



# **A Rigorous Approach to Front-End Innovation**

*or*

*How “American Idol” Can Teach Innovation*

West Michigan PDMA Annual Conference

April 15, 2008

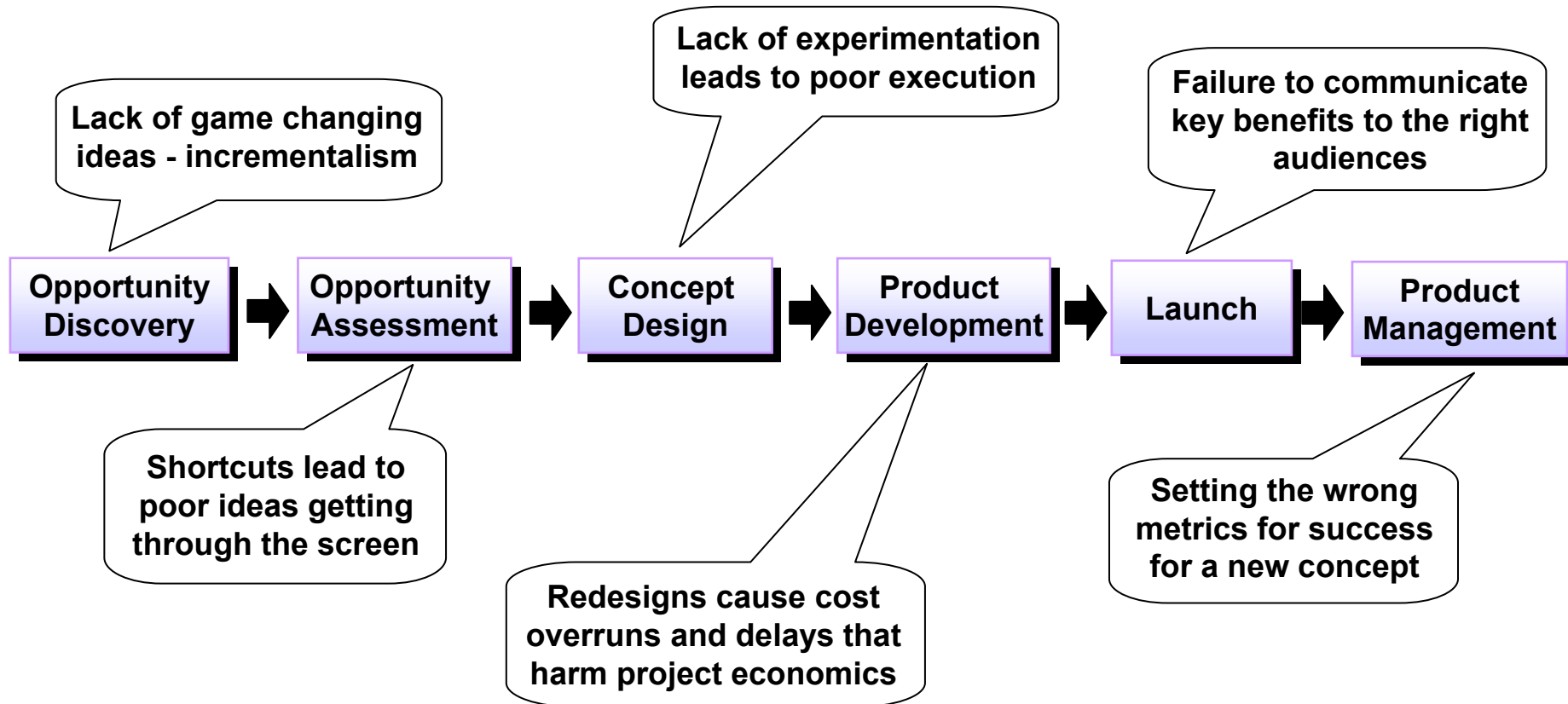
# Innovation is a Notoriously Risky Investment

## *The Results of Innovation Investments*

- Only 15 percent of respondents said they are very satisfied with their company's ability to convert ideas into service offerings and only 13 percent said they can do it repeatedly
  - *2007 survey by Accenture and The Economist Intelligence Unit*
- For the 1,000 largest spenders on research and development around the world, there is no correlation between spending and shareholder return
  - *2006 survey by Booz, Allen & Hamilton*
- Almost three-quarters of senior executives cite innovation as a priority but only 52% are satisfied with the returns on their innovation investments
  - *2006 survey by the Boston Consulting Group*

# Many Things Can Go Wrong in the Process of Turning an Idea Into a Marketplace Success

## *End-to-End Product Development Process*



# We are Surrounded by a Cacophony of Voices Telling Us How to Do Innovation and NPD Better

Future-Casting

TRIZ

Intellectual Property Management

Modeling & Simulation

Technology Roadmapping

Quality Function Deployment

Idea Management

Voice of the Customer

Brainstorming

Learning Organization

Trends and Discontinuities

Open Innovation

Knowledge Management

Collaboration

Stage Gate Process

Blue Oceans

Innovation Strategy

Business Model Innovation

Experimentation

Portfolio Management

Management Innovation

Creative Leadership

# However, Beginning at the Beginning is Probably a Good Place to Start

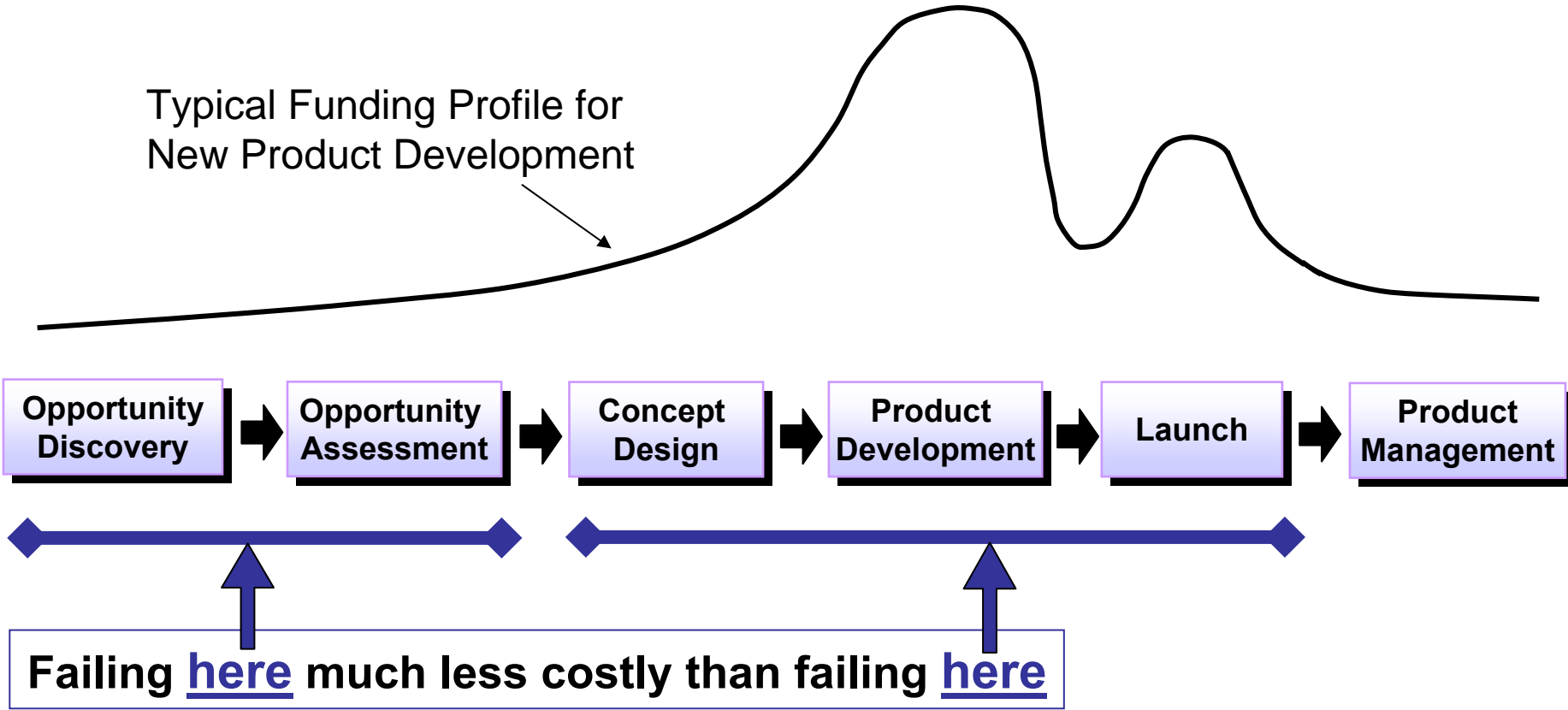
## ***Rationale for a Good Front-End Process***

- We are prone to three kinds of mistakes in the early stage
  - False positives (Type I or alpha errors)
  - False negatives (Type II or beta errors)
  - Incrementalism (a hybrid)
- Once formal product development has begun, cognitive dissonance sets in...sunk cost fallacy, confirmation bias
- Failing early leaves time and resources to develop truly good ideas...no harm, no foul
- Failing late is expensive, causes loss of morale and, most importantly, ruins our appetite for innovation

# The Financial Benefits of Eliminating Bad Ideas Early are Significant

## *Importance of a Good Front-End Process*

Typical Funding Profile for New Product Development



# This Seems Obvious...So Why is the Front End of Innovation So Hard to Do Well?

1. Early idea selection is too often seen as a manager's privilege
2. Paradigm that product development must be linear
3. Strong biases toward action vs learning and profit vs truth
4. Internal bias toward incremental innovation
5. An overly internal process
6. Myth of epiphany
7. Engineers are like fish...we like to pursue "shiny lures"

# Many of These Failure Risks Can Be Overcome But It Requires a Counterintuitive Approach

1. Increase time & resources at the front end
2. Clearly define the boundaries
3. Engage the entire *community*
4. Start with unfiltered ideas
5. Stay focused on *needs & desires* until it hurts
6. Don't just *screen* ideas, nurture and improve them
7. Anticipate barriers to entry early on
8. Use the *wisdom of crowds* to advance ideas

# The Television Show “American Idol” Can Teach Us How to Be Better Innovators

## The “American Idol” Innovation Process



**2** *Rigorous, Iterative Discovery Process*

**1** *All are Welcome*

10,000



Regional Auditions

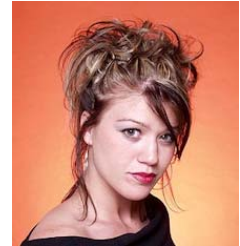
164

Finalist Selection

24

14 Weekly Televised Events

1 Winner



Kelly Clarkson

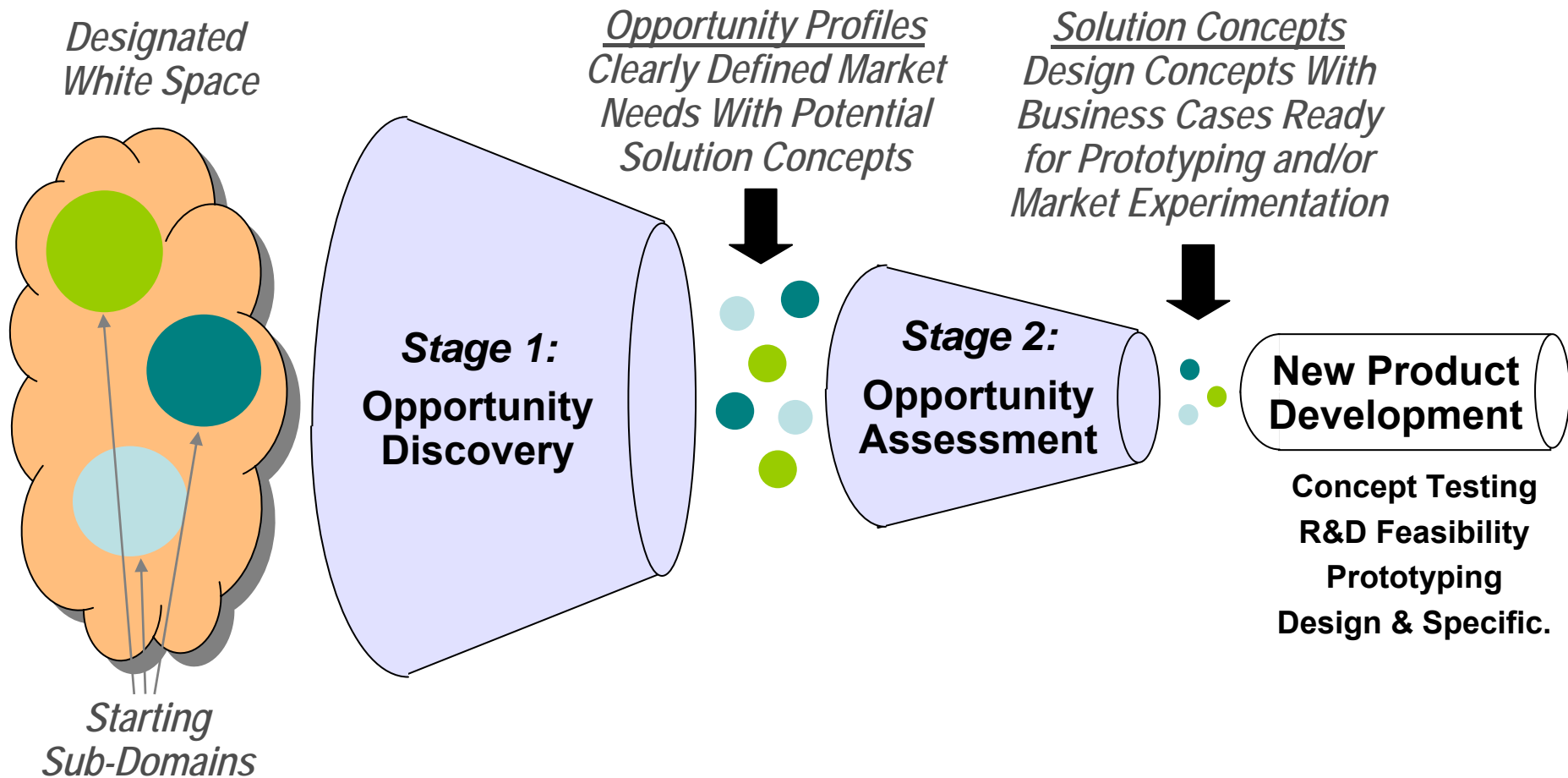
**5** *What you end up with isn't what you started with*

**6** *Real Investment Begins Here*

**3** *Critical Feedback Throughout the Process*

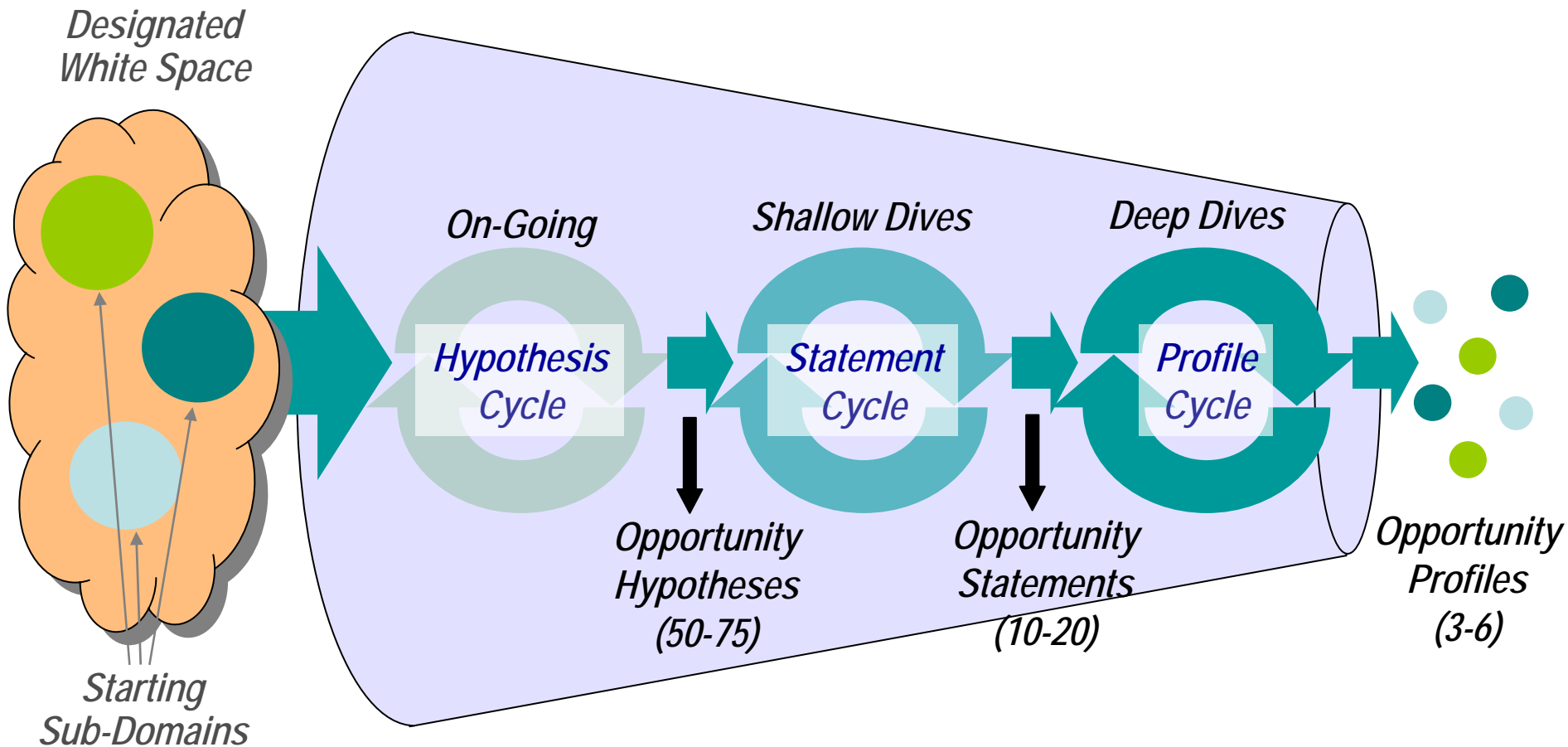
# I Will Describe a Two-Stage Program for Front-End Innovation That Accomplishes the Same Objective

## *Two-Stage Approach to Front-End Innovation*



# Opportunity Discovery Uses Iterative Deepening<sup>†</sup> to Distill the Best Opportunities from a White Space

## Stage 1: Opportunity Discovery Process<sup>(1)</sup>



(1) The [Iterative Deepening](#) method is based on the well-known theoretical model (of the same name) used to explore a space too large to search in its entirety

# Evolving Indicators Through the Process... Hypotheses, Statements and Profiles

- Opportunity Hypothesis (OH)
  - Many hypotheses come from exploration
  - Led by evidence not speculation
  - Documented using mind-maps
- Opportunity Statement (OS)
  - A one-page analyst's report
  - Clear and comparable statements
  - Group evaluation by pairwise comparison
- Opportunity Profile (OP)
  - A 10-page profile supported by deeper research and fleshed out through a structured working session



Allergen Detect			
The process of allergens to feed and the environment is critically important to address safety for a number of people, especially children. The main idea for this case is to use the evidence. The longer the allergen is "allergen" is also a specific one. When a single one will be the environment that it is usually safe to use the allergen's condition. The allergen may be able to survive in the environment and a constant although it has high value for the case and its effects. The ability to find the process of allergen foundation in its own, health and safety.			
<b>Technology</b>	<b>Community</b>		
How allergen foundation in its own environment is critically important to address safety for a number of people, especially children. The main idea for this case is to use the evidence. The longer the allergen is "allergen" is also a specific one. When a single one will be the environment that it is usually safe to use the allergen's condition. The allergen may be able to survive in the environment and a constant although it has high value for the case and its effects. The ability to find the process of allergen foundation in its own, health and safety.	It is a very important and critical one to address safety for a number of people, especially children. The main idea for this case is to use the evidence. The longer the allergen is "allergen" is also a specific one. When a single one will be the environment that it is usually safe to use the allergen's condition. The allergen may be able to survive in the environment and a constant although it has high value for the case and its effects. The ability to find the process of allergen foundation in its own, health and safety.		
<b>Substrate Safety</b>	<b>Community Safety</b>		
How allergen foundation in its own environment is critically important to address safety for a number of people, especially children. The main idea for this case is to use the evidence. The longer the allergen is "allergen" is also a specific one. When a single one will be the environment that it is usually safe to use the allergen's condition. The allergen may be able to survive in the environment and a constant although it has high value for the case and its effects. The ability to find the process of allergen foundation in its own, health and safety.	It is a very important and critical one to address safety for a number of people, especially children. The main idea for this case is to use the evidence. The longer the allergen is "allergen" is also a specific one. When a single one will be the environment that it is usually safe to use the allergen's condition. The allergen may be able to survive in the environment and a constant although it has high value for the case and its effects. The ability to find the process of allergen foundation in its own, health and safety.		
<b>Conclusion</b>			
It is a very important and critical one to address safety for a number of people, especially children. The main idea for this case is to use the evidence. The longer the allergen is "allergen" is also a specific one. When a single one will be the environment that it is usually safe to use the allergen's condition. The allergen may be able to survive in the environment and a constant although it has high value for the case and its effects. The ability to find the process of allergen foundation in its own, health and safety.			
<b>Index of OP</b>			
<b>Context</b>	<b>Why this case is interesting</b>	<b>Related Evidence</b>	<b>Notes</b>
How allergen foundation in its own environment is critically important to address safety for a number of people, especially children. The main idea for this case is to use the evidence. The longer the allergen is "allergen" is also a specific one. When a single one will be the environment that it is usually safe to use the allergen's condition. The allergen may be able to survive in the environment and a constant although it has high value for the case and its effects. The ability to find the process of allergen foundation in its own, health and safety.	It is a very important and critical one to address safety for a number of people, especially children. The main idea for this case is to use the evidence. The longer the allergen is "allergen" is also a specific one. When a single one will be the environment that it is usually safe to use the allergen's condition. The allergen may be able to survive in the environment and a constant although it has high value for the case and its effects. The ability to find the process of allergen foundation in its own, health and safety.	It is a very important and critical one to address safety for a number of people, especially children. The main idea for this case is to use the evidence. The longer the allergen is "allergen" is also a specific one. When a single one will be the environment that it is usually safe to use the allergen's condition. The allergen may be able to survive in the environment and a constant although it has high value for the case and its effects. The ability to find the process of allergen foundation in its own, health and safety.	It is a very important and critical one to address safety for a number of people, especially children. The main idea for this case is to use the evidence. The longer the allergen is "allergen" is also a specific one. When a single one will be the environment that it is usually safe to use the allergen's condition. The allergen may be able to survive in the environment and a constant although it has high value for the case and its effects. The ability to find the process of allergen foundation in its own, health and safety.

# What Companies Like About the Results of This Approach to Opportunity Discovery

## 1. Lots of interesting and viable ideas are generated

- Many internal and external contributors
- Ideas that were not previously on the radar screen
- With a supporting chain of evidence – customer need or desire, technology enablers, vacancy of competition, internal fit

## 2. Ideas mature through rigorous, structured debate

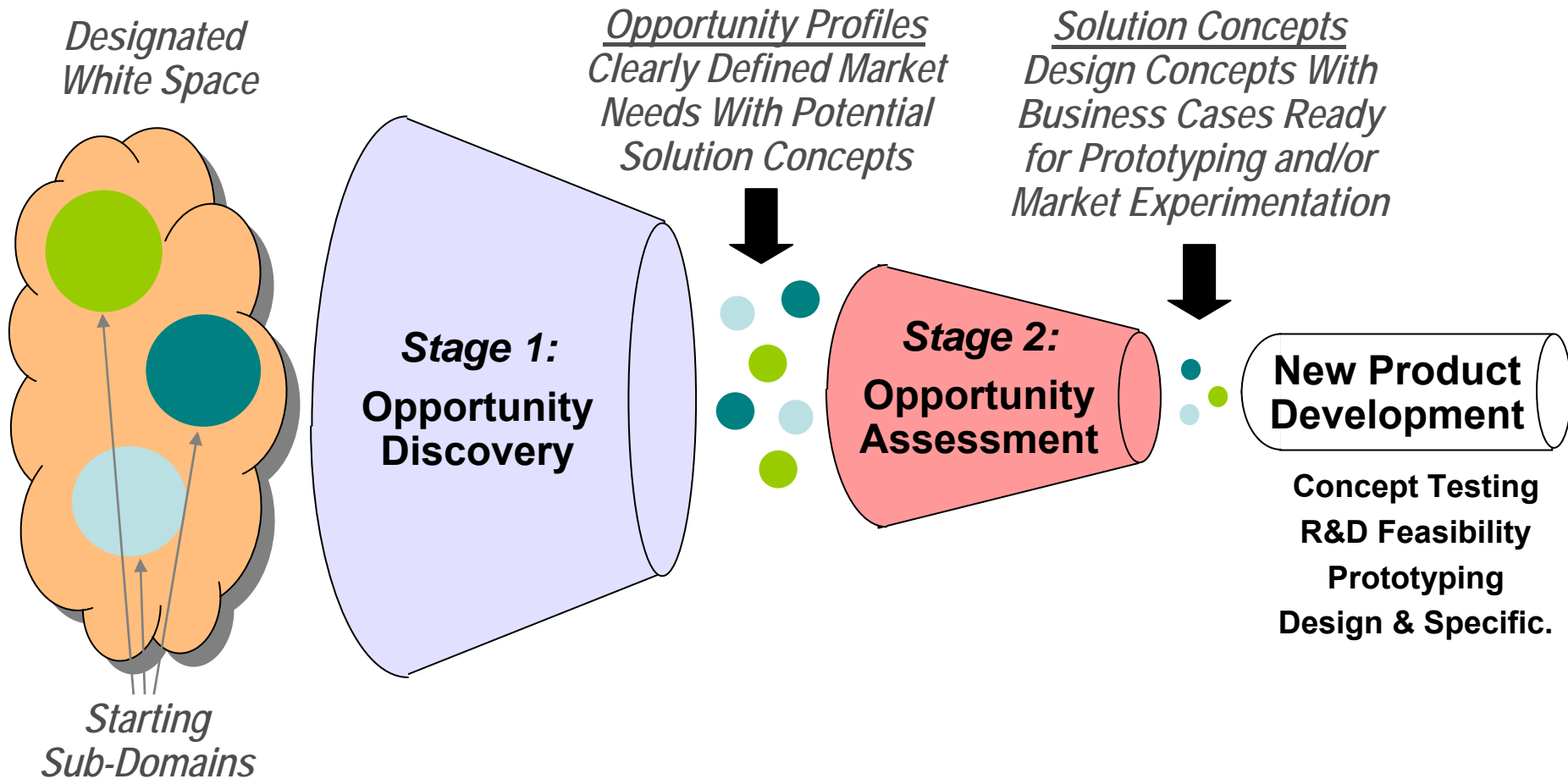
- Does not jump to solution too quickly
- Why is it good? Why is it bad? Which customers will like it? In which situations is it most useful? Will it pass the internal funding hurdle?
- Recognizes the myth of epiphany...great ideas evolve over time

## 3. Good ideas create internal alignment along the way

- A democratic process for prioritization...not top down
- Lightweight, pair-wise comparison with a larger group
- Bad ideas are eliminated without disenfranchising anyone

# Opportunity Discovery is Followed By Opportunity Assessment

## Two-Stage Approach to Front-End Innovation

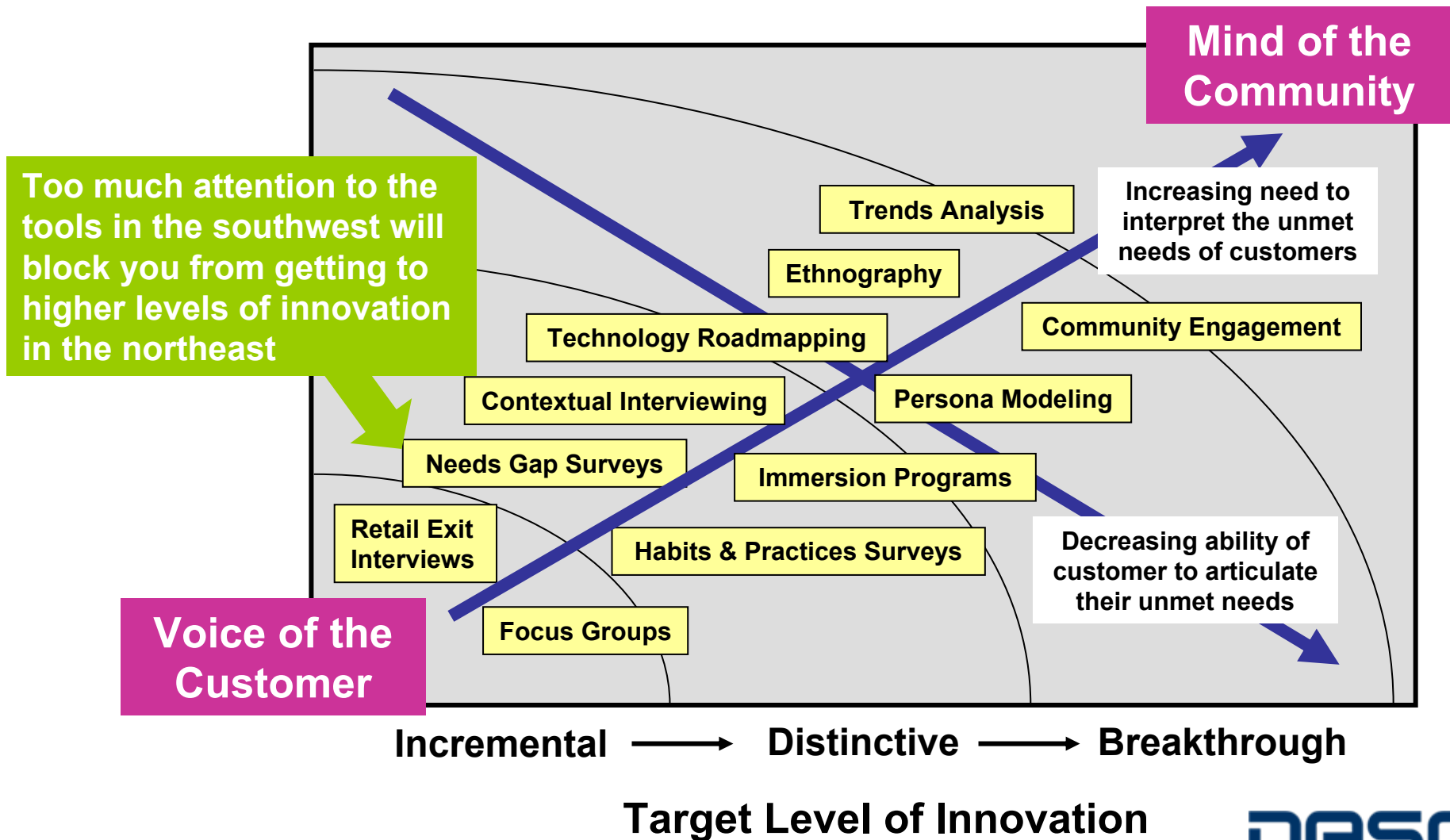


# The Foundation of Opportunity Assessment is Getting Knowledge from People

- ❑ Many individuals in the community have valuable knowledge and experience
  - Adoption of a new product or service depends on people
- ❑ They also have distinct perspectives, opinions, personalities and motivations
  - It is necessary to understand (and model) people to get a sense of what will affect adoption
- ❑ The knowledge you want is inside their heads; moreover, the knowledge you want is sub-conscious
  - People's motivations are determined by cognitive processes
- ❑ The assessment uncovers the hidden needs and desires of people in the community
  - This knowledge is captured in software personas that can be used to see how new solution concepts will be adopted

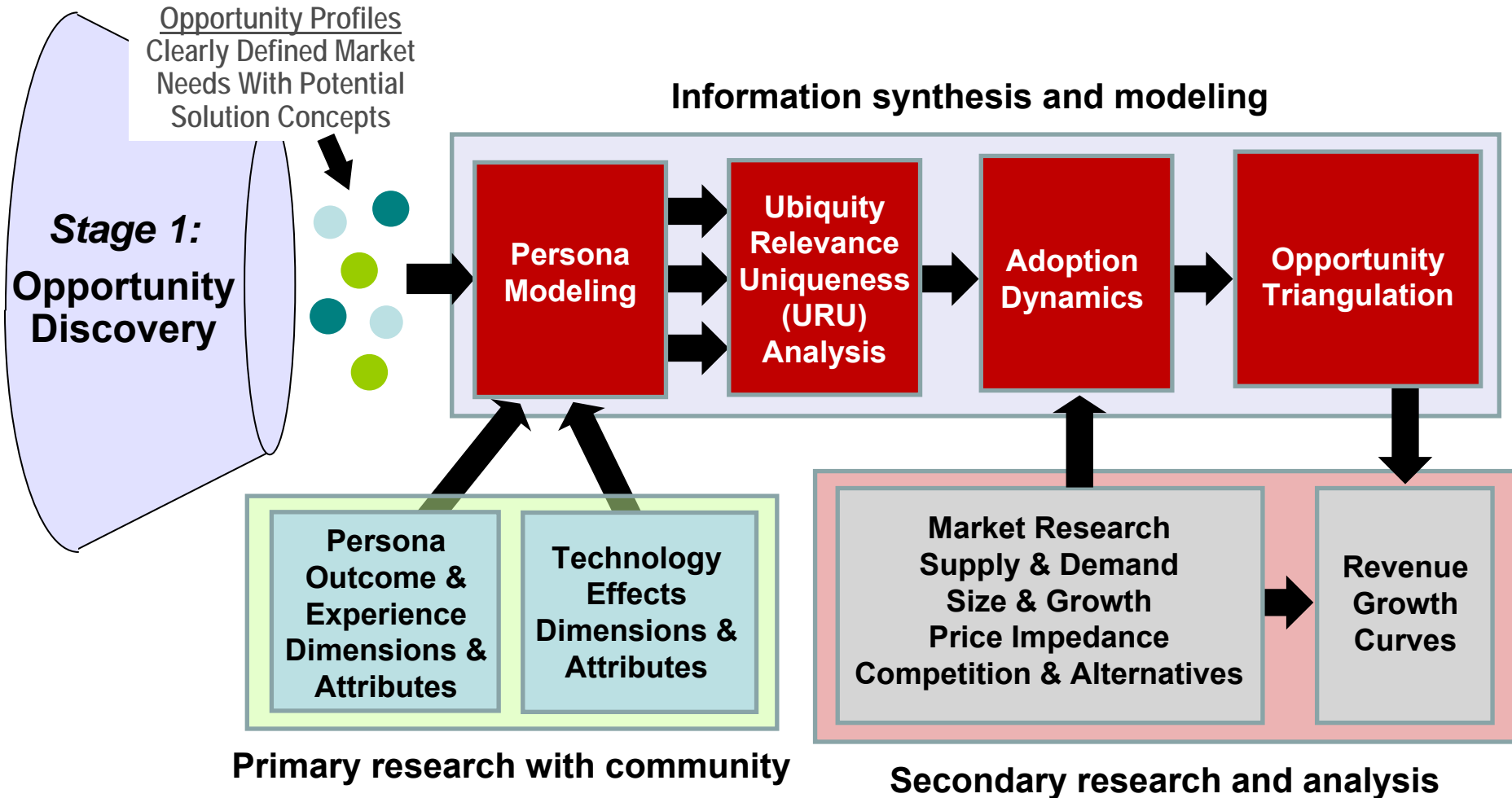
# Front-End Success Requires Getting Beyond the “Voice of the Customer”

## How Market Research Tools Support Innovation



# Opportunity Assessment Generates Revenue Growth Curves for a Handful of the Best Solution Concepts

## Opportunity Assessment Process Overview



# “Persona Models” are Created for Specific Unmet Needs – Not Demographic or Behavioral Segments

## Knowing who to talk to

1



### Community R&D

## Knowing how to talk to them

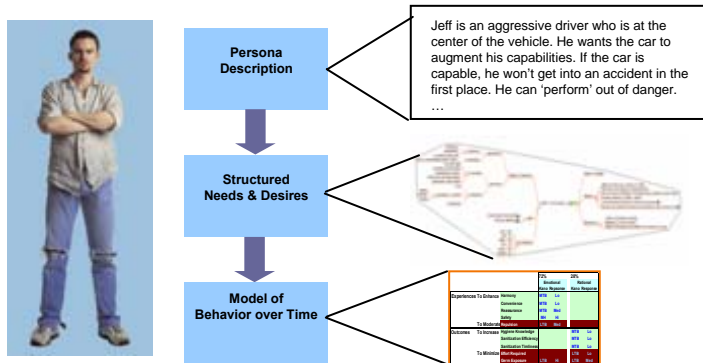
2

How do people think and choose?  
What do they truly desire?  
Why do they desire this?



## Knowing what to do with the information

3



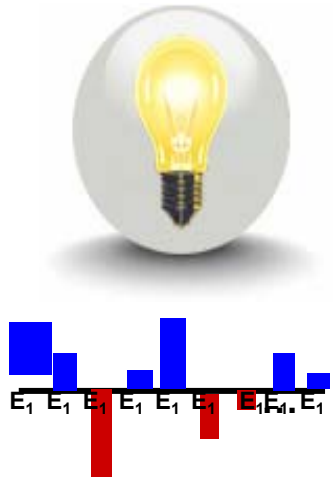
### Persona Modeling

### Uncovering latent needs & desires

# Solution Concepts and Personas are Combined to Predict Adoption Response

$$\text{Solution X Persona} = \text{Adoption}$$

**Solution Concept Effects Profiles**



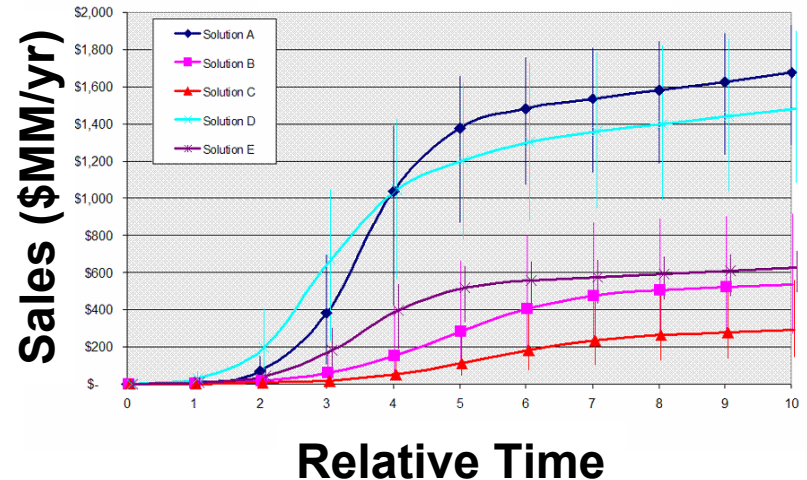
**X**

**Persona Profiles**



**=**

**URU Analysis and Adoption Dynamics (for each persona)**



# What Companies Like About The Results of This Approach to Opportunity Assessment

1. Represents a broader community of interested people, not just gurus or current customers
  - Brings in novel viewpoints from different industry perspectives
2. Gets to a deeper and more useful level of customer understanding
  - Customer motivations, not just demographics or behavioral descriptors
  - Real toolkit to do this (Persona Modeling)
3. Projects the business opportunity more accurately and earlier than previously possible
  - Gives us an early business case for screening solution concepts
  - Real toolkit to do this (URU and Adoption Modeling)
4. Identifies collaboration partners and other business model options to augment the core product opportunity

# **Case Study**

## **Global Tier-One Auto Supplier**

# We Began With an Initial *People Mobility* Domain Definition

## *People Mobility Domain Definition*

### Definition

The need and desire of people to have more options for getting themselves and their things from place to place will provide significant opportunities for new products, services and business models over the next decades. The technological landscape today provides many possibilities for creating mobility solutions at a personal level but there will also be a lot of 'experiments' that don't catch on.

### Boundaries

- Local power, moving one or a few people, individual focus
- Safety, reliability, assurance of destination, social acceptance, cost effective
- Electric power, small, easily used & stored

### Examples Inside the Domain

- Small EVs, wheeled transport vehicles
- Motor carts, strollers, wagons, etc to carry stuff
- Personal (on-body) transport mechanisms
- Transport interface/transfer devices
- Stationary mobility (exercise equipment)

### Examples Outside the Domain

- Large vehicles
- Mass transit (except for interface/transfer)
- ICE power (except for electricity generation)
- Manual means (e.g. pedaled bikes)

### Scenarios

Increased congestion, frustration with existing infrastructure, cost of infrastructure, cost of energy, energy independence, environmental impact, new materials, increased connectivity, aging population

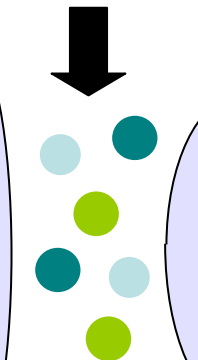
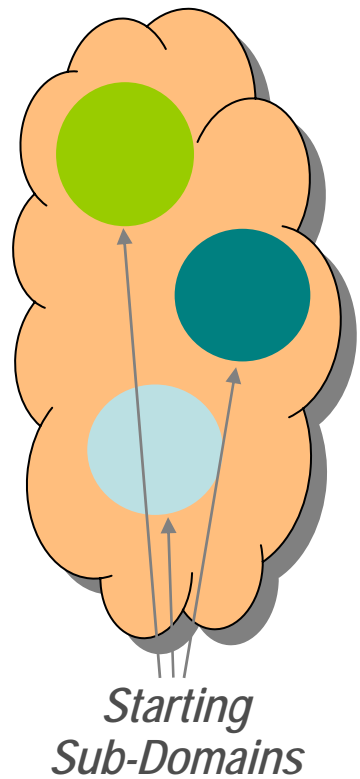
# We Have Just Completed the Opportunity Discovery Phase of the Program

## Overall Opportunity Development Process

*People Mobility  
White Space*

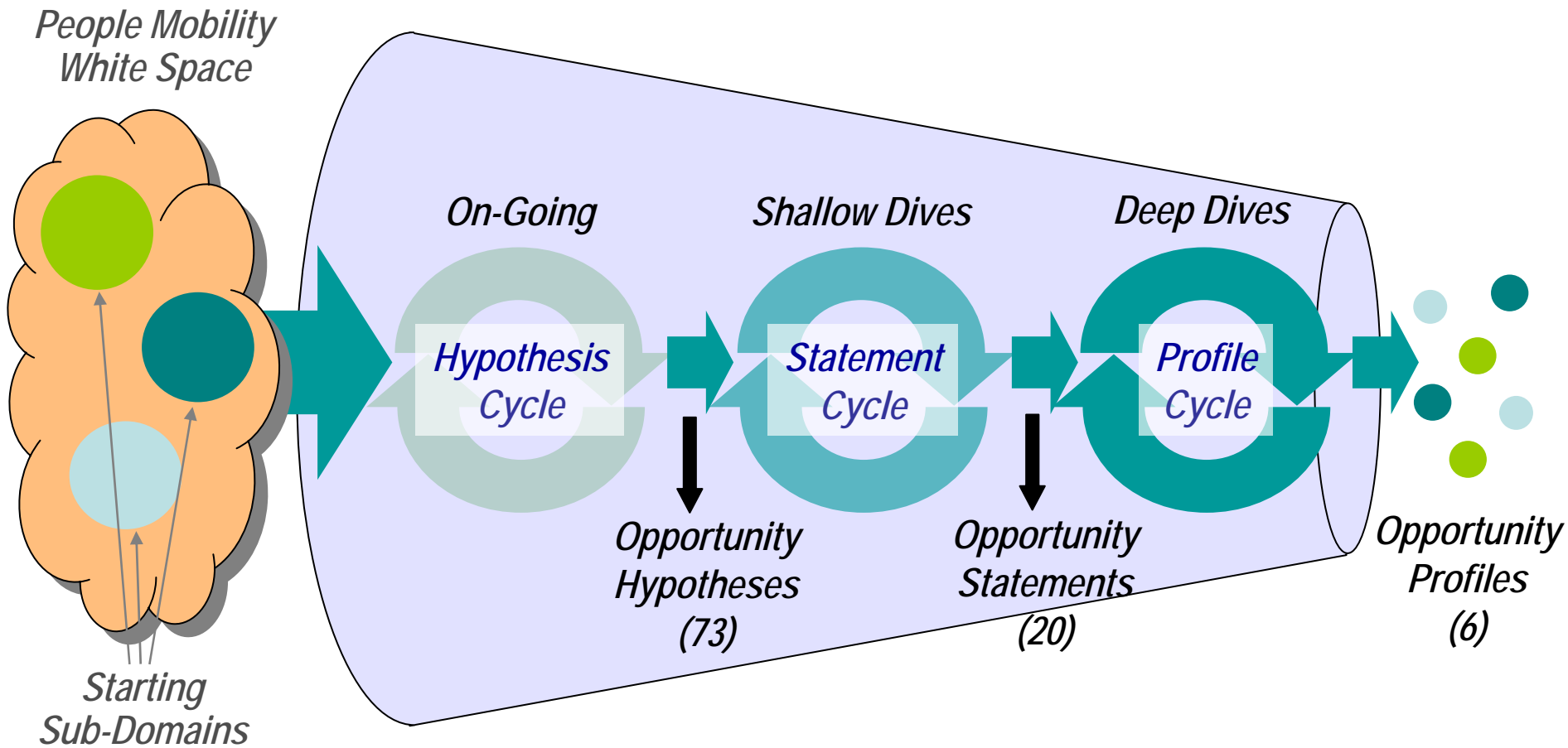
*Opportunity Profiles*  
*Clearly Defined Market  
Needs With Potential  
Solution Concepts*

*Solution Concepts*  
*Design Concepts With  
Business Cases Ready  
for Prototyping and/or  
Market Experimentation*

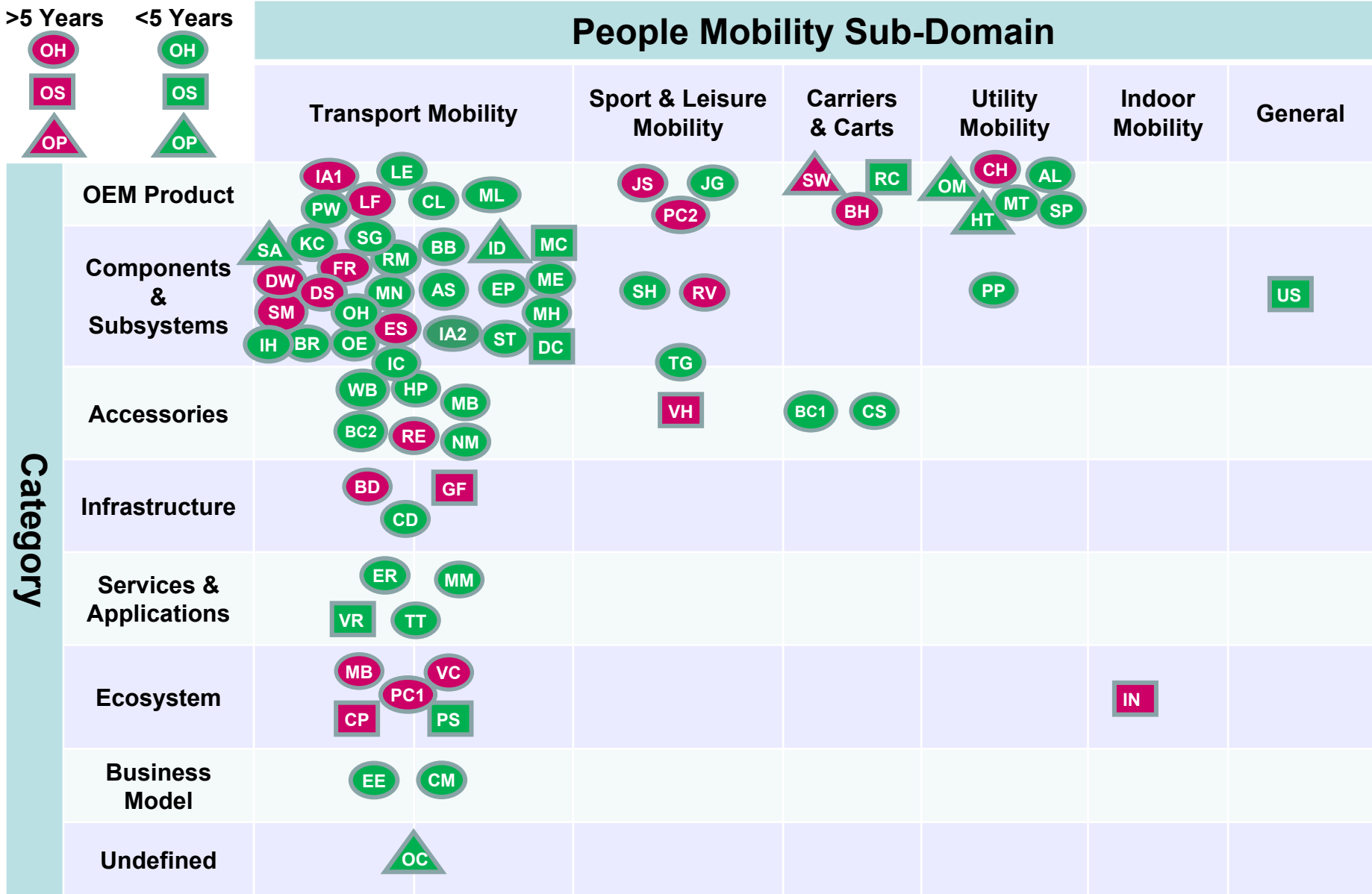


# We Generated Six Opportunity Profiles for Further Exploration in the Opportunity Assessment Phase

## Stage 1: Opportunity Discovery Process<sup>(1)</sup>



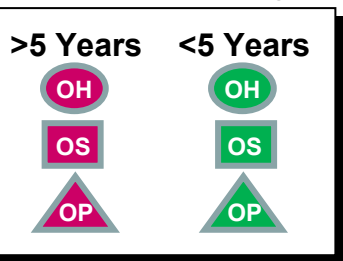
# We Identified a Total of 73 Opportunity Hypotheses That Passed the First Level Screen



# More Than 3/4 of the Opportunities Aim Toward New Product Categories and/or New Distribution Channels

## New Products/New Channels Innovation Matrix

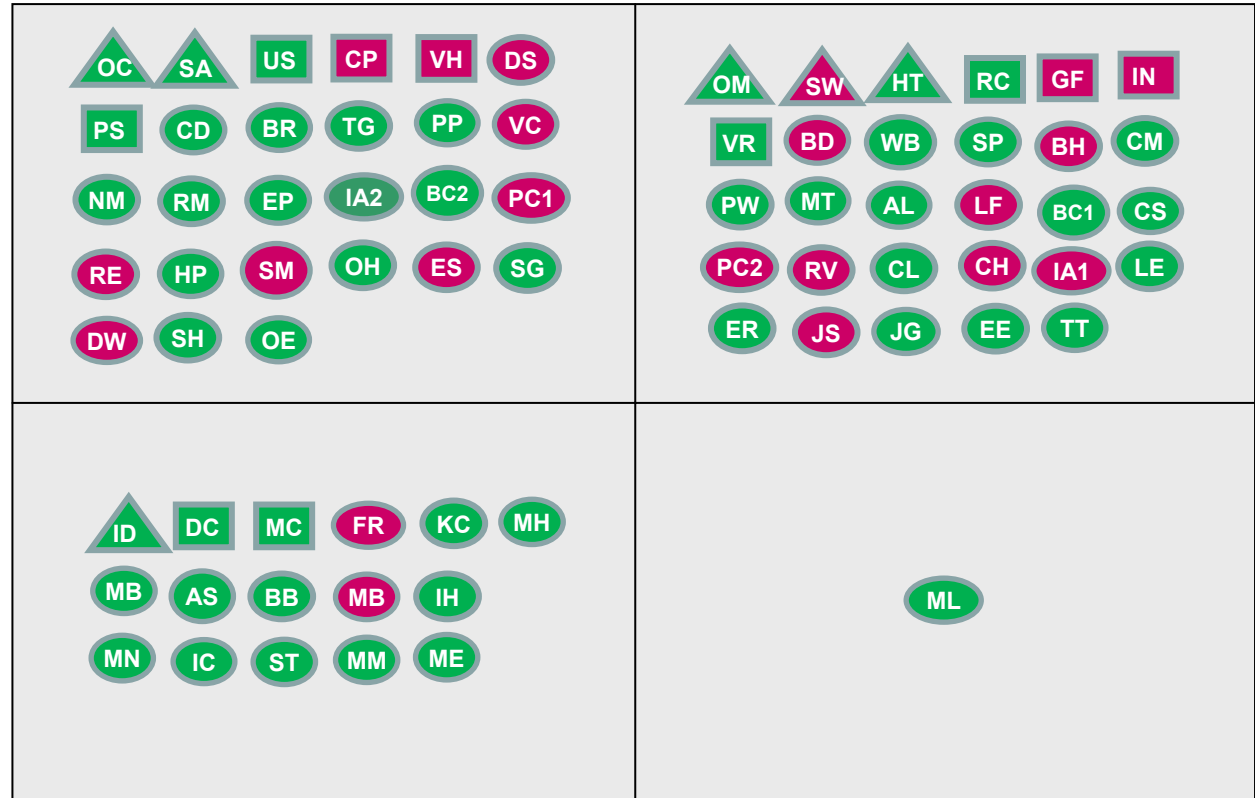
### Reference Key



New

Product Categories

Current



Current  
(auto OEMs)

Channels

New

# Opportunity Profile #1: Daily Commuting

## Evidence of Need

- 91 million people in the U.S. drive to work alone each day
- These daily trips are time-consuming, unproductive, costly, stressful, uncomfortable, unsafe, and eco-unfriendly
- Average commuter spends more than 200 hours each year commuting to and from work
- Rear-end collisions represent 1/3 of all reported accidents; in 50% of these, the offending driver does not touch the brake before impact



## Scenarios

- Solo commuter
- Ride sharer
- Mass transit rider
- Pedestrian
- Employer of commuters
- Public administrator

## Outcomes

### Increase

- Mental/physical health
- Workforce productivity

### Minimize

- No./impact of accidents
- Hours spent commuting
- Adverse enviro impact

## Experiences

### Enhance

- Physical safety and comfort
- Flexibility in use of time
- Enjoyment of commuting time

### Moderate

- Mental burden
- Fear, uncertainty and doubt

# Opportunity Profile #2: Outdoor Maintenance Assistance

## Evidence of Need

- Every year, nearly 80,000 Americans require hospital treatment for injuries caused by lawn mowers
- 80 to 100 million gas-powered lawn mowers in U.S. produce pollution equivalent to 3.5 million new cars
- America's ladder industry generates in excess of \$850 million in sales annually
- Ladder accidents send more than 200,000 people to emergency rooms each year; more than 300 people die



## Scenarios

- Mow lawn, edge sidewalk, whack weeds
- Till garden
- Spread mulch or ground cover
- Sweep sidewalk/drive
- Blow/rake leaves
- Snow blow, push, or shovel
- Fertilize lawn
- Spray herbicides/insecticides
- Wash windows
- Paint house exterior
- Transport items (tools, plants, etc.)
- Clean car (wash, vacuum, etc.)

## Outcomes

### Increase

- Free leisure/work/family time
- Productivity & efficiency
- Useable space in garage, shed

### Minimize

- Time & effort required
- Economic cost
- Noise pollution/hearing loss
- Adverse environmental impact

## Experiences

### Enhance

- Time flexibility
- Convenience
- Enjoyment of outdoor time
- Sense of eco-friendliness

### Moderate

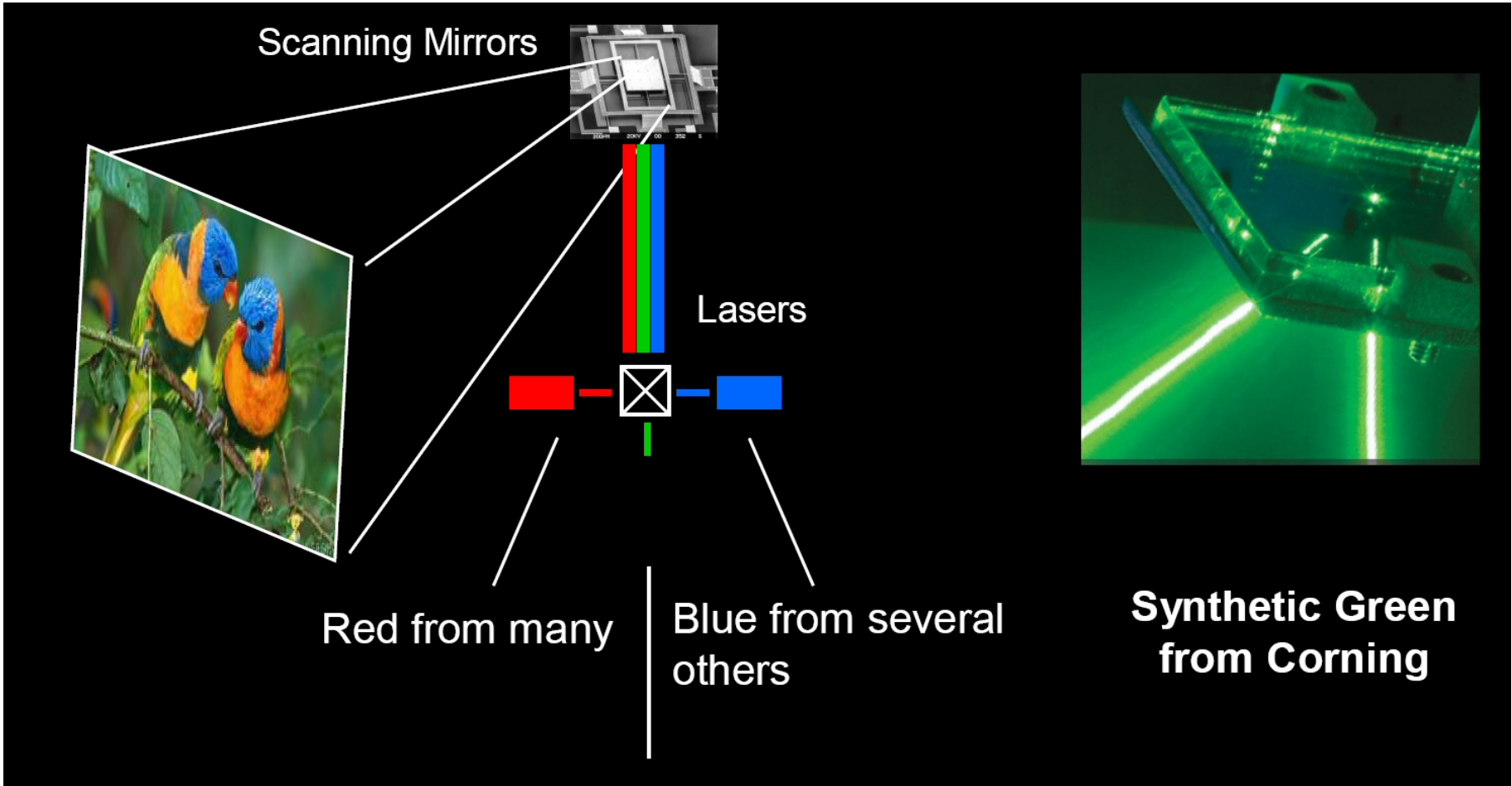
- Physical burden
- Mental burden regarding service/repair issues

# **Case Study**

## **Corning Inc.**

# Finding an Outlet for a Breakthrough Technology

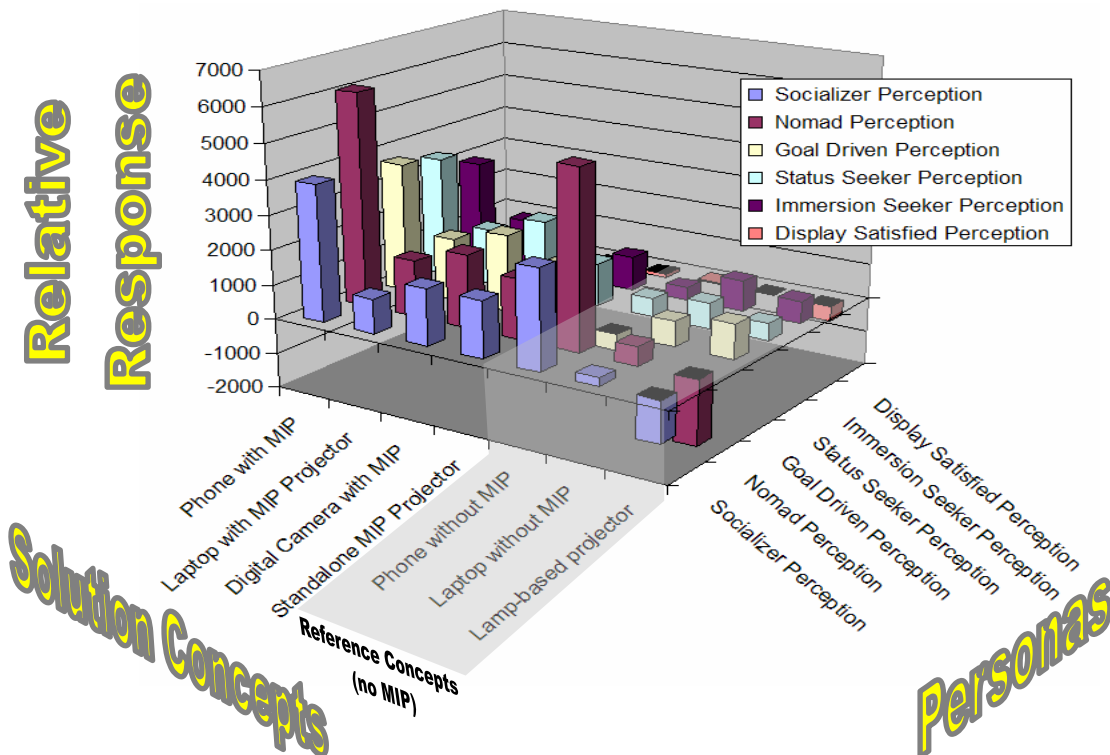
## Corning Solved the Synthetic Green Laser Problem



# Understanding Which Customers of Which Products Will Generate the Greatest Market Impact

The desire was to find the right product and customer segment

- What is the right product application?
- Which technology effects are most desired?
- Which customers most desire them?
- Who are the right partners?



The research objectives:

- Understand the personas in the domain and how they think
- Model their thinking (in software)
- Test many product ideas for insight and planning

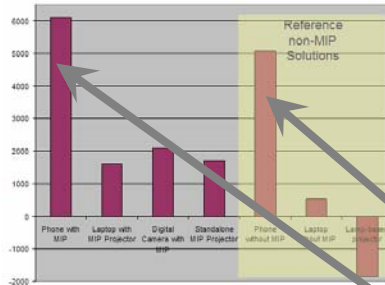
# The Result and Insight

**Not all customers think alike** – Compare their predicted response

## Persona A



← Product Ideas →

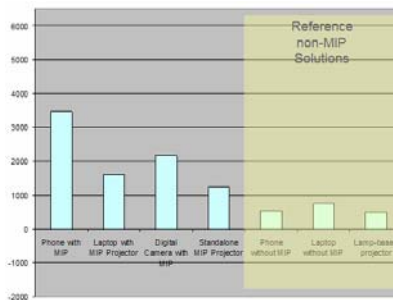


Some are **impressed**

Sound familiar?

All product roll outs are like this...but it's good to know **who, what and why** in advance

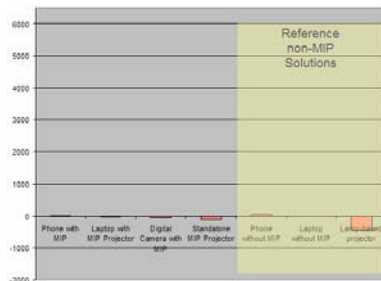
## Persona B



Some are **lukewarm**

And some product options are true delighters!

## Persona C



Some could **care less**

# The Lessons

1. It is **Outcomes** and **Experiences** that are desired, not features
2. People are customers only after the sale – beforehand they are **Personas** that can be modeled
3. Not all Personas think alike...knowing how personas think and choose is the only way to make decisions about products that don't yet exist

# Closing Comments

- A robust front-end innovation process is critical to an effective new product development program
- It is possible to improve the effectiveness of the front-end process...it need not be left to random creativity and good fortune

***Thank You!***

# We are In the Age of Innovation

*Driven By the Convergence of Two Major Complementary Economic Forces... One Societal and One Technological*

