

**15.356**  
**The Lead User**  
**idea generation method**

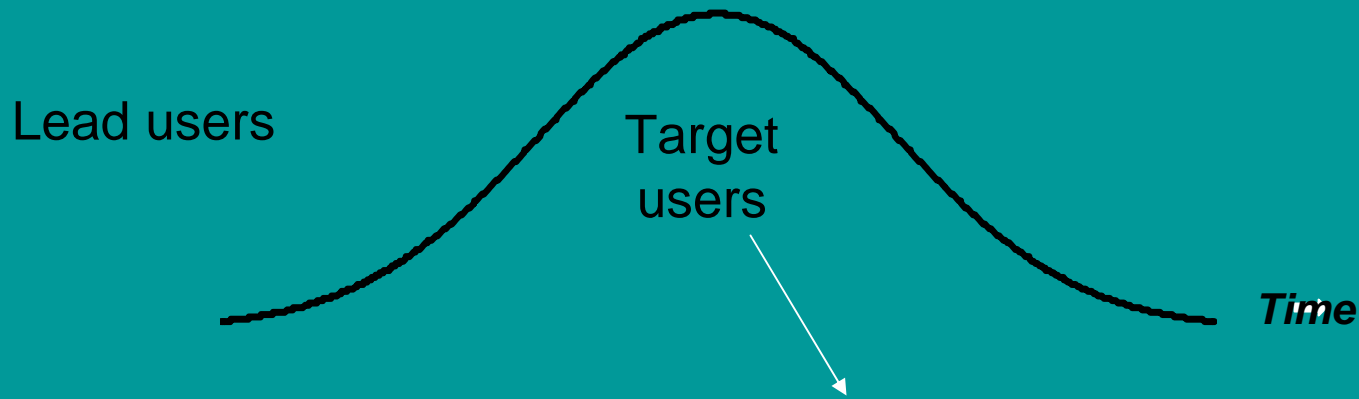
**Professor Eric von Hippel**

MIT Sloan School of Management



# Contrasting innovation methods

Need and market life cycle curve



**New methods** are based on finding / encouraging and commercializing **solutions** developed by users themselves

**Traditional methods** are based on “find a need and fill it”  
(Target users provide **needs**;  
Manufacturer develops solutions)

# Essential Definitions

1. An **INNOVATION** is anything new that is actually used (“enters the marketplace”) – whether major or minor.
2. The “functional” source of innovation depends upon the *functional* relationship between innovator and innovation:
  - An innovation is a **USER** innovation when the developer expects to benefit by *using* it;
  - An innovation is a **MANUFACTURER** innovation when the developer expects to benefit by *selling* it.

# Many industrial and consumer products have roots in user innovation.

## Consumer product examples:

Category	Example
Health Products	Gatorade
Personal Care	Protein-base Shampoo Feminine Hygiene
Sports Equipment	Mountain Bike Mountain Climbing-Piton
Apparel	Sports Bra
Food	Chocolate Milk Graham Cracker Crust
Office	White-out Liquid
Software	Electronic Mail, Desk Top Publishing

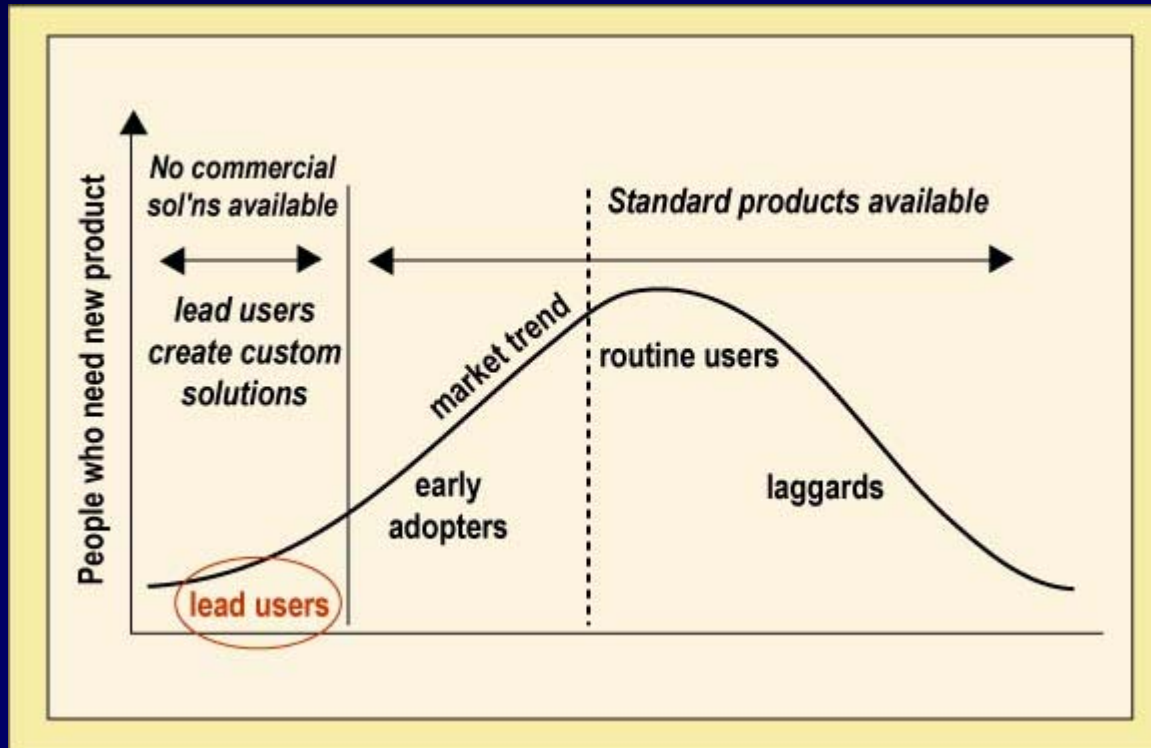
# Users innovate when it pays... for them

Only “**Lead User**” innovations form the basis for new products and services of value to manufacturers.

“**Lead Users**” are users that:

1. Have needs that *foreshadow general demand* in the marketplace;
2. *Expect to obtain high benefit* from a solution to their needs. (Such users are more likely to innovate – “Necessity is the mother of invention!”)

# Lead users at leading edge of “need curve”



# The World Wide Web

## – A Lead User Innovation

“Berners-Lee did not set out to invent a contemporary cultural phenomenon; rather, he says, “it was something I needed in my work.” He wanted to simply to solve a problem that was hindering his efforts as a consulting software engineer at CERN.

Berners-Lee’s innovation was to apply hypertext to the growing reality of networked computers. He expanded the idea he had developed at CERN and made it available on the Internet in the summer of 1991.

*Technology Review*, July 1996, p.34

# Adopter Categorization According to Innovativeness

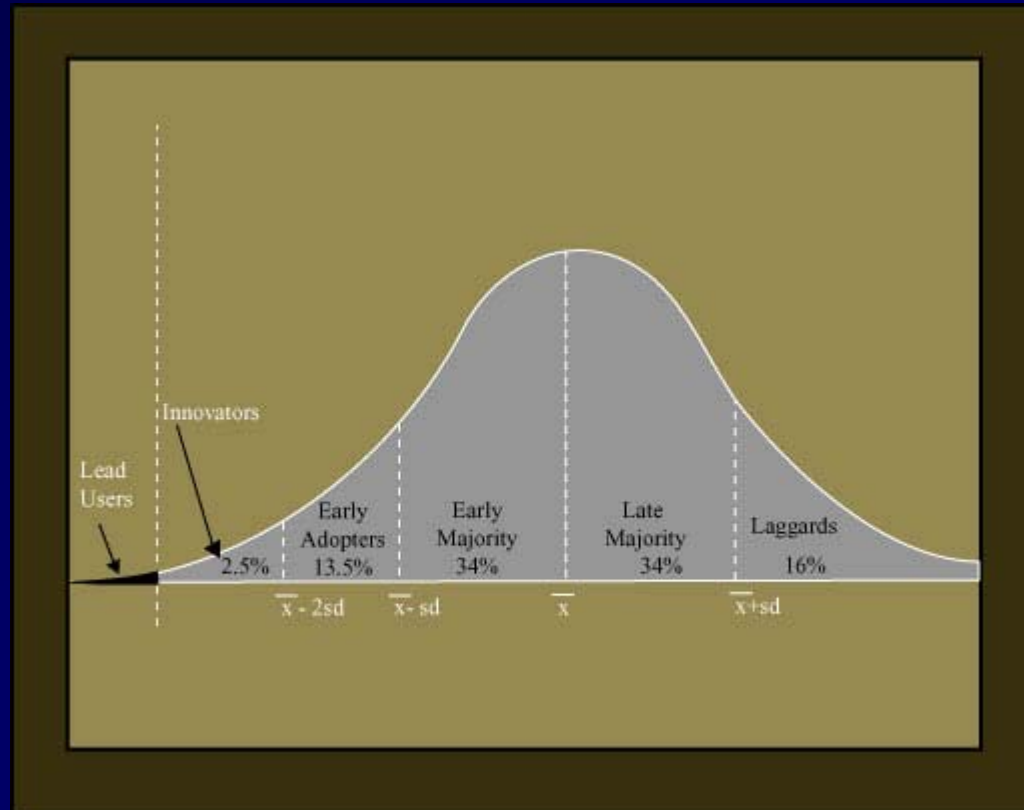
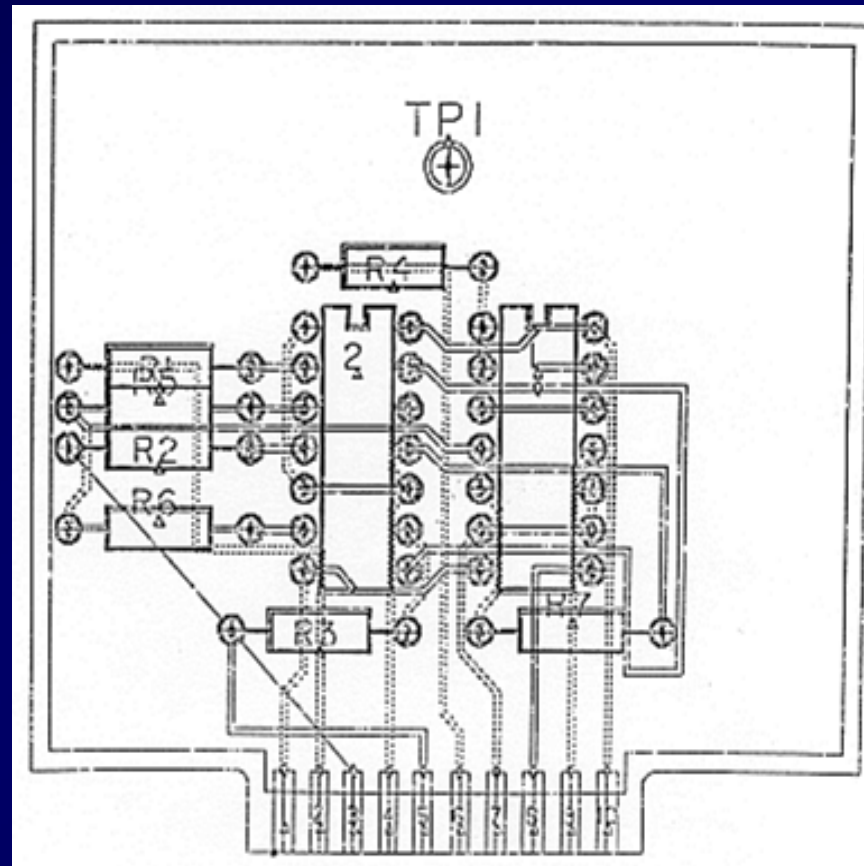


Diagram based on: Rogers, E. M. *Diffusion of Innovations*.  
New York: Free Press, p. 182.



# Product area selected for pilot test of lead user methods:

**Computer-Aided-Design systems  
Used to lay out printed circuit boards (PCB-CAD)**



# In PC-CAD Lead Users were innovating - Routine Users were not

Expected Lead User Attribute	Type of Questions We Asked	LEAD Users	Routine Users
At Front of “High Density” Trend?	What are your:		
	<ul style="list-style-type: none"> <li>● Avg. Number of layers?</li> <li>● Avg. Line width (mils)? (1988 data)</li> </ul>	6.8 11	4.1 15
High Need For Improved System?	“Are you satisfied with your present PCB CAD system?”	No	It’s OK
Active In Solving Own Problem?	Did you build own PCB CAD System	<b>82%</b> Yes	<b>1%</b> Yes
Number in Sample		33	99

# Consumer product innovators are lead users too

Sports equipment user Characteristics	Innovators	Non-innovators	Difference
---------------------------------------	------------	----------------	------------

## *Lead User Characteristic (1): Being Ahead of the Trend\**

“I improved or developed new techniques in my sport.”	4.29	5.84	p<0.001
---	------	------	---------

## *Lead User Characteristic (2): High Benefit from Innovation\**

“I have new needs which are not satisfied by existing products.”	3.27	4.38	p<0.001
--	------	------	---------

“I am dissatisfied with the existing equipment.”	3.90	5.13	p<0.001
--	------	------	---------

## **Sports equipment study: Franke and Shah (2003)**

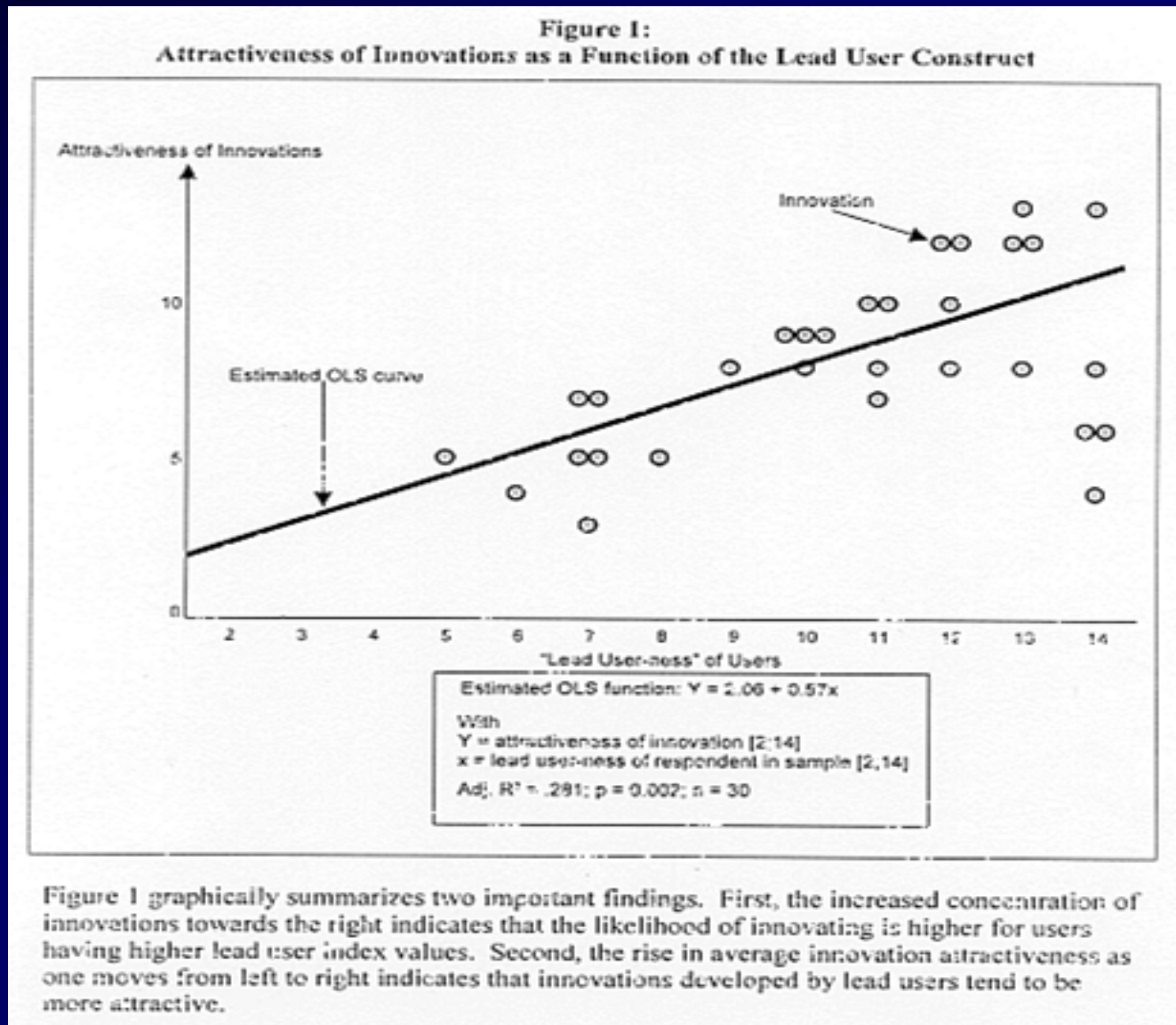
**\*7-point rating scale: 1 = very accurate; 7 = not accurate at all**

## Many lead users innovate

<b>Industrial products</b>	n	% innovating
Printed Circuit CAD	136	24.3%
Pipe Hanger Hardware	74	36%
Library IT Systems	102	26%
Software security features	131	19.1%
Surgical Equipment	262	22%
<b>Consumer products</b>		
Outdoor Products	153	9.8%
"Extreme" sports equipment	197	37.8%
Mountain biking equipment	291	19.2%

Table source: Franke, Nikolaus, and Eric von Hippel. "Finding Commercially Attractive User Innovations: An Exploration and Test of "Lead User" Theory." MIT Sloan School of Management Working Paper No. 4402-03, July 2003. Used with permission.

# As innovator LU characteristics go up – so does innovation attractiveness



# Performance Assessment of Lead User Research at 3M

**Research Team:** Prof. Gary Lilien, Penn State University;  
Prof. Pam Morrison, University of New South Wales; Dr. Kate Searls,  
ASI Associates, Mary Sonnack, Division Scientist, 3M;  
Prof. Eric von Hippel, MIT

(For the complete article and other Lead User Videos and articles:  
Go to [leaduser.com](http://leaduser.com) on the Web)

For more information on the following 7 slides, see: Lilien, Gary L., Pamela D. Morrison, Kathleen Searls, Mary Sonnack, Eric von Hippel. "Performance Assessment of the Lead User Idea Generation Process." MIT Sloan School of Management Working Paper No. 4151, January 2001. *Management Science*, forthcoming.

# Assessment Results: Lead User vs. Non-Lead User Funded Ideas

	LU Ideas (n=5)	NON-LU Ideas (n=42)	Sig.
<b>“Newness” of Idea</b>			
● Novelty compared to competition	<b>9.6</b>	6.8	0.01
● Newness of needs addressed	<b>8.3</b>	5.3	0.09
<b>Projected Profitability</b>			
● % market share in year 5	<b>68%</b>	<b>33%</b>	0.01
● Estimated sales in year 5	<b>\$146m</b>	<b>18m</b>	0.00
<b>Strategic Value</b>			
● Strategic importance	9.6	7.3	0.08
● Fit with Strategic plan	9.8	8.4	9.24
<b>Fit with Business</b>			
● Intellectual prop. protection	<b>7.1</b>	<b>6.7</b>	0.80
● Fit with mfr. Capabilities	7.8	6.7	0.92
● Fit with distribution channels	8.8	8.0	0.61

Note: Items measured on 10 pt. Scale, 10=high, 1=low

# Essential Definitions

## “Breakthrough:”

- Determines Future Business Growth and Margins
- Major Product line >20% of Division Sales

## Incremental improvement:

- Valuable to existing business
- Extension to existing line

	Incremental	Breakthrough
Traditional 3M Method	41	1
LU Method At 3M	0	5



# Example of a LU innovation on 3M website

## “3M's Major Innovations”

Commercialized 2001

- 3M™ Inflata-Pak™ Air Cushion Packaging. This packaging eliminates the need for peanuts or bubble wrap while protecting fragile items for shipping. Made of tough, durable plastic, it conforms to odd shapes and seals itself.

## Lead User concept generation projects cost more than traditional ones

	Person Days	Total Cost
Traditional 3M concept development stage	60	\$30,000
Lead User concept development stage At 3M	154	\$100,000 (plus coaching)

# **ACTIVITY: Think about possible Lead Users in *your* markets**

**Step 1**     **Select a specific market & specific *major* trend to think about**

**Step 2**     **Brainstorm possible lead users *within* that target market**

- Which types of individuals or firms have needs at the leading edge of the trends?
- Which ones have a high incentive & the resources to solve their leading edge needs?

**Step 3**     **Brainstorm possible lead users *outside* target market**

- Which types of users in other fields & applications are facing a similar need but in a more demanding form?

**Step 4**     **Specify what you might learn from each type of LU**

# Example of searching for lead users *outside* your target market

## Medical X-Ray

Instead of a “board of leading radiologists” ...

Look for users facing *higher* needs than anyone in target market:

People who need even high resolution than anyone doing medical imaging

Image enhancement (“pattern recognition”) specialists

Examples:

Experts in semiconductor chip imaging

Experts who process photographs from space probes

# Organizing to use the LU Method

