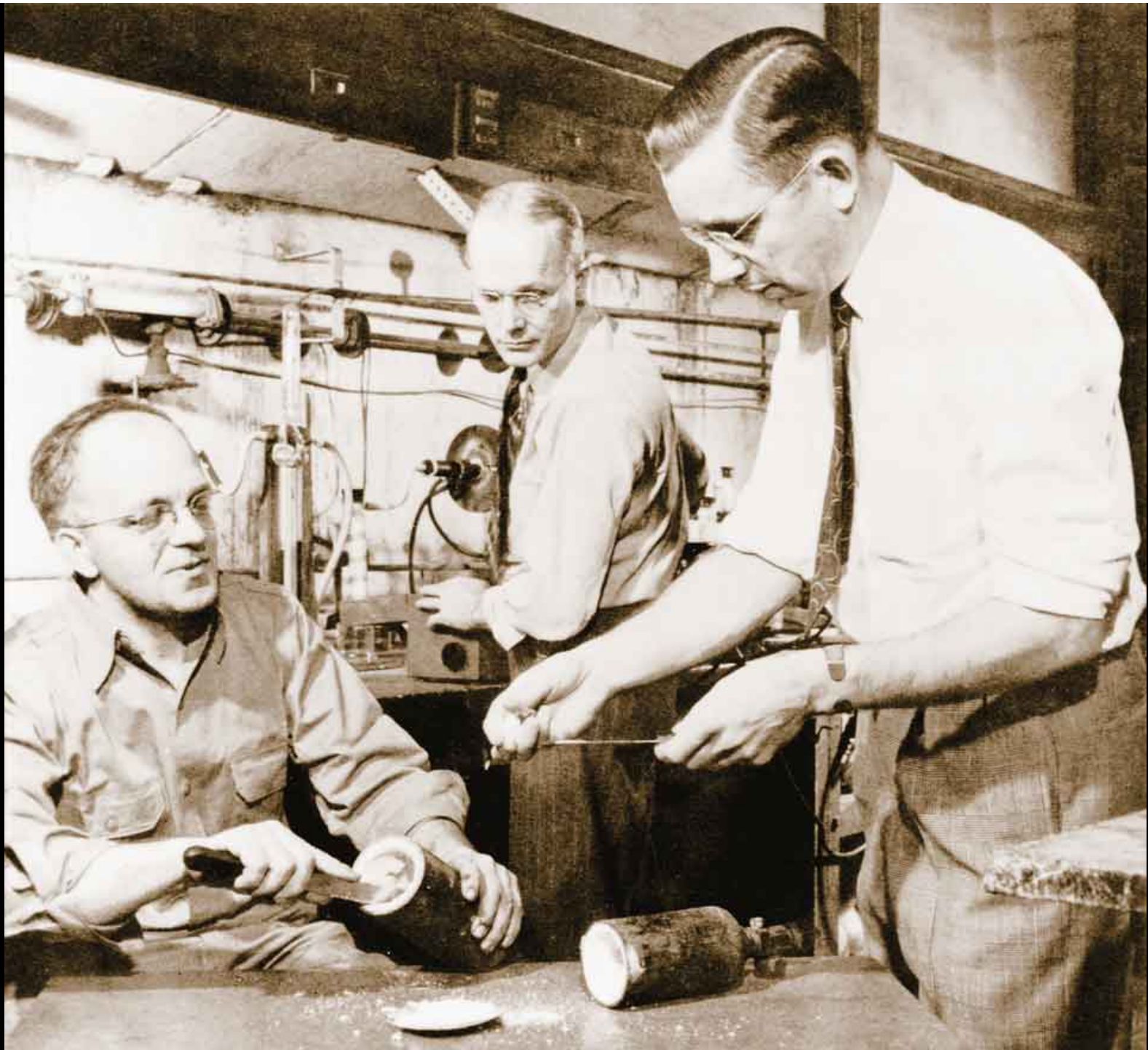
**Price – Cost >> 0**



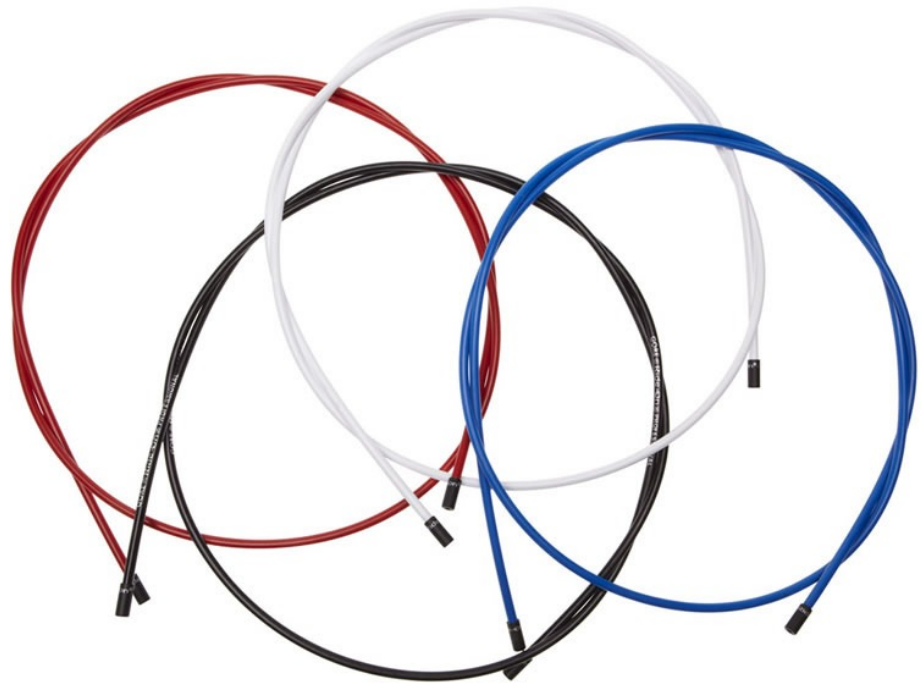












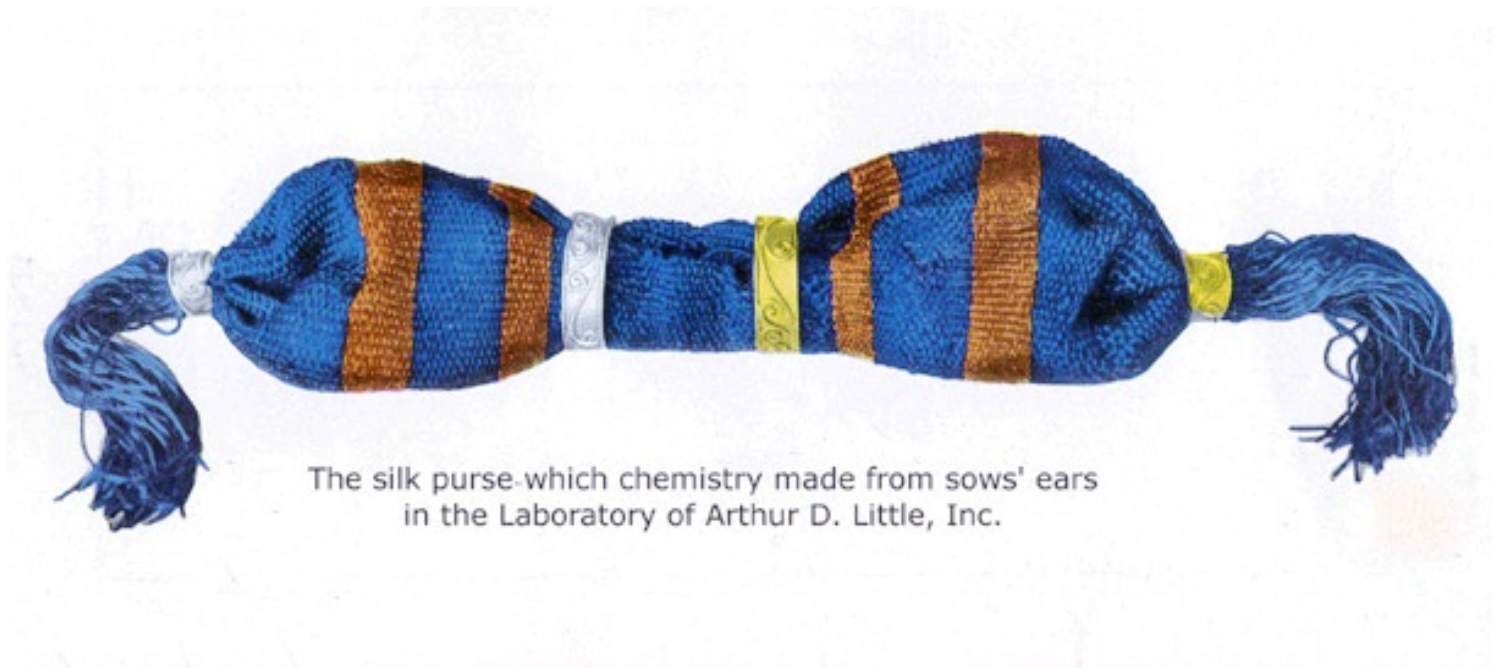


Sabeer Bhatia

Ref: *Business Week*: Could anyone have thought up Hotmail?

<http://www.businessweek.com/smallbiz/news/coladvice/book/bk990903.htm>





The silk purse which chemistry made from sows' ears  
in the Laboratory of Arthur D. Little, Inc.

# nest











## Sow's Ear Hypothesis

*"You can't make a silk purse out of a sow's ear." (Jonathan Swift)*

*Idea itself determines much of the value of the opportunity.*



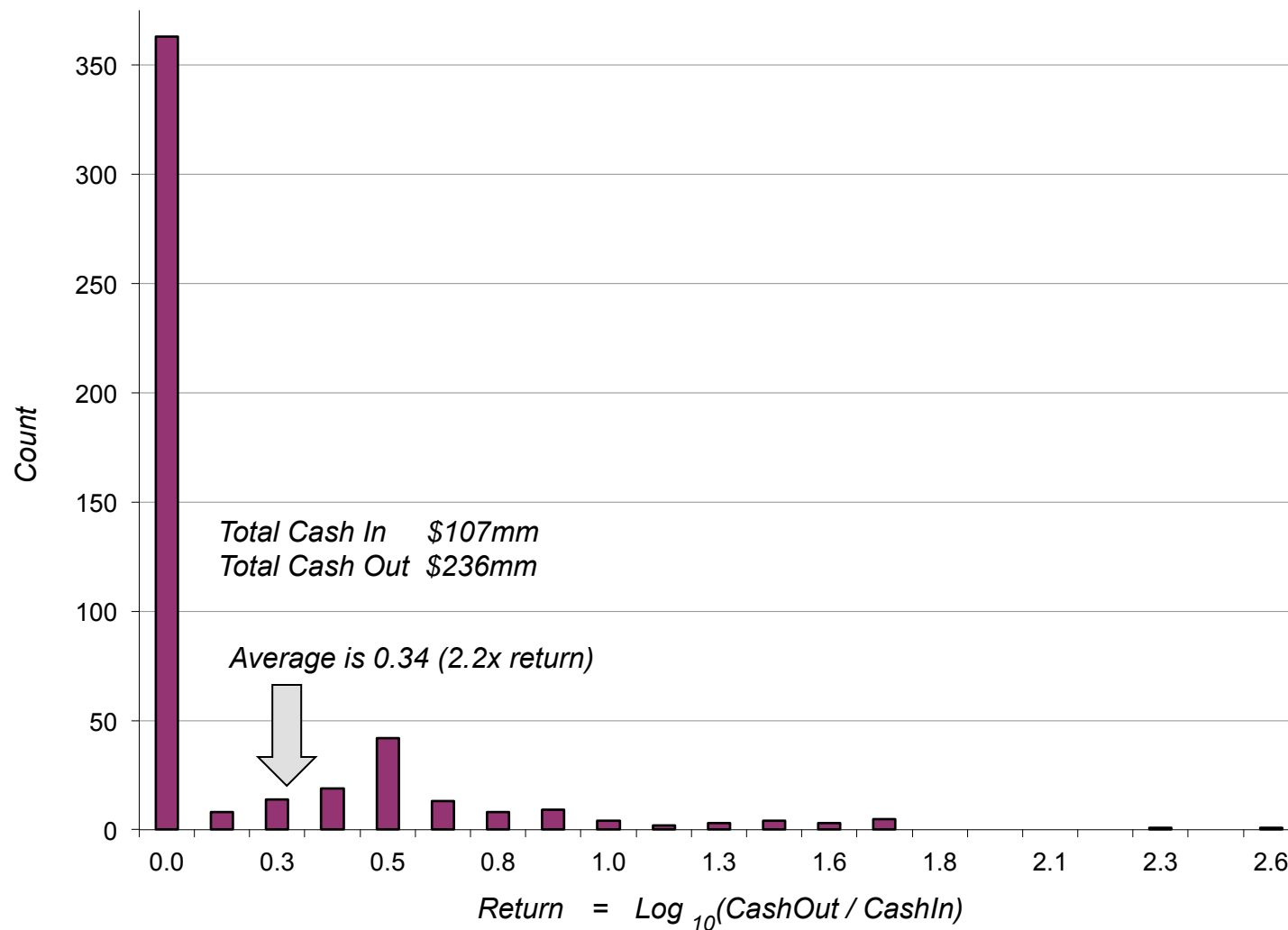
## Midas Hypothesis

*The team is everything.*

*Doesn't much matter where you start – can make any reasonable opportunity successful.*



## Histogram of Returns for 499 Ventures by Angel Investors



*e.g. 1,000,000 cash out on 100,000 cash in has Return of 1.0*

*Note: Negative or undefined returns set to 0.*

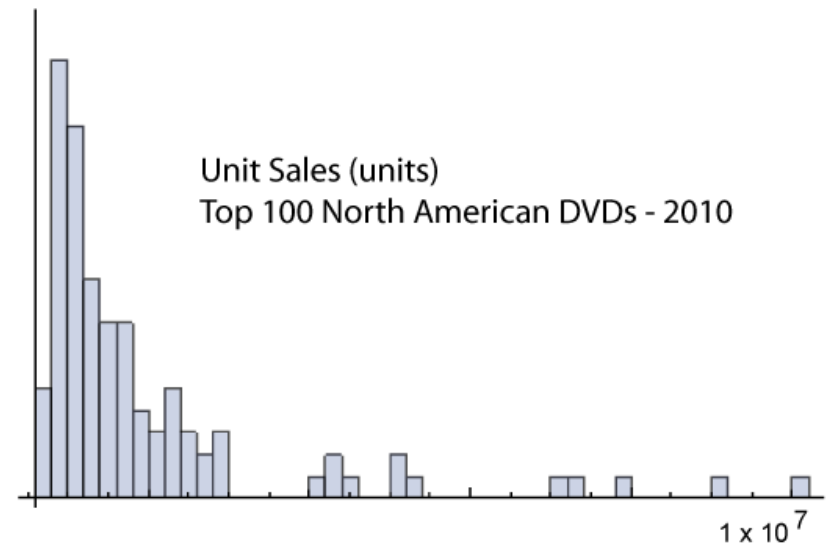
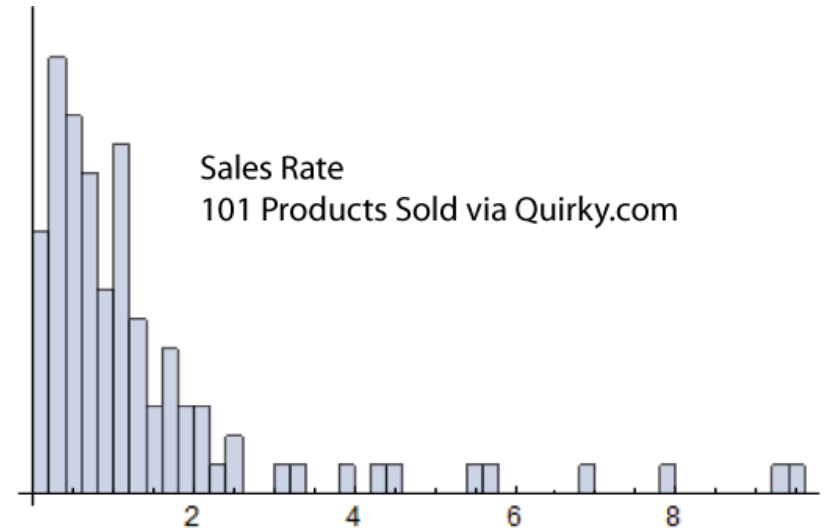
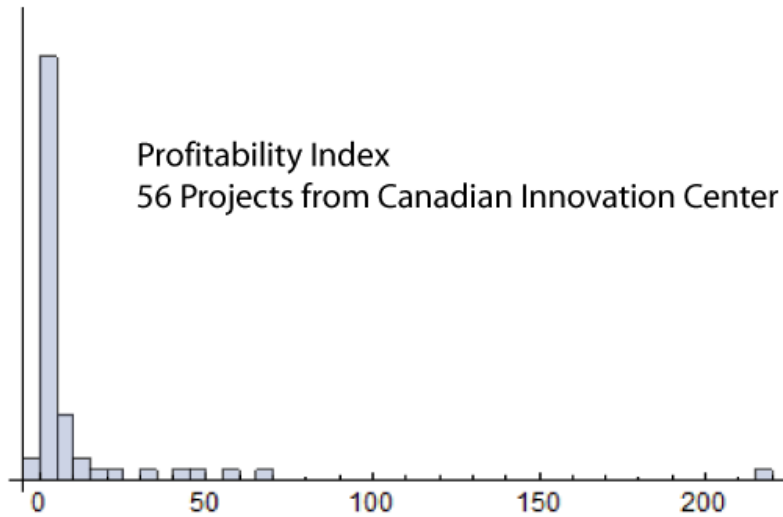
*Source: Kauffman Foundation Angel Investor Performance Project. Sample is only those 499 ventures for which cash investments were made.*



# VIDE Model

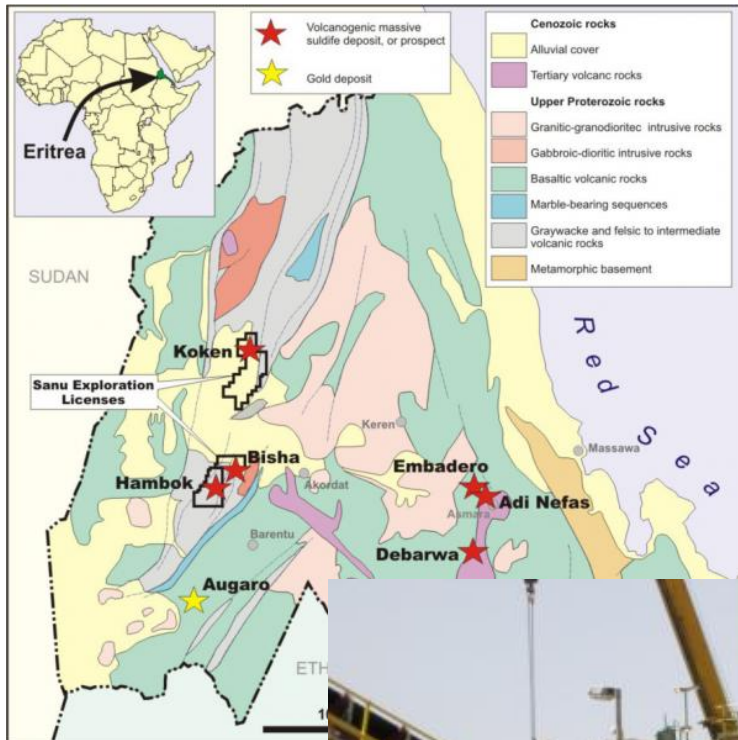
*Value = fn(Idea, Development, Exogenous Factors)*

*Conceptually:  $V = I \times D \times E$*



Idea

$$V = f(I, D, E)$$



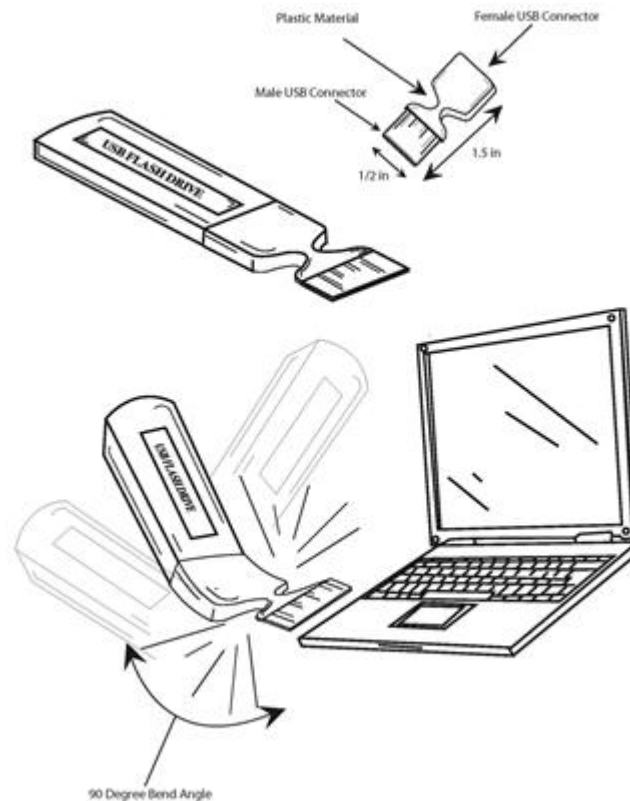
Exogenous Factors



Development







### ***Protect USB Thumb Drive***

*The problem is that USB drives stick out awkwardly from laptops and PCs; they are fragile and easy to break if you hit them hard enough with a hand or a knee. The solution is bendIT, the flexible and bendable USB adapter/cover that does not break. It is made out of a plastic/silicon material that bends 90 degrees in every direction (or more depending on the material) it is small in size and shape, it has a female connector on one side and a male connector on the other, and while it might increase the length of your thumb drive a little bit, it keeps it safe. You can either attach it to the thumb drive or keep attached to you laptop at all times.*



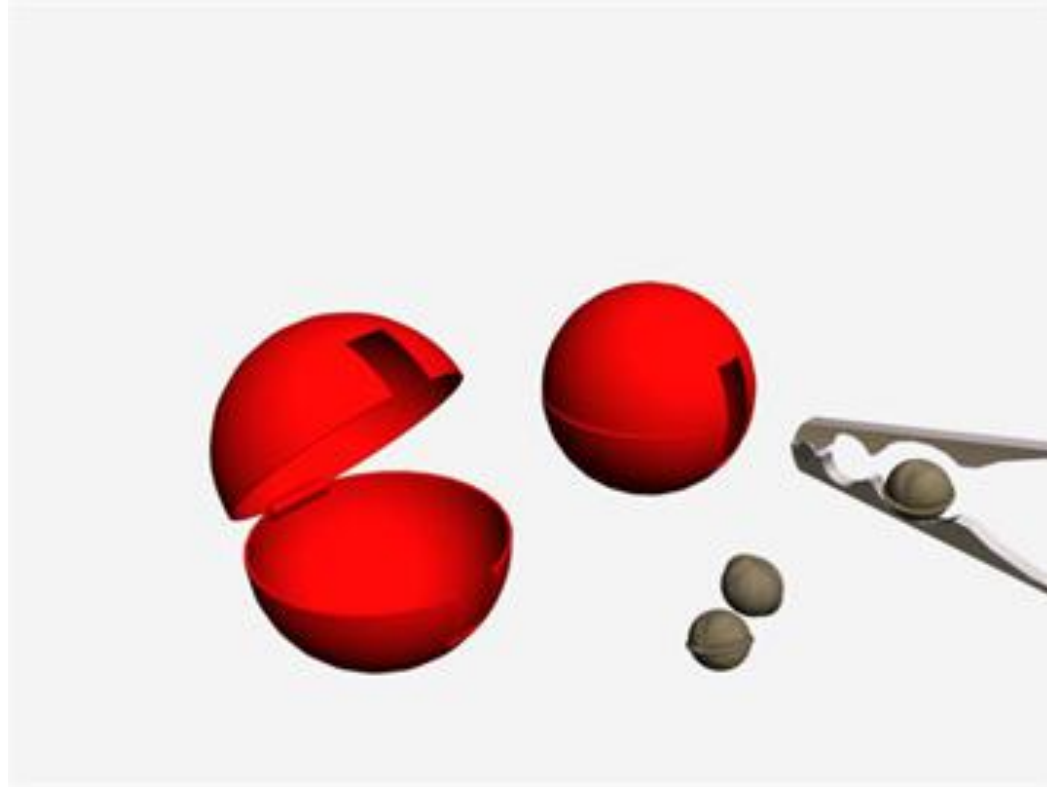
### *The Monitor LED Light Kit*

*Mount it under your monitor for a rockin' ambient neon light effect + a practical desk lamp. Take two great ideas (a LED neon under-dash light kit and a powerful LED desk lamp) and combine them into a LED light strip that mounts under the front edge of a monitor. Power it through USB, and there you go...an Alienware look ...*



### *Armpit Cooler with Bellows*

*Two small plastic bellows are affixed to your t-shirt under your arms. As you move your arms the bellows blow air onto your armpits cooling them down.*



### *Shell Stop Nut Cracker*

*When using traditional nut crackers to crack nuts...the shell normally flies across the room and gets stuck in the carpet or sofa. The edible part of the nut quite often also does the same so you spend time hunting for those good bits of nut. My idea for a new design of a nut cracker device has a dome or two-piece sphere which stops the shell and nut pieces flying off. The cracker and nut are operated within the dome ensuring you get to eat the whole nut without the mess of normal handheld nut crackers.*

[Shop](#)[Participate](#)[Upcoming](#)[Learn](#)[Invent](#)[Sign up](#)[Log in](#)

# The *easiest* way to bring your ideas to life.

Watch our manifesto to learn more about how  
Quirky makes invention accessible.

[Submit Your Idea Now](#)

Have a great product idea? [Here's where to start.](#) ►







Gifts

Power

Kitchen

Cord Management

Digital Accessories

Bath

Utility

Cordies

Spring Cleanin



## Contort

Protects with a Flex

\$24.99

Charcoal

Add to Cart

Tweet 89

Like 138

share

Earn 10% on sales!





Gifts

Power

Kitchen

Cord Management

Digital Accessories

Bath

Utility

Cordies

Spring Cleaning



## Mantis

Let There Be Light

\$29.99

Black

Add to Cart

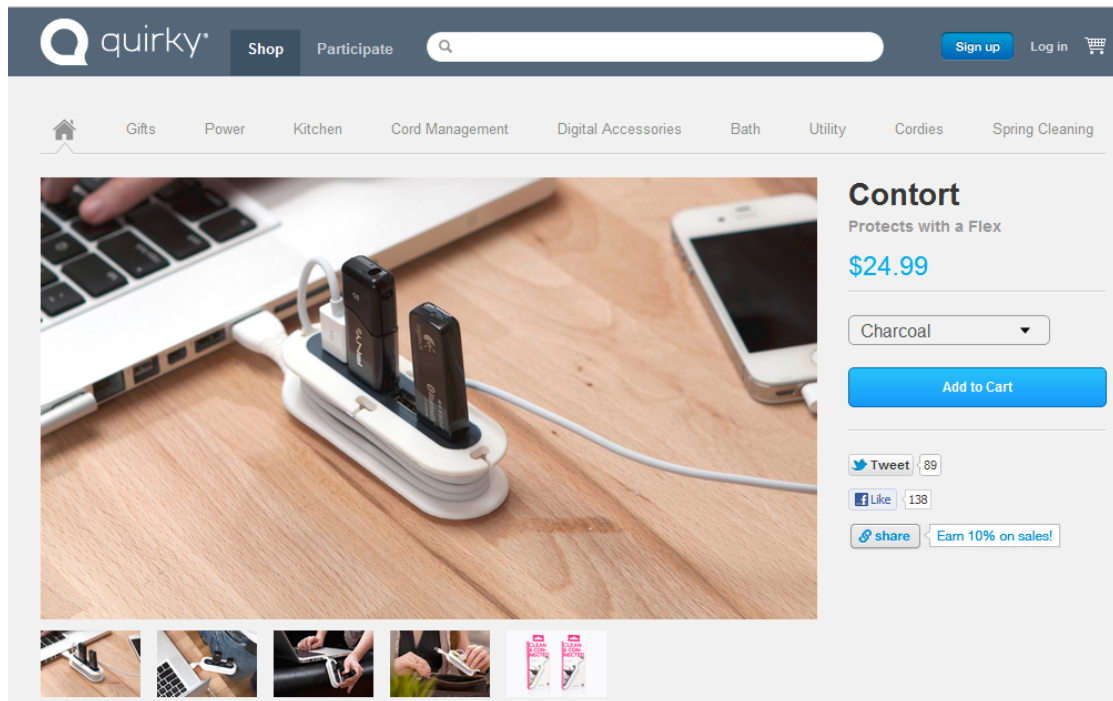
Tweet 68

Like 208

share Earn 10% on sales!







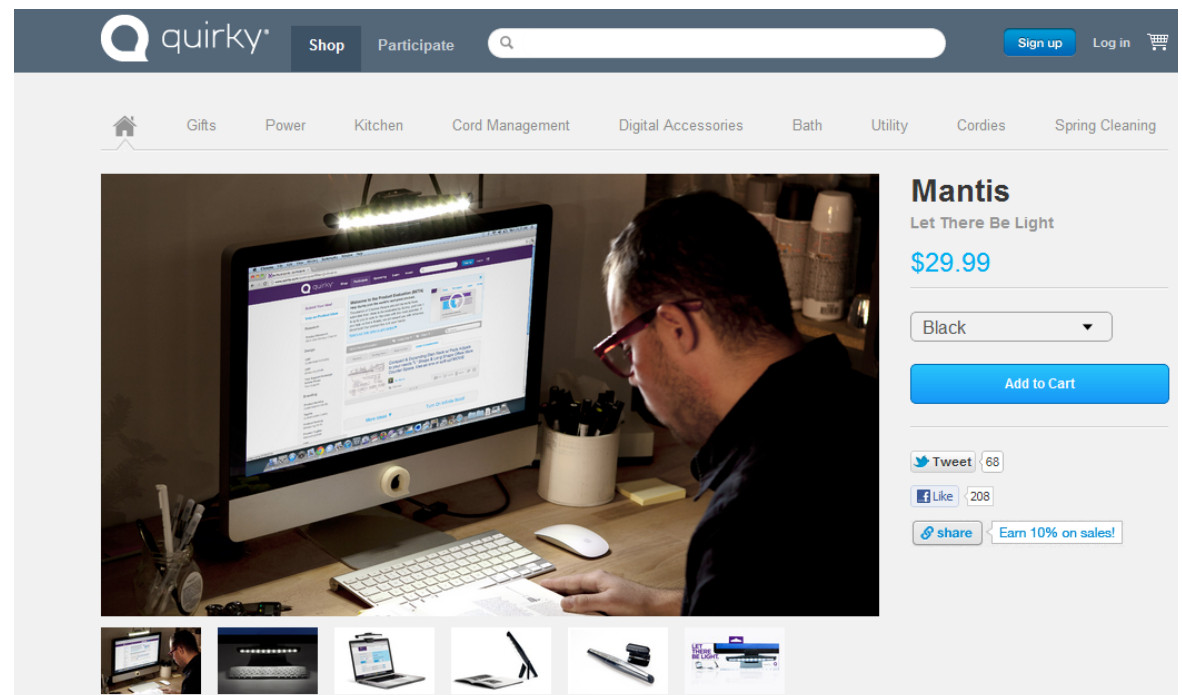
*Sales Rate X*

*Sales Rate 3.4X*

*A lot of variance in outcomes.*

*Hard to predict outcomes based on ideas.*

*What could we do with a large sample?*



[Shop](#)[Participate](#)[Upcoming](#)[Learn](#)[Invent](#)[Sign up](#)[Log in](#)

# The *easiest* way to bring your ideas to life.

Watch our manifesto to learn more about how  
Quirky makes invention accessible.

[Submit Your Idea Now](#)

Have a great product idea? [Here's where to start.](#) ►

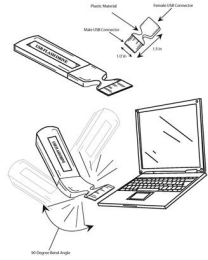
## Estimating Idea Quality

$$\hat{I} = I + \varepsilon$$

	Quirk Score - Idea	Expert Rating - Idea	Purchase Intent - Idea	Purchase Intent – Final	Log Sales Rate
Quirk Score - Idea	-	0.19	0.27	-0.06	-0.17
Expert Rating - Idea	0.19	-	<b>0.49</b>	<b>0.31</b>	<b>0.24</b>
Purchase Intent - Idea	0.27	<b>0.49</b>	-	<b>0.55</b>	<b>0.25</b>
Purchase Intent – Final	-0.06	<b>0.31</b>	<b>0.55</b>	-	<b>0.36</b>
Log Sales Rate	-0.17	<b>0.24</b>	<b>0.25</b>	<b>0.36</b>	-

*Values in boldface significant at 0.05 level.*





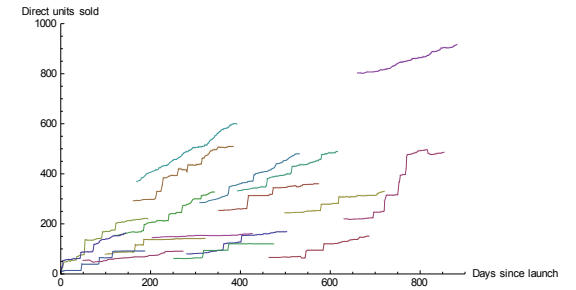
*raw idea*



*final design*



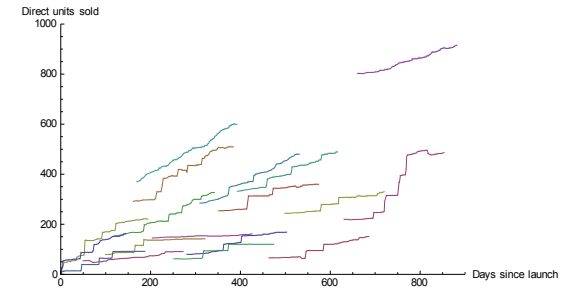
*product sales*



*Purchase Intent (PI)*  
*Raw Idea*

*Purchase Intent (PI)*  
*Final Design*

*Ln(Sales Rate)*



*Both Steps: Regression of Ln(Sales Rate) on Purchase Intent for Raw Idea  
(2SLS with controls for product category, and instrumented price)*

Constant	3.501***
PI Raw Idea	4.885***
Estimated Ln(Price)	-1.330***
R <sup>2</sup>	0.32

*(“Partial R<sup>2</sup>” for PI Raw Idea is 6%)*

➔ *1 s.d. increase in purchase intent of the raw idea ~ 51 - 78% increase in sales rate.*



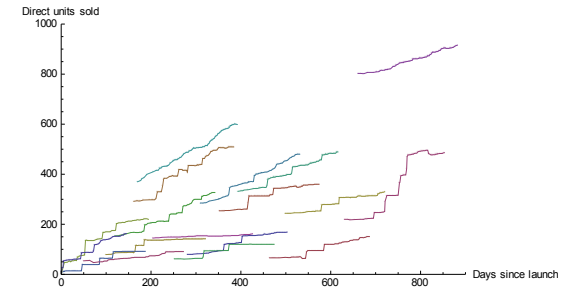
*raw idea*



*final design*



*product sales*



### Step 1: Regression of PI Final Design On PI Raw Idea

Constant	0.138***
PI Raw Idea	0.551***
Estimated Ln(Price)	-0.036***
R <sup>2</sup>	0.52

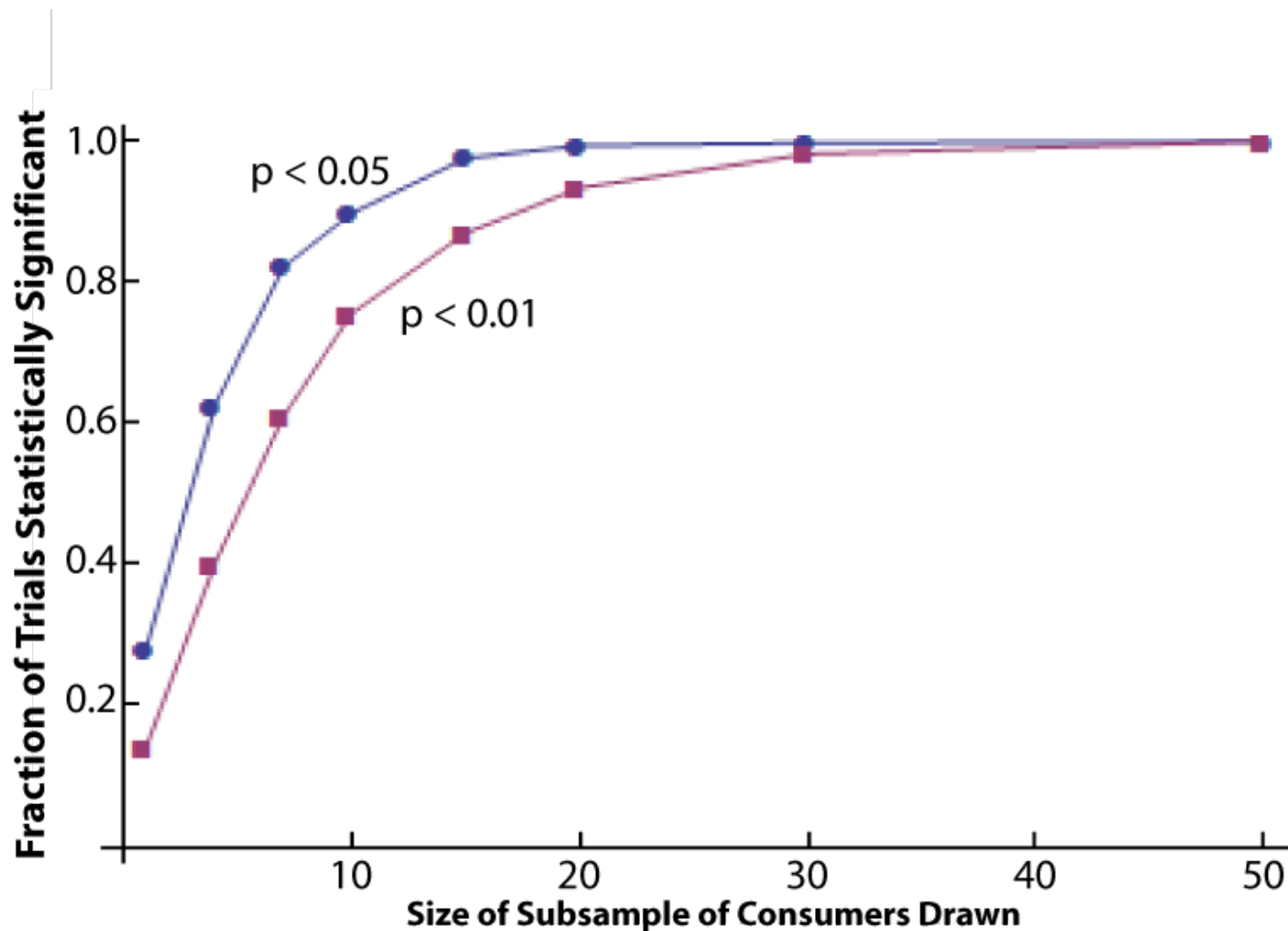
### Step 2: Regression of Ln(Sales Rate) on PI Final Design

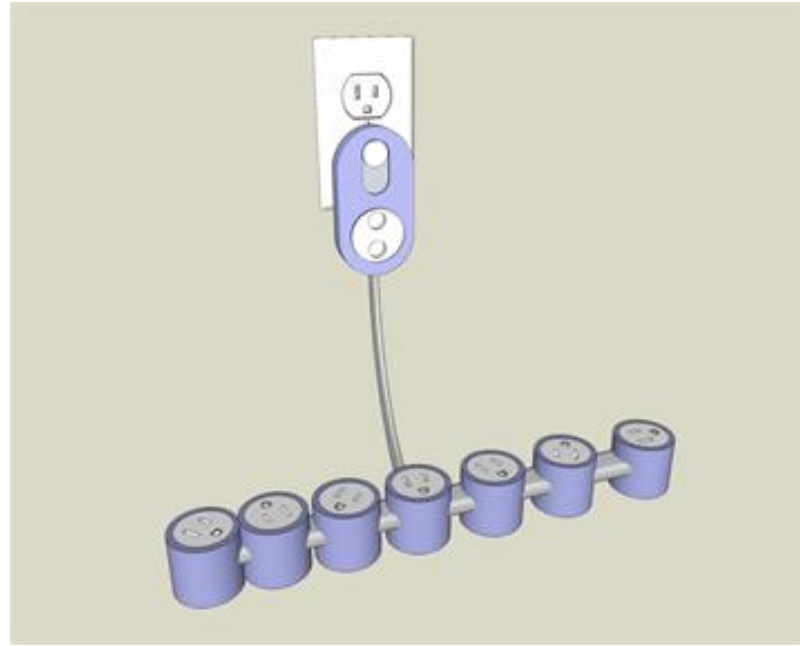
Constant	4.247***
PI Final Design	3.591*
Estimated Ln(Price)	-1.155***
R <sup>2</sup>	0.31

(2SLS including controls for category and instrument for price. "R2" is (1-ESS)/TSS)



1. *Seven experts are about as good as four random consumers.*
2. *Only need about 10-20 consumers to get a really good estimate.*





### *The Usable Power Strip*

*Have a look at the power strip under your desk. How many of its outlets are being used? How many of them would you like to use, but you can't, because a giant power brick (transformer) in the adjacent outlet is blocking it? My solution is to put each outlet in its own cylindrical pod, and allow these pods to be either pushed up next to each other or pulled apart by a couple of inches. When extended, the outlets could accommodate large plugs like power bricks.*



Gifts

Power

Kitchen

Cord Management

Digital Accessories

Bath

Utility

Cordies

Spring Cleaning



## Pivot Power

A Creative Outlet

\$29.99

Pivot Power White ▾

Add to Cart

Tweet 1,362

Like 1k

share Earn 10% on sales!





# CabStalker.com – Stop Waiting



**Source:** 2009 Wharton workshop on web-based products and services.



**Photo:**  
Wikimedia  
(cstockwe)



## Challenge JOB

IWWMW improve the way jobs for young professionals are created, marketed, identified, and filled?



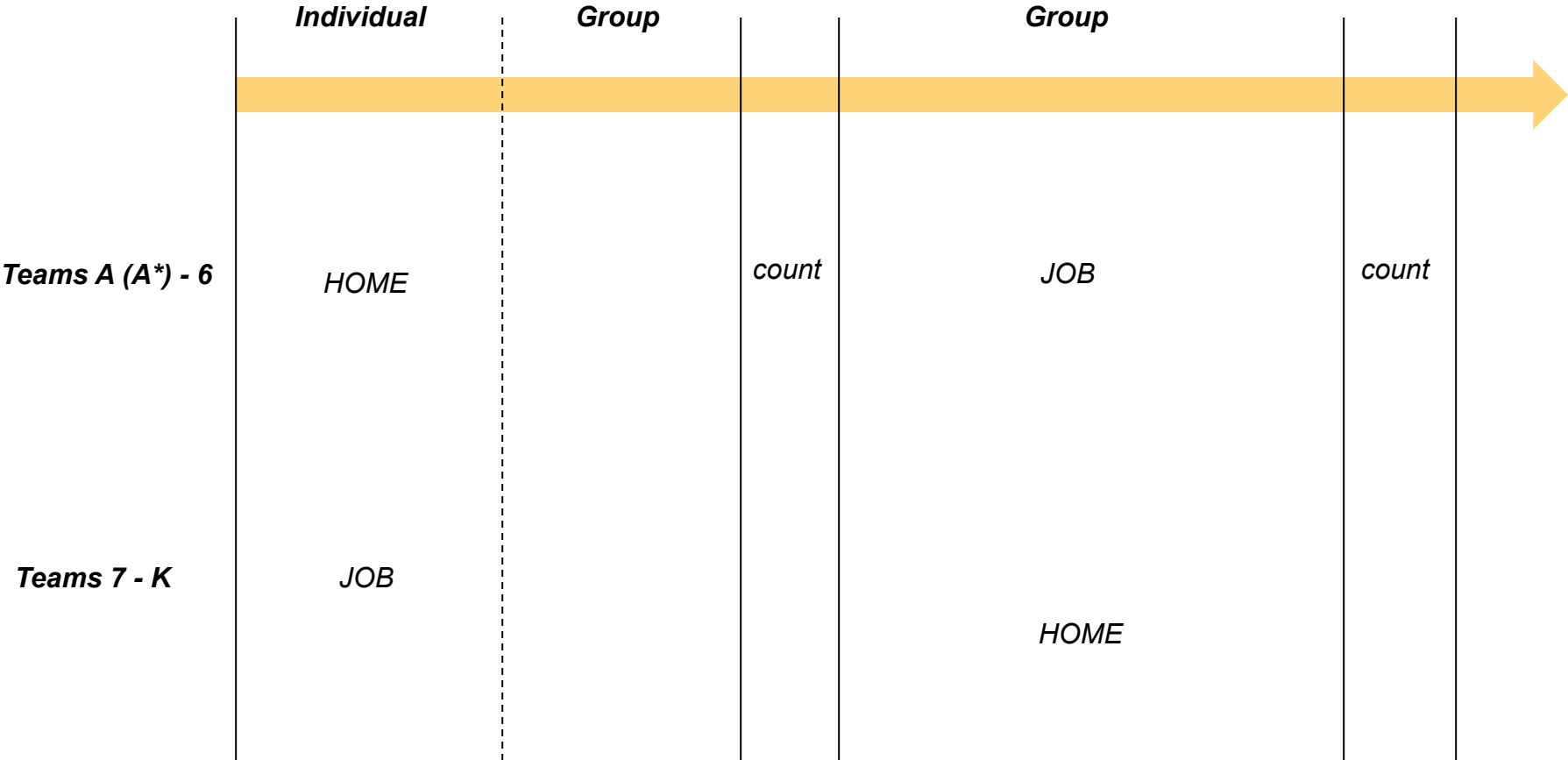
## Challenge HOME

*IWWMW improve the way rental housing for young professionals is created, marketed, identified, booked, and transacted?*





# Opportunity Identification Workshop Timing and Plan





**Photo:** [http://commons.wikimedia.org/wiki/File:Lancaster,\\_California\\_desert.jpg](http://commons.wikimedia.org/wiki/File:Lancaster,_California_desert.jpg)





Photo: [http://commons.wikimedia.org/wiki/File:M%C3%A9st ASM\\_clermont.jpg](http://commons.wikimedia.org/wiki/File:M%C3%A9st ASM_clermont.jpg)



## Groups vs. Individuals in Idea Generation

### *Group Approach*



30 minutes  
4 people working together

### *Hybrid Approach*



10 minutes    20 minutes

4 people  
working  
alone



4 people working  
together

- 2.5 x more ideas
- Better quality ideas

**Source:** Girotra, Terwiesch, and Ulrich. 2010. Idea Generation and the Quality of the Best Idea. *Management Science*. Vol. 56, No. 4, pp. 591–605. (Available via [ktulrich.com](http://ktulrich.com).)

# Three Example Projects



new & easy way of  
booking doctor appointments

Search highly qualified doctors, filter results to match  
your needs. Book online, INSTANTLY.



Get Started

Select Doctor Specialty

▼

Select Carrier/Network

▼

Enter Your Zip Code

Select Plan/Option



OF | MERCER

# Innovation Process – OIDD 614

